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Master's degree programme	International Economics

GRADUATION THESIS
on
Optimization of Sino-Russian trade structure

Master's degree student _____ Zhang Shuyuan
signature, date

Academic adviser _____ Vasin S. M.
signature, date

Compliance supervisor _____ Vlazneva S.A.
signature, date

Reviewer Bondarenko V.V.
Doctor of Economic Sciences, Director of the Penza Branch of the Financial University under the Government of the Russian Federation
_____
signature, date

The thesis was approved for defence (record of the department meeting dated _____ no._____)

Head of the Department _____ Rozhkova L.V.
signature, date

The thesis was defended and marked _____ (record of the State Examination Board dated _____ no.____)

Secretary of the SEB _____ Rasskazova N. V.
signature, date

Penza, 2021

FSBEI HE Penza State University
Institute of Economics and Administration
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Master's degree programme International Economics

APPROVED BY:
Head of the Department
Doctor of Social Sciences,
Associate Professor
Rozhkova L.V.

_____
«_____»_____20___

ASSIGNMENT
FOR THE GRADUATION THESIS OF

Master's degree student Zhang Shuyuan, group 19ЭЭм(а)3, full-time mode of study

1 The topic of the graduation thesis: «Optimization of Sino-Russian trade structure» was approved by the university order
dated «___»_____20__ no. _____

2 The deadline for the Master's degree student to complete the graduation thesis is 11.06.2021.

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 influencing factors of the development of Sino-Russian trade, overview of the development of Sino-Russian trade, empirical analysis of Sino-Russian trade structure, suggestions on the optimization of Sino-Russian trade structure.

5 The list of visuals contains tables and figures.

6 The date of setting the assignment is 29.11.2019.

Academic adviser _____/ Vasin S. M. /
(signature) (full name)

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

Schedule for completing the graduation thesis

No.	Content of the thesis	Deadline for completion	Due date, signature of the academic adviser
First year of study			
1	Analysis of scientific literature, choice and updating of the research topic	01.09.2019 – 28.11.2019	
2	Framing the scientific concept of research	29.11.2019 – 12.01.2020	
3	Devising the detailed plan of the first chapter and draft of the thesis	13.01.2020 – 23.02.2020	
4	Conducting theoretical research within the first chapter of the thesis	24.02.2020– 30.04.2020	
5	Preparing the first chapter of the thesis	1.05.2020– 30.06.2020	
Second year of study			
6	Collection of statistical data and material for the thesis	01.09.2020 – 30.09.2020	
7	Studying new literature sources within the topic of the thesis	01.10.2020 – 31.10.2020	
8	Conducting research within the first and the second chapters of the thesis	01.11.2020 – 31.12.2020	
9	Preparing the second chapter of the thesis	1.01.2021 – 1.03.2021	
10	Preparing the third chapter of the thesis	2.03.2021 – 2.05.2021	
11	Preparing the introduction and conclusion	3.05.2021 – 16.05.2021	
12	Completing the graduation thesis	17.05.2021 – 30.05.2021	
13	Handing in the thesis for compliance control and antiplagiat	31.05.2021 – 9.06.2021	
14	Getting acquainted with the feedback and review	10.06.2021	
15	Presenting the written thesis	11.06.2021	

Academic adviser _____ / Vasin S. M. /
(signature) (full name)

The assignment was accepted by Master's degree student _____ / Zhang Shuyuan /
(signature) (full name)

Summary

The graduation thesis comprises 81 pages, 3 chapters, 15 figures, 15 tables, 60 sources.

RUSSIA, CHINA, TRADE COOPERATION, EXPORT, IMPORT, INVESTMENT COOPERATION, BELT AND ROAD

The object of this research is international bilateral economic relations.

The goal of the research is to study problems and prospects of Russia and China economic relation development.

The methodological framework of the paper is formed by system approach, analysis and synthesis, statistical and comparative methods. To display identified economic dependencies graphical method was applied.

The results of research include: economic development of China and Russia was studied; favorable factors for the smooth development of Sino-Russian economic relations were identified; problems and reasons in the economic development of China and Russia were analysed; import and export of goods between countries was analysed; mutual investments between the two countries were identified; Sino-Russian economic cooperation under the Belt and Road was examined; recommendations to improve economic relationship between China and Russia were given.

The novelty of work is trends, prospects for the development of trade cooperation of the countries and suggestions on optimization of trade structure are revealed.

The results of the research can be used in the teaching of educational disciplines «World Economy», «International Economic Relations», «International Trade».

The theoretical significance of the research is that the conclusions made in the thesis form the basis for further research of the trade and economic cooperation of the countries.

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Introduction

China and Russia are important emerging economies in the world. In recent years, the relationship between China and Russia has been developing rapidly, and the speed of bilateral economic and trade development has been accelerating.

Affected by overall changes in the international situation, the trade between China and Russia has been growing continuously in the past three years. In 2020, the bilateral trade volume between China and Russia has reached 701.5 billion.

However, the expanding bilateral trade has not significantly improved trade mix between China and Russia. The low added value of Sino-Russian foreign trade, the low level of intra-industry trade and the unreasonable trade structure are caused by many reasons.

In view of factors that affect the structure of foreign trade of a country, many scholars in the world have done a lot of work and made some great achievements.

Ostrovsky (2002) studied the current trade situation between China and Russia and concluded the level of mutual FDI between China and Russia was low and trade scale was not large. The solution is to achieve economic integration between Russia and Asia-Pacific region in order to promote the expansion.

Lu Haiyue (2011) made a detailed analysis of the different characteristics of the industrial structures between China and Russia, believed there were the following problems in Sino-Russian trade: trade mode was not standardized, the international competitiveness of commodities was not strong; Small amount of investment, single way of investment. The following countermeasures are put forward: the government should give the scientific guidance, enhance the innovation ability and strengthen the cooperation among enterprises.

Guan Xiuli (2012) found through research that the trade cooperation between China and Russia lags behind the political relations between the two countries. China and Russia should take advantage of their friendship to shift the structure of Sino-Russian trade to «capital-technology-intensive» trade. In terms of specific measures,

they can strengthen investment cooperation, carry out high-tech cooperation, finance, transportation and other aspects of cooperation.

The object of this research is international bilateral economic relations. The subject of this thesis is current state, problems and prospects of China and Russia trade relation.

This master thesis aims to analyze the current situation of Sino-Russian trade structure by the sorting out relevant data, provide reasonable optimization suggestions for the overall development of Sino-Russian trade. In order to achieve this goal we need to complete the following tasks:

– to overview the features and the influencing factors of Sino-Russian trade;

– to analyze the trade structure between China and Russia;

– to study the problems existing in the trade structure between China and Russia;

– to give suggestions on the optimization of Sino-Russian trade structure.

The present study is based on comparative advantage theory (the theory of comparative advantage holds that international trade is based on the relative differences in labor productivity); Heckscher-Olin theory (the theory holds that a country should export products with abundant factors of production and import products with scarce factors of production).

The following research methods used in this paper are to analyze the current situation of Sino-Russian trade structure. In this master thesis the analysis of trade structure mainly involves empirical analysis which includes:

– the revealing comparative advantage index (RAC). RAC means to exclude import comparative advantage from export comparative advantage of a certain industry in a country;

– the trade complementarity index (TCI). TCI measures trade complementarity between two countries by calculating the degree of the coincidence between the imports of a country and exports of a partner country.

Based on the research methods of literature research, quantitative analysis, and based on relevant theories of international trade theory and regional cooperation theory, this work develops current situation of Sino-Russian economic and trade

cooperation and the new situation and new opportunities it faces. A more comprehensive and systematic analysis was carried out. On this basis, it analyzes the current situation of economic and trade cooperation between China and Russia, and puts forward countermeasures and suggestions to promote the development of trade structure between the two countries.

The novelty of work is trends, prospects for the development of trade cooperation of the countries and suggestions on optimization of trade structure are revealed.

The theoretical and practical significance of the research is that the conclusions made in the thesis form the basis for further research of the trade cooperation of the countries. The results of the research can be used in the teaching of educational disciplines «World Economy», «International Economic Relations», «International Trade».

The master thesis structure is determined by the purpose and tasks decided in the work. It includes introduction, three main parts, conclusion and references.

Chapter 1 The development process and history of Sino-Russian trade

1.1 The history and feature of Sino-Russian trade

China and Russia have vast territory, rich resources, mutual political trust and long trade ties. The third Sino-Russian Joint Statement signed by China and Russia in Beijing in 1996 formally established the «strategic cooperative partnership» between the two countries [21, p. 22].

The structure of the foreign trade commodity refers to the share of import and export trade of various kinds of imported and exported goods in a certain period of time. The structure of foreign trade in a broad sense includes the structure of foreign trade commodities, the structure of foreign trade mode, the structure of foreign trade mode, and the regional structure of foreign trade. The structure of the foreign trade in a narrow sense is the structure of foreign trade commodities.

1 The connotation and main content of the optimization of trade structure.

The optimization of the so-called structure of foreign trade is mainly the stage and level reached in process of the evolution of a country's foreign trade according to the history and logical sequence of economic development. It refers to the process of gradual rationalization, advanced trade structure, is a dynamic development process.

The optimization content of foreign trade structure mainly includes:

1) From the point of view of industrial structure optimization, the process of trade structure optimization is the advantage of the second and third industries in the trade structure, gradually replacing the primary industry process.

2) From the point of view of the composition of industrial technology content, the optimization of the trade structure is the process of expanding the share of capital, technology-intensive industries in the overall trade structure, and the share of labor-intensive industries in the overall trade structure is gradually shrinking.

3) From the point of view of structure of trade commodities, the optimization of trade structure is the historical evolution process in which primary products have an advantage to the manufactured goods. From the stage and the process of economic

development in all countries of the world, the faster, higher economic development of a country, the faster the optimization and upgrading of its industrial structure, and the faster the process of optimizing the trade structure.

In addition to dealing with the above 3 aspects of trade structure optimization, but also from the overall grasp of the internal links between the various parts of the trade structure, combined with the current development trend of international trade and the actual development of the country or the region, from grasping the main line of trade commodity structure, to solve for whom to produce, how much, what kind of foreign trade goods, and foreign trade commodities in what way to exchange issues, correctly handle the role of the various parts in the trade structure [1, p. 27].

In the process of handling the optimization of the trade structure, we should adhere to the concept of people-oriented, sustainable development, pay attention to combination of economic trade development, people's welfare, economic development and environmental carrying capacity of sustainable green foreign trade, so as to speed up the pace of economic progress of a country or region, to achieve the improvement of the quality of life, ecological environment, resources and healthy development.

2 The three-stage path of trade structure optimization.

Different trade theories provide different theoretical basis for the optimization of trade structure. The driving force of trade development under different theoretical models comes from different aspects, the traditional trade theory holds that the main driving force of trade development comes from the comparative advantage of factor endowment, new trade theory holds that the main driving force of trade development comes from economies of scale or the increasing compensation of scale, and Porter's theory of competitive advantage takes competitive advantage as the main driving force of trade development. The driving force of trade development under different theoretical models comes from different aspects, the traditional trade theory holds the main driving force of trade development comes from comparative advantage of the factor endowment, the new trade theory holds that the main driving force of the trade development comes from economies of increasing compensation of scale, Porter's

theory of competitive advantage takes competitive advantage as main driving force of the trade development. Taking the trade development route of developed countries, developing countries summarize three-stage path of optimization by combining the theory of trade structure optimization, in which the level of trade development and development momentum are different at each stage.

1) The comparative advantage of natural endowment is the main driving force of trade development.

In the first stage, the main driving force of trade development comes from the comparative advantage of natural endowment. Under condition of resource constraint, in order to realize optimization and upgrading of trade structure, we must improve the efficiency of resource use and realize the optimal allocation of resources. Developing countries, owing to lack of adequate financial resources and advanced science and technology, have a comparative disadvantage in the production of capital-intensive products, trade structures are based on comparative advantages of resources or labour, such as primary or labour-intensive products [1, p. 29].

2) Advanced comparative advantage is the main driving force for optimization of trade structure.

In the second stage, the main driving force of the trade structure optimization comes from the advanced comparative advantage, that is, to view the dynamic change of advantage from the perspective of development, the optimization of trade structure is realized by seeking economies of the scale effect. The advanced of the comparative advantage is mainly manifested in two aspects: on the one hand, it refers to the rise of comparative advantage from natural endowments such as resources to endowments of science and technology, knowledge transformation and marketing management, and on the other hand, it refers to substantial transformation of the content of factor endowment from basic elements to advanced elements [1, p. 30].

3) Competitive advantage becomes the main driving force for the optimization of trade structure.

In the third stage, the main driving force of trade structure optimization comes from competitive advantage. Economies of scale, scientific and technological

strength and innovation ability are the three main manifestations of competitive advantage. Developing countries should adjust trade strategies, focus on competitive advantage strategies, supplement them with strategic trade policies, take the improvement of innovation ability and technological progress as the main driving force, promote the optimization and upgrading of industrial structure, and comprehensively improve the market competitiveness of their products. Competitive advantage can be based on some of the country's comparative advantages are not obvious or lack of industrial sectors and enterprises, the use of «dry middle school» and reference to the advanced model, through the continuous improvement to form a development model with the technological advantages and scale effects [26, p.19].

Trade is a kind of commercial activity between countries and nations to meet production and living needs of people, promote economic and social development, obtain production and living materials through exchange of goods and commodities, and improve economic and social benefits.

The Ancient Silk Road carried Chinese goods to Europe, Africa and West Asian countries, opening a window for people around the world to know about China. In the middle of the seventeenth century, Russian footprints had also been along the coast of the Arctic Ocean eastward into the Pacific Northwest and North America, Alaska and Siberia east of Lake Baikal. Since then, the trade between China and Russia has gradually developed into a commodity exchange for the purpose of obtaining high profits in original exchange of production and living materials, which has injected a steady stream of endogenous power for enhancing the understanding and friendship between the Chinese and Russian people in historical process of more than 300 years.

1 The history of trade between China and Russia.

According to the data released by the Ministry of Commerce, the trade between China and Russia has gone through four stages since 1992.

The first stage (1992–1993) is the stage after the collapse of the Soviet Union, in which trade between China and Russia takes government agreement trade and the barter trade between enterprises as the main mode.

The second stage (1994–1996) is the transition from the bilateral trade mode to spot exchange trade and the decline of the trade scale. The main reason is that China neglects the quality of export products, resulting in the decline of credit.

The third stage (1997–1998) is the continuous decline of bilateral trade volume, is mainly due to the impact of Asian financial crisis and Russian domestic crisis.

The fourth stage (1999 till now) is the recovery stage of the bilateral trade. In 2014 and 2015, due to downturn in global economic situation, structural reforms faced by all countries, western economic sanctions faced by Russia, the IMF lowered the global trade growth rate, correspondingly trade volume between China and Russia declined for two consecutive years [38, p.13].

2 Features of Sino-Russian trade.

China and Russia have enjoyed sound political relations and a comprehensive strategic partnership of the coordination. In recent years, the bilateral economic and trade development has maintained a sound momentum and trade relations have been continuously strengthened.

1) Obvious complementarity of bilateral products.

Among all kinds of the products exported by China to Russia, the mechanical equipment products are the most, and other miscellaneous and chemical products are also more. China's imports from Russia are mainly primary products such as fossil fuel, wine oil, etc., and the two countries' exports are obviously complementary.

2) The differences between the import and export markets are obvious.

The trade between China and Russia has been basically in a state of China's trade deficit for a long time. Unless Russia's demand for industrial products is large in a few years, China rarely has a surplus.

3) Bilateral trade in services has become a new growth point.

With the rapid development of the bilateral trade in goods between China and Russia, the scale of service trade is gradually expanding, the scope of service trade is also gradually expanding. Besides, the two countries have signed relevant agreements in the fields of power transmission, communication services and financial services, and service trade is gradually becoming a new growth point of trade [1, p. 35].

3 The status of Sino-Russian trade in the international arena.

Gao Feng, spokesman for the Ministry of Commerce, said at the regular press conference late last year 2020 could be a «fruitful year» for China-Russia economic and trade cooperation. Under the strategic guidance and personal promotion of the two heads of state, China-Russia economic and trade cooperation has achieved new breakthroughs in both scale and quality. At present, the growth of China-Russia trade ranks first.

1.2 Influencing factors of the development of Sino-Russian trade

China and Russia are each other's largest neighbors. The relationship between the two countries is the most important and exemplary set of bilateral relations in the world today. The report takes the development of import and export trade between China and Russia as the entry point, and through the establishment of a quantifiable index system, accurately reflects the national and regional trade with Russia in an all-round and multi-level way, and scientifically monitors the development level and trend of bilateral trade.

The relationship between China and Russia occupies a special place in major-country diplomacy with the Chinese characteristics. It serves as a model of the stable, healthy and mature state-to-state relations. It is an important force for maintaining world peace, stability and promoting the building of an open world economy. China stressed that China and Russia are comprehensive strategic partners of coordination who stand side by side through thick and thin. China is ready to work with Russia to plan for the next development of bilateral relations and usher them into a new era.

China and Russia are good neighbors, good partners and good friends to each other. The China-Russia comprehensive strategic partnership of coordination is based on solid foundation, rich in content and of great significance.

Over the past five years, China-Russia political mutual trust has reached a new high. The heads of state of China and Russia have held more than 20 meetings on bilateral and multilateral occasions, charting the course for the future development of

bilateral relations. China-Russia relations featuring equality, trust, mutual support, common prosperity and friendship from generation to generation have maintained a high level of performance.

New breakthroughs have been made in China-Russia practical cooperation. The two sides have made full use of the cooperation mechanisms between governments and enterprises in various fields to tap their complementary strengths and cooperation potential. The bilateral trade structure has been continuously improved, the stock of investment has grown steadily, and cooperation on major strategic projects in energy, nuclear energy, aerospace and infrastructure has deepened. New growth areas, such as trade in agricultural products, cross-border e-commerce, small and medium-sized enterprises, finance and high-tech cooperation, are being explored. China and Russia have also conducted active discussions on Arctic development, digital economy and cooperation in the Far East, fully tapping the potential of cooperation between small and medium-sized enterprises, upgrading China-Russia practical cooperation.

In recent years, Sino-Russian trade cooperation has steadily expanded in scale, improved in quality and reached a new level. It has become omni-directional, deep-rooted and wide-ranging. China has been Russia's largest trading partner for 11 years in a row, while Russia has been China's 10th largest trading partner.

Data according to the Ministry of Commerce, China will continue to collaborate with the Russian side, next to fully implement the important consensus between the two heads of state, deepen strategic project cooperation, expand mutual investment, promote industrial chain integration of the supply chain, build the scientific and the technological innovation, biological medicine, green low carbon, promote economic and trade relations between China and Russia to accelerate the quality upgrading, We will move closer to the target of 200 billion dollars in bilateral trade [38, p.12].

The trade volume between China and Russia exceeded 100 billion dollars for three consecutive years from 2018 to 2020. Bilateral trade between China and Russia from January to April 2021 reached 40.21 billion dollars, exceeding 40 billion dollars for the first time in the first four months, increasing by 21.2 % compared with the

same period in 2019. In 2021, China-Russia trade is expected to maintain its momentum of growth, and the volume of trade is expected to hit a new high [34].

The establishment of the relationship between China and Russia has not only consolidated the bilateral cooperative relations, but also created a favorable political environment for bilateral economic and trade cooperation.

1 The driving force of the development of Sino-Russian trade.

The development of Sino-Russian trade is supported by some driving forces.

1) Location factors. China and Russia have more than 4300 kilometers of the land borders. China and Russia, as neighboring economic powers in geographical location, have obvious geographical advantages, and they have the complementary advantages in factors of production, industrial structure, product import and export structure. Therefore, the two countries have a favorable conditions and the huge advantages to carry out their bilateral trade [47].

2) Historical factors. China and Russia have a profound traditional friendship. The settlement of the border issue between China and Russia has promoted the development of the bilateral relations between the two countries, and the establishment of mechanism of regular leaders' meetings has enhanced mutual understanding between the two government.

3) Political factors. In recent years, China and Russia have an established strategic partnership and signed different kinds of the economic cooperation treaties, laying a certain political foundation for the trade cooperation between these two countries. And Russia is an important pivot country along China’s «Belt and Road» initiative. The close political ties laid the foundation for the cooperative development of its trade [48].

4) Policy factors. At the beginning of the 21st century, Chinese government released the strategy of «going out». And in 2013, China put forward strategy of «Belt and Road», which provided an opportunity for the Sino-Russian trade development. Under the impetus of this strategy, bilateral trade between China and

Russia will be supported by more policies, funds and investment projects of the two governments [48].

2 Resistance to the development of Sino-Russian trade.

The trade between China and Russia is developing rapidly, but now trade order is still in disorder, such as «non-tariff barriers», «tariff barriers», «black areas» in trade, many other issues hinder the development of trade between the two countries.

1) The political and cultural foundation of Sino-Russian trade is weak. Russia's political environment is relatively volatile affecting economic stability. Since Putin came to power, Russia's political environment has been relatively stable in general, but it still experiences a lot of turbulence. Cultural differences also hinder the development of bilateral trade between China and Russia. The Chinese generally pay attention to the overall thinking, from the overall situation, analyzing relevant details; Russians, on the contrary, firstly considering details, pay more attention to empirical analysis. Meanwhile, the difference of thinking causes misunderstanding of relevant legal provisions, which is extremely unfavorable for the Chinese to carry out trade activities in Russia.

2) The problem of «grey customs clearance». In fact, «grey customs clearance» violates the international trade practice. Since both China and Russia have used «grey customs clearance» to obtain benefits, some Russian customs clearance companies have a large number of powerful departments and the exports to rely on. They can attract a large number of Chinese exporters at a lower price. On the contrary, the goods imported and the goods exported according to the golden procedures are difficult to complete customs clearance [43, p. 7].

3) Lack of a supporting trade service system. The international transportation between China and Russia is relatively weak; There are many difficulties in trade settlement. The development of trade can not be separated from the financing. There are many disadvantages in the Russian banking system. The freedom of deposit and withdrawal is limited, which seriously restricts the development of trade.

4) Lack of compound talents. The degree of trade system fit is low. In terms of technical barriers, many of Russia's products are higher than China's, China's

mechanical and electrical products, food, light textile products and other advantageous products are lower than Russia's, which is very unfavorable to China's export. In terms of the tariff barriers, Russia has very high tariff barriers. For imported goods, Russia generally imposes high tariffs, especially for all kinds of bulk products imported from China.

Chapter 2 The status quo of Sino-Russian trade structure

2.1 Overview of the development of Sino-Russian trade

After a brief introduction, this chapter aims to analyze the current situation of Sino-Russian trade development and the empirical analysis of its trade structure. In the last section of this chapter, the problems and shortcomings existing in the trade structure of Sino-Russian will be systematically sorted out, so as to put forward some effective and practical countermeasures in the last chapter.

In recent years, China and Russia have strengthened their cooperation, signing cooperation agreements such as China-Russia Development Plan for Cooperation in the Far East, Agricultural Cooperation in the Northeast and the Far East. The scale and quality of bilateral economic and trade cooperation of Sino-Russian have been steadily expanded [40, p. 31].

1 Total volume of trade. The so-called «bilateral trade» refers to trade between two countries or regions. «Bilateral trade volume» refers to the total volume of trade between two countries or regions. In general, the closer the distance, the more frequent and relatively more trade between countries. The bigger the country, the more trade it does. International trade volume, also known as the value of international trade, is the index reflects the scale of world trade within a certain period of time expressed with currency, it is the sum total of export trade volume of all countries in the world within a certain period.

At the beginning of Russian independence, there was a shortage of domestic goods, so a large number of Chinese goods were exported to Russia. China-Russia trade is growing rapidly. In 1993, China's export to Russia grew by 15.0 %.The growth rate of China's imports from Russia reached 41.8 %.As Russia adjusted its trade policy in 1994, the growth rate of China's exports to Russia fell to -33.9 %, while the growth rate of China's imports from Russia fell to -29.9 %. In the following years, the trade increased steadily. In 1998, the outbreak of the Southeast Asian

financial crisis affected Sino-Russian trade to 5.48 billion dollars. By 2000,Sino-Russian trade recovered gradually, developed rapidly and achieved gratifying results.

In 2001, the total volume of Sino-Russian trade exceeded 10 billion dollars, in 2004, it exceeded 20 billion dollars. During this period, the growth rate of the trade was basically maintained at more than 20 %. This is due to a sharp rise in the price of oil and other energy sources, which has led to a sharp increase in China's imports from Russia. And Russia's economy also has a momentum of rapid development, leading to an increase in Russia's imports from China. The double growth of import and export volume will inevitably bring the rapid growth of Sino-Russian trade. In 2011, the bilateral trade between China and Russia reached 79.24 billion dollars, or nearly 80 billion dollars. The growth rate of Sino-Russian trade was 20.2 % higher than the overall growth rate of China's foreign trade. Russia has also become China's eighth-largest trading partner [53, p. 73].

According to statistics, the total volume of trade between China and Russia in 2012 was 88.19 billion dollars, with an increase of 11.3 %. Russian export to China was 44.13 billion dollars, up by 9.4 %. Russia's imports from China rose 13.2 % to 4.46 billion dollars. From the perspective of trade balance, China's trade deficit increased year by year from 1992 to 2001, from 1.18 billion dollars in 1992 to 5.25 dollars billion in 2001. From 2002 to 2008, China's deficit narrowed year by year. In 2007–2008, due to the impact of the financial crisis, China still had a surplus. From 2009 to 2012, the trade balance rose and fell, but on the whole, China's trade deficit shrank year by year. According to Russian customs statistics, the total volume of China-Russia trade in goods was 68.33 billion dollars in 2013, down 9.0 %. Among them, Russia's export trade to China was 16.64 billion dollars, down by 30.8 %. Russia's exports to China account for 5.7 % of its total exports; Russia's imports from China rose 1.3 % to 51.69 billion dollars. Russian import trade from China accounts for 18.0 % of Russian total imports. In 2013, Russia had a deficit of 35.05 billion dollars, an increase of 29.8 %. It can be seen that the trade between China and Russia is growing, but import, export and balance of trade fluctuate

greatly. To achieve the steady and rapid development of China-Russia trade, there is still room for improvement (table 2.1).

Table 2.1 – Total volume of Sino-Russian trade from 1992–2019 [4]

Date	Total volume (Mln dollars)	Growth rate (%)	Exports (Mln dollars)	Growth rate (%)	Imports (Mln dollars)	Growth rate (%)	Balance (Mln dollars)
1992	58.6	50.0	23.4	28.0	35.2	69.0	-11.8
1993	76.8	31.1	26.9	15.0	49.9	41.8	-23.0
1994	50.8	-33.9	15.8	-41.3	35.0	-29.9	-19.2
1995	54.6	7.5	16.6	5.1	38.0	8.6	-21.4
1996	68.4	25.3	16.9	1.8	51.5	35.5	-34.6
1997	61.2	-7.2	20.3	20.1	40.8	-20.8	-20.5
1998	54.8	-10.5	18.4	-9.4	36.4	-10.8	-18.0
1999	57.2	4.4	15.0	-18.5	42.2	15.9	-27.2
2000	80.0	39.9	22.3	48.7	57.7	36.7	-35.4
2001	106.7	33.4	27.1	21.5	79.6	38.0	-52.5
2002	119.3	11.8	35.2	29.9	84.1	5.7	-48.9
2003	157.6	32.1	60.3	71.3	97.3	15.7	-37.0
2004	212.2	34.6	90.0	49.3	121.2	24.6	-31.2
2005	291.0	37.1	132.1	46.8	158.9	31.0	-26.8
2006	333.8	14.7	158.3	19.8	175.5	10.4	-17.2
2007	481.6	44.3	284.9	80.0	196.7	12.1	88.2
2008	568.3	18.0	330.1	15.8	238.3	21.1	91.8
2009	387.9	-31.7	175.1	-46.9	212.8	-10.7	-37.7
2010	554.5	42.9	296.1	69.1	258.4	21.4	37.8
2011	792.4	42.9	389.1	31.4	403.4	56.1	-14.3
2012	881.9	11.3	440.6	13.2	441.3	9.4	-0.7
2013	892.1	1.6	166.4	-44.5	516.9	1.3	350.5
2014	952.8	6.8	375.1	125.4	508.9	-1.5	133.8
2015	680.7	-28.6	286.1	-23.7	349.5	-31.3	63.1
2016	695.3	2.1	280.2	-2.1	380.9	9.0	100.7
2017	840.7	20.9	389.2	38.9	480.4	26.1	91.2
2018	1070.6	27.3	560.8	441	560.8	16.7	38.8
2019	1107.6	3.5	567.9	1.3	541.3	-3.5	26.6

In 2018, China-Russia economic and trade cooperation «brewed» sweet results, as of the mid-December of that year, the trade volume between the two countries has exceeded 100 billion dollars, a record high. Under the strategic guidance and the personal promotion of the two heads of the state, Bilateral Economic And Trade Cooperation between China and Russia has achieved new breakthroughs in scale and quality.

Total volume of Sino-Russian trade is presented in figure 1.1.

Figure 2.1 –Total volume of Sino-Russian trade from 2012–2020, mln dollars [4]

The bilateral trade between China and Russia reached 107.06 billion dollars in 2018, surpassing 100 billion dollars for the first time, a record high of 27.1 %, ranking first among China's top 10 trading partners.

The main import and export of goods to Russia to mechanical and electrical products, imports from Russia mainly concentrated in crude oil, coal, sawn timber and other energy resources products. It can be seen that the total trade volume has shown an overall growth trend in the past 10 years, making China the largest trading partner of Russia. However, during this period, trade volume fell to 68.7 billion dollars in 2015 before recovering to 107.7 billion dollars in 2020.

2 The import and export of bilateral trade.

Balance of trade, also known as the net exports or trade balance, refers to the difference between the total value of a country's exports and the total value of its imports in a certain period of time.

It can be seen that from 2013 to 2019, Russia's import and export trade with China basically showed a trade deficit, but the gap is gradually narrowing. In 2018, Russia's trade balance with China peaked, realizing a trade surplus between Russia and China.

Table 2.2 shows the import and export of Russia to China from 2013–2019.

Table 2.2 – The import and export of Russia to China from 2013–2019 [5]

	2013	2014	2015	2016	2017	2018	2019
Russian exports (Mln dollars)	166.4	375.1	286.1	280.2	389.2	560.8	567.9
Growth rate (%)	-44.5	125.4	-23.7	-2.1	38.9	441	1.3
Russian imports (Mln dollars)	516.9	508.9	349.5	380.9	480.4	560.8	541.3
Growth rate (%)	1.3	-1.5	-31.3	9.0	26.1	16.7	-3.5
The balance (Mln dollars)	350.5	133.8	63.1	100.7	91.2	38.8	26.6

Figure 2.2 shows import and export of bilateral trade from 2013–2019.

Figure 2.2 – The import and export of bilateral trade from 2013–2019 [5]

From 2013 to 2019, the bilateral trade volume with China showed the fluctuating changes, mainly due to the impact of global trade environment, from Sino-Russian bilateral trade volume as a proportion of Russian total trade volume increased year by year, from 8.12 % in 2013 to 15.76 % in 2018, can be seen that the depth of bilateral trade between China and Russia has deepened year by year.

Looking back on 2019, complex international relations have entered a century-old dramatic change. In increasingly uncertain international situation, the interactive game of the great powers, China and Russia have made a rock-solid comprehensive strategic partnership of the cooperation between their old neighbors, moving steadily forward, entering a new era with a new era and achieving impressive results.

2.2 Macroscopic analysis of trade structure

This section will make a macro analysis of the import and export products of Sino-Russian trade structure based on the international trade standard classification and HS code.

1 Analysis of the Sino-Russian trade. According to International Trade Standard Classification, trade commodities can be divided into SITC0-SITC9 categories. For the convenience of the research, these ten categories of commodities are further classified: SITC0-SITC4 are primary products; SITC5-SITC8 are manufactured product. SITC5+SITC7 with manufactured goods are further classified as technology-intensive products; SITC6+SITC8 are classified as labor-intensive products. Considering the research needs of this paper, SITC9 will not be analyzed for the time being. This section mainly analyzes import and export volume of various products in China and Russia and proportions [39, p. 30].

1) Analysis of Russian exports to China. Russia's export pattern to the world is basically the same as its export pattern to China, with mineral products accounting for more than 60 % of its exports. This is mainly due to Russia's vast territory, the main mineral resources are coal, iron, peat, oil, natural gas, copper, manganese, zinc and so on.

The reserves in the world are as follows: the proven reserves of natural gas are 48 trillion cubic meters, accounting for 21 % of the world's total, ranking first in the world. The proved oil reserves are 25.2 billion tons, accounting for 5 % of the world's total, and the coal reserves are 157 billion tons, ranking second in the world.

According to the latest data from China's Ministry of Commerce, China-Russia trade growth in 2018 ranks first among China's major trading partners, while China continues to be Russia's largest trading partner and Russia is China's 10th largest trading partner. Table 2.3 shows Russian exports to the world and to China in 2018.

Table 2.3 – Russian exports to the world and to China in 2018 [6]

Customs classification	H-S code	Commodity categories	Russian exports abroad in 2018		Russian exports to China in 2018	
			(Mln dollars)	100 (%)	(Mln dollars)	100 (%)
SITC5	25-27	Minerals	2419.64	62.7	427.13	77.2
SITC15	72-83	Base metals and products	450.25	11.7	13.39	2.4
SITC6	28-38	Chemical products	193.42	5.0	10.04	1.5
SITC16	84-85	Mechanical, electronic products	139.42	3.6	16.04	2.8
SITC2	06-14	Plant products	121.67	3.2	4.07	0.7
SITC14	71	Precious metals and products	100.90	2.6	0.44	0.1
SITC9	44-46	Wood and products	90.22	2.3	35.56	6.0
SITC7	39-40	Plastics, rubber	62.89	1.6	4.74	0.8
SITC1	01-05	Live animals, animal products	50.63	1.3	15.15	2.7
SITC10	47-49	Cellulose pulp	49.06	1.3	12.88	2.1
SITC4	16-24	Food, beverage, tobacco	48.99	1.3	2.34	0.3
SITC17	86-89	Transportation equipment	47.51	1.2	0.36	0.1
SITC3	15	Animal and vegetable oils	26.66	0.7	3.70	0.7
SITC18	90-92	Optics, medical equipment	17.54	0.5	1.89	0.2
SITC13	68-70	Ceramics, Glass	15.71	0.4	0.12	0.1
Others	/	Other products	24.45	0.6	13.02	2.3
Amount	/	The total amount	3859.34	100.0	560.80	100.0

In terms of commodities, the mineral products are main export commodities of Russia. In 2018, export volume was 241.96 billion dollars, up 36.3 %, accounting for 62.7 % of Russian total export volume.

Among them, export of mineral products are mainly fossil fuels, mineral oil and its products and asphalt, the export of 237.16 billion dollars, accounting for

52.7 % of Russia's total export. Mechanical and electrical products, chemical products and transportation equipment are the top three categories of Russian imports. In 2018, the imports were 73.42 billion dollars, 29.81 billion dollars and 25.63 billion dollars, up 31.9 %, 12.9 % and 11.1 % respectively, accounting for 55.9 % of Russian total imports.

According to the table 2.3, bilateral trade in goods between Russia and China reached 108.28 billion in 2018, up 24.5 %. Among them, Russia's exports to China reached 56.08 billion, up 44.1 %, accounting for 12.5 % of its total exports, up 1.6 %. Russia imported 52.2 billion from China, up 8.6 %, accounting for 22.0 % of its total imports, up 0.9 %. Russia's trade surplus with China was 3.87 billion, up 142.4 %.

Mineral products are a major part of Russian exports to China. In 2018, Russia exported 42.71 billion of the mineral products to China, up 61.9 %, accounting for 77.9 % of Russian total exports to China. Russian mineral exports to China are mainly fossil fuels, mineral oil and its products, asphalt. In 2018, Russia exported 41.22 billion, accounting for 73.5 % of its total exports to China.

2) Analysis of Russian imports from China. Russia's main imports from China are mechanical and electrical products. In 2018, Russia imported 26.45 billion of mechanical, electrical products from China, up 3.9 % and accounting for 50.7 % of Russian total imports from China.

China takes the first place in Russian import markets of 7 categories of goods, namely mechanical, electrical products, base metals and products, textiles and raw materials, furniture, toys and miscellaneous products, plastics, rubber, shoes, boots, umbrellas, optical watches and medical equipment. They accounted for 36.0 %, 23.8 %, 34.7 %, 47.9 %, 17.2 %, 53.9 % and 17.3 % of Russian total imports of similar goods, respectively.

Among them, Germany is China's biggest competitor in the export of the light industrial products, plastics and rubber, optical clocks and medical equipment to Russia. In Russia's transport equipment imports, products from China accounted for 8.6 % of the total, lower than Japan's 7.8 % and Germany's 6.6 %.

In recent years, Russia has further stepped up its efforts to promote the «look east» strategy, and hopes to actively integrate into the economic development of the Asia-Pacific region, the establishment of the Oriental Economic Forum is one of the important signs. In order to better achieve the strategic goal of «looking east» and to more effectively solve the long-standing «under exploitation» problem in Russia's Far East, promoting trade, investment and infrastructure cooperation with China in the region has become a priority for Russia. Table 2.4 shows Russian imports from the world and China in 2018.

Table 2.4 – Russian imports from the world and China in 2018 [7]

Customs classification	H-S code	Commodity categories	Russian imports From abroad in 2018		Russian imports from China in 2018	
			(Mln dollars)	100 (%)	(Mln dollars)	100 (%)
SITC16	84-85	Mechanical, electronic products	734	31.9	254.50	50.7
SITC6	28-38	Chemical products	298	12.9	28.49	5.5
SITC17	86-89	Transportation equipment	256	11.1	22.06	4.2
SITC15	72-83	Base metals and products	170	7.4	40.41	7.8
SITC7	39-40	Plant products	135	5.9	23.34	4.5
SITC2	06-14	Plastics, rubber	113	4.9	10.31	2.0
SITC11	50-63	Textiles and raw materials	111	4.8	38.66	7.4
SITC4	16-24	Food, beverage, tobacco	104	4.5	5.89	1.1
SITC18	90-92	Optics, medical equipment	72	3.1	12.38	2.4
SITC1	01-05	Live animals, animal products	65	2.8	2.69	0.5
SITC20	94-96	Furniture, toys and miscellaneous goods	61	2.6	29.04	5.6
SITC5	25-27	Minerals	48	2.1	/	/
SITC12	64-67	Shoes, boots and light industrial products	36	1.6	19.65	3.8
SITC10	47-49	Cellulose pulp	31	1.4	3.43	0.7
SITC13	68-70	Ceramics, Glass	29	1.3	9.67	1.9
SITC8	41-43	Leather goods and bags	/	/	6.03	1.2
Others	/	Other products	41	1.8	4.85	0.9
Amount	/	The total amount	2304	100.0	521.39	100.0

Russian main imports from China are mechanical and electrical products. In 2018, Russia imported 26.45 billion of the mechanical and electrical products from China, up 3.9 % and accounting for 50.7 % of Russian total imports from China. China takes the first place in Russian import markets of seven categories of goods, namely mechanical, electrical products, base metals and products, textiles and raw materials, furniture, toys and miscellaneous products, plastics, rubber, shoes, boots, umbrellas, optical watches and medical equipment. They accounted for 36.0 %, 23.8 %, 34.7 %, 47.9 %, 17.2 %, 53.9 %, 17.3 % of Russia's total imports of similar goods, respectively. Among them, Germany is China's biggest competitor in the export of light industrial products, plastics and rubber, optical clocks and medical equipment to Russia. In Russia's transport equipment imports, products from China accounted for 8.6 % of the total, lower than Japan's 7.8 % and Germany's 6.6 %.

From the perspective of the proportion of Russia's imports from China in the total imports of product, light industrial products such as umbrellas, miscellaneous products such as furniture, mechanical and electrical products, textiles, ceramics and other labor-intensive products are more popular in the Russian market, accounting for 53.87 %, 47.93 %, 36.03 % and 34.73 % respectively.

There is a real opportunity to expand trade turnover between Russia and China. However, this potential will remain largely untapped if the current structure of the Russian economy, which determines the commodity positions of Russian exports to China, does not change.

The export of goods with low added value reduces potential export revenues from the trade with China. Consequently, Russia should strive to increase the share of the products with high added value. Russia could use the opportunities afforded by various exhibitions to demonstrate developments in this area.

3) Analysis of China’s exports to Russia. In recent years, Russia has further stepped up its efforts to promote the «look east» strategy, and hopes to actively integrate into the economic development of the Asia-Pacific region, the establishment of the Oriental Economic Forum is one of the important signs. In order to better achieve the strategic goal of «looking east» and to more effectively solve

the long-standing «under exploitation» problem in Russia's Far East, promoting trade, investment and infrastructure cooperation with China. Mineral products are a major part of Russian exports to China [24, p. 314]. Table 2.5 shows comparison of China's exports to the world Russia in 2018.

Table 2.5 – Comparison of China's exports to the world and Russia in 2018 [8]

Customs classification	H-S code	Commodity categories	China's exports abroad in 2018		China's exports to Russia in 2018	
			(Mln dollars)	100 (%)	(Mln dollars)	100 (%)
SITC1	01-05	Live animals, animal products	177.9	0.72	2.69	0.5
SITC7	39-40	Plant products	255.7	1.03	23.34	4.5
SITC3	15	Animal and vegetable oils	10.9	0.04	22.06	4.2
SITC4	16-24	Food, beverage, tobacco	331.1	1.33	5.89	1.1
SITC5	25-27	Minerals	516.1	2.08	/	/
SITC6	28-38	Chemical products	1365.4	5.49	28.49	5.5
SITC2	06-14	Plastics, rubber	1018.7	4.10	10.31	2.0
SITC8	41-43	Leather goods and bags	343.3	1.38	6.03	1.2
SITC9	44-46	Wood and products	164.7	0.66	/	/
SITC10	47-49	Cellulose pulp	230.8	0.93	3.43	0.7
SITC11	50-63	Textiles and raw materials	2660.1	10.70	38.66	7.4
SITC12	64-67	Shoes, boots and light industrial products	611.2	2.46	19.65	3.8
SITC13	68-70	Ceramics, Glass	502.1	2.02	9.67	1.9
SITC18	90-92	Optics, medical equipment	197.1	0.79	12.38	2.4
SITC14	71	Precious metals and products	1854.3	7.46	9.67	1.9
SITC16	84-85	Mechanical, electronic products	10933.4	43.97	254.50	50.7
Others	/	Other products	3694.0	14.86	62.26	11.94
Amount	/	The total amount	24866.8	100.0	521.39	100.0

4) Analysis of China's imports to Russia. China has occupied the first place in Russia's import markets of mechanical and electrical products, base metals and

products, textiles and raw materials, furniture, toys and miscellaneous products, plastics, rubber, shoes, umbrellas and other light industrial products, as well as optical watches and medical equipment. The development of foreign trade has strongly promoted China's modernization drive, China has grown into an open economy. Participation in international division of labor and competition, the introduction of advanced technology, equipment and management, the use of FDI, greatly promoted China's technological progress and industrial upgrading, improve the level of the enterprise management and the market competitiveness. Table 2.6 shows China's imports from the world and Russia in 2018.

Table 2.6 – China's imports from the world and Russia in 2018 [9]

Customs classification	H-S code	Commodity categories	China's imports abroad in 2018		China's imports Russia in 2018	
			(Mln dollars)	100 (%)	(Mln dollars)	100 (%)
SITC1	01-05	Live animals, animal products	293.6	1.37	15.15	2.7
SITC7	39-40	Plant products	624.6	2.92	4.07	0.7
SITC3	15	Animal and vegetable oils	86.1	0.40	3.70	0.7
SITC4	16-24	Food, beverage, tobacco	259.3	1.21	2.34	0.3
SITC5	25-27	Minerals	4932.6	23.10	427.13	77.2
SITC6	28-38	Chemical products	1555.5	7.28	10.04	1.5
SITC2	06-14	Plastics, rubber	917.9	4.30	4.74	0.8
SITC8	41-43	Leather goods and bags	91.3	0.43	/	/
SITC9	44-46	Wood and products	249.9	1.17	35.56	6.0
SITC10	47-49	Cellulose pulp	322.9	1.51	12.88	2.1
SITC11	50-63	Textiles and raw materials	341.4	1.60	/	/
SITC12	64-67	Shoes, boots and light industrial products	50.3	0.24	0.36	0.1
SITC13	68-70	Ceramics, Glass	108.5	0.51	0.12	0.1
SITC18	90-92	Optics, medical equipment	780.2	3.65	1.89	0.2
SITC14	71	Precious metals and products	1065.2	4.99	0.44	0.1
SITC16	84-85	Mechanical, electronic products	7238.1	33.89	16.04	2.8
Others	/	Other products	2439.9	11.42	26.34	4.7
Amount	/	The total amount	21357.3	100.0	560.8	100.0

2 Major trading partners

1) Russian major trading partners

In 2018, Russian exports to China, the Netherlands and Germany were $56.08 billion, 43.52 billion, 34.10 billion, up by 44.1 %, 22.2 % and 32.5 % respectively, accounting for 12.5 %, 9.7 % and 7.6 % of Russian total exports. Table 2.7 shows Russian exports to major trading partners in 2018.

Table 2.7 – Russian exports to major trading partners in 2018 [10]

Country	Amount (Million)	Compared to the same 100 (%)	Accounted for 100 (%)
China	56076	44.1	12.5
Netherlands	43516	22.2	9.7
Germany	34097	32.5	7.6
Belarus	21545	15.8	4.8
Turkey	21445	14.7	4.8

Figure 2.3 shows Russian exports to major trading partners in 2018.

Figure 2.3 – Russian exports to major trading partners in 2018 [10]

As can be seen from the figure that in 2018 Russia took China, the Netherlands and Germany as its main export objects, and the exports to these 3 countries reached

nearly 30 % of the total export volume. Table 2.8 and figure 2.4 show Russian imports from major trading partners in 2018.

Table 2.8 –Russian imports from major trading partners in 2018 [11]

Country	Amount (Million)	Compared to the same (%)	Accounted for (%)
China	52203	8.6	22.0
Germany	25505	5.3	10.7
The U.S	12530	-0.4	5.3
Belarus	11654	-3.2	4.9
Italy	10572	4.7	4.5

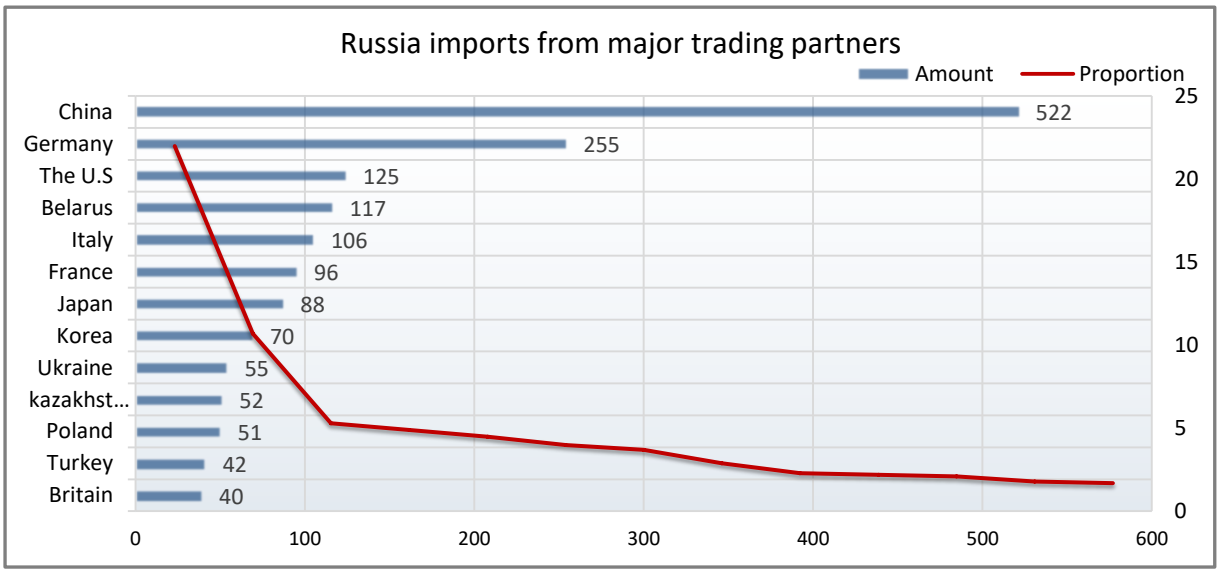

Figure 2.4 – Russian imports from major trading partners in 2018 [11, p. 83]

In 2018, Russian imports from China, Germany and the U.S were 52.20 billion, 25.51 billion and 12.53 billion, among which imports from the U.S decreased by 0.4 %, while imports from China and Germany increased by 8.6 %, 5.3 %, accounting for 22.0 %, 10.7 % and 5.3 % of Russia's total imports. The top five sources of Russia's trade deficit were France, Vietnam, Thailand, Spain and Ecuador, with deficits of 1.94 billion, 1.16 billion, 1.10 billion, 1.03 billion and 930 million respectively. Russia's trade surplus was mainly in the Netherlands, Turkey, Poland, South Korea and Belarus, with surpluses of 39.82 billion, 17.24 billion, 11.15 billion, 10.90 billion and 9.89 billion, respectively.

Figure 2.5 shows Russian trade to the major trading partners in 2018.

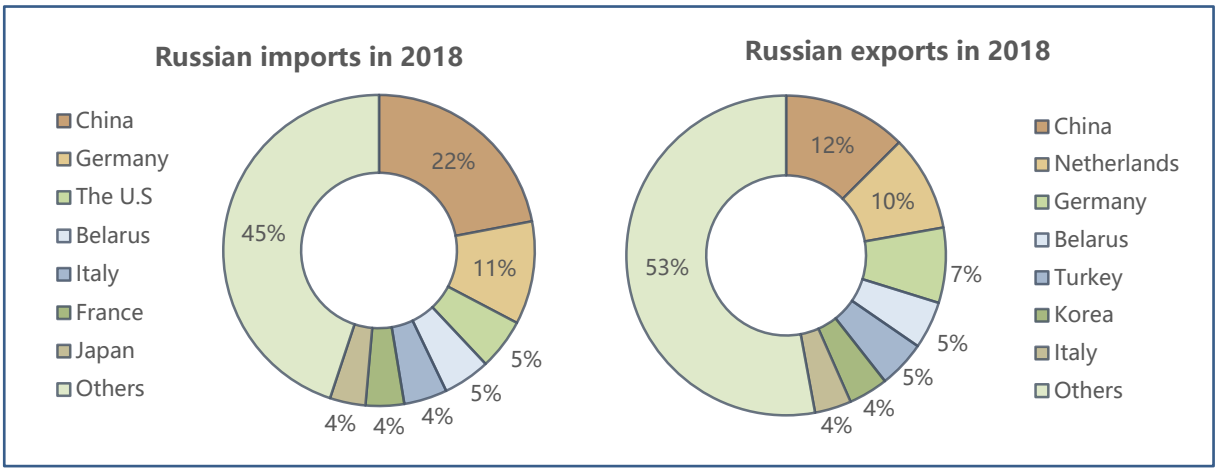

Figure 2.5 – Russian trade to the major trading partners in 2018 [12]

1) China's major trading partners. Table 2.9 and figure 2.6 show China's exports to major trading partners in 2018.

Table 2.9 – China's exports to major trading partners in 2018 [42]

Country	Amount (Mln)	Compared to the same (%)	Accounted for (%)
The U.S	4784	11.3	19.2
Japan	1471	7.1	5.9
Korea	1088	5.9	4.4
Vietnam	839	17.1	3.4
Turkey	775	9.0	3.1

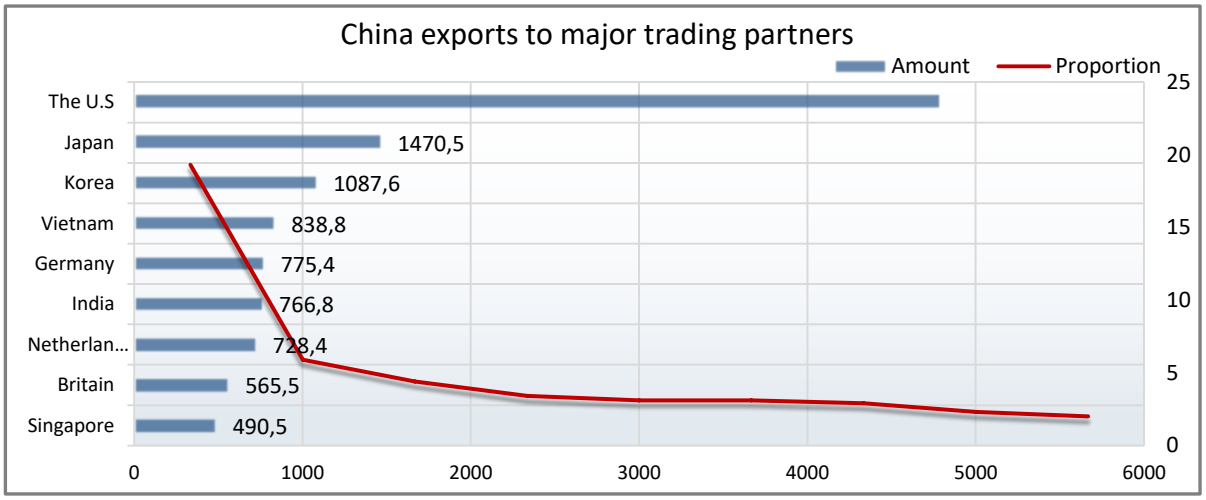

Figure 2.6 – China's exports to major trading partners in 2018 [42]

In 2018, the import and export volume of the major trading partners of China increased across the board. According to customs statistics, the U.S, Japan, Korea, Germany, Australia and Russia all accounted for the top 10 countries and regions in China's total import and export volume in 2018 with a total value of 100 billion.

China's exports to the U.S reached 478.4 billion in 2018, up 11.3 % year on year. The trade surplus between China and the U.S widened to a record high for the second year in a row since 2006, when statistics began. The development of China's foreign trade not only promotes the modernization of China's economy and the promotion of its overall national strength, but also makes China's economy a part of world economy, promotes the development of economic globalization in a direction conducive to the common prosperity of all countries and regions in the world (table 2.10 and figure 2.7).

Table 2.10 – China’s imports from major trading partners in 2018 [2]

Country	Amount (Mln)	Compared to the same (%)	Accounted for (%)
Korea	2047	15.30	9.6
Japan	1806	9.01	8.5
The U.S	1552	0.98	7.3
Germany	1063	9.70	5.0
Australia	1058	11.3	4.9

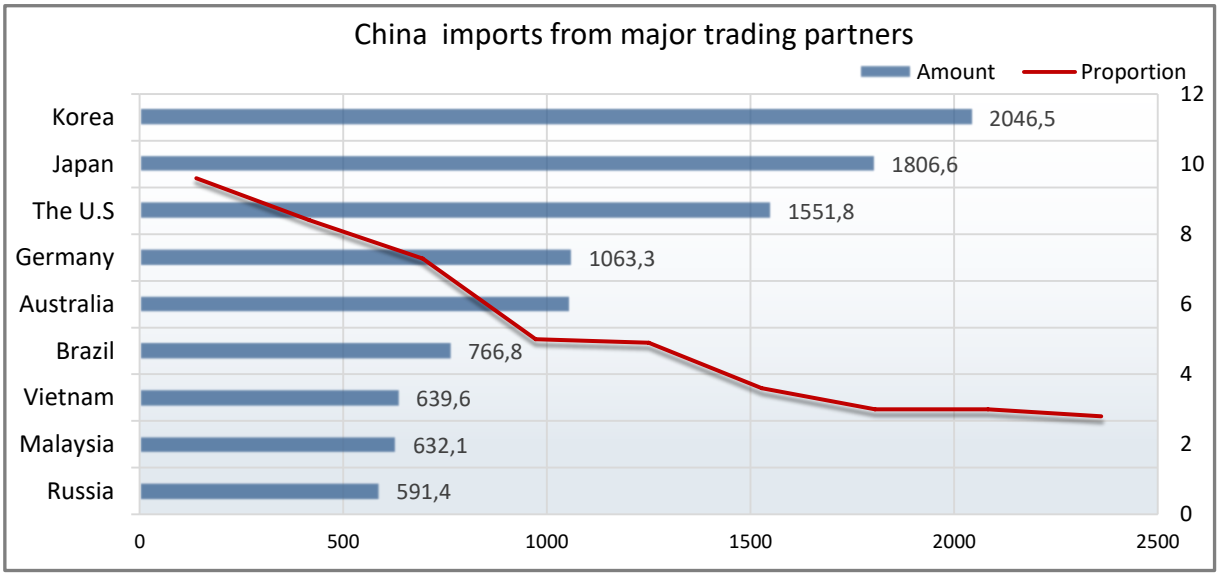

Figure 2.7 – China’s imports from major trading partners in 2018 [2]

Against the backdrop of the expanding domestic imports, China's import and export volume in the first four quarters of 2018 was 6.76 trillion yuan, 7.36 trillion yuan, 8.18 trillion yuan and 8.21 trillion yuan, respectively, rising quarter by quarter. The volume of imports and exports in the third and fourth quarters both exceeded 8 trillion yuan, at a relatively high level. China’s trade to major trading partners is shown in figure 2.8.

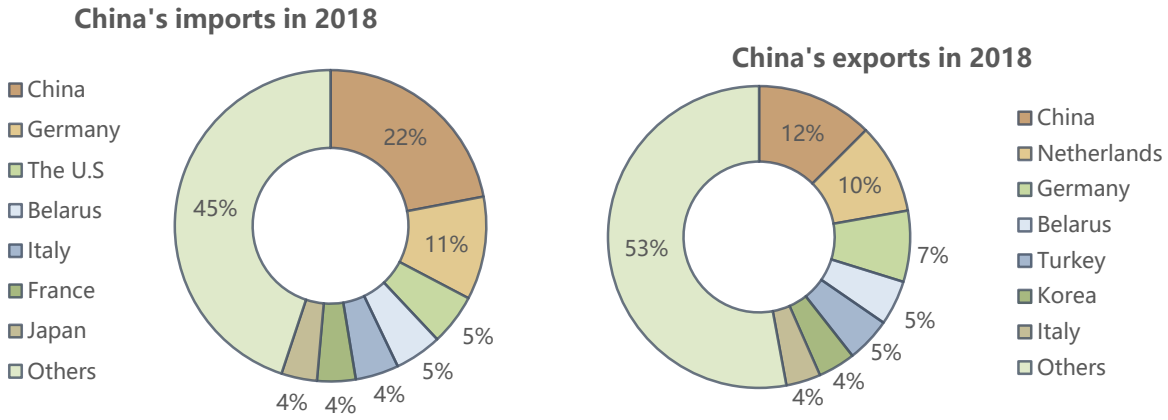

Figure 2.8 – China’s trade to major trading partners in 2018 [3]

China's major trading partners saw an overall increase in imports and exports in 2018. According to the data in the table, the United States, Japan, South Korea, Germany, Australia, Vietnam, Brazil, Malaysia and Russia all occupied the top 10 countries and regions in China's total import and export volume in 2018 with a scale of 100 billion dollars, among which the growth rate of Brazil and Russia was as high as 25 % or more. The EU remained China's largest trading partner in 2018.

2.3 Empirical analysis of Sino-Russian trade structure

This part will use theories of comparative advantage and trade complementarity index to analyze Sino-Russian trade structure. In the current free trade environment, each country participating in international trade should concentrate on the production and export of its own products with comparative advantages, and import of its own products with comparative disadvantages, both sides can make profits in trade.

1 Analysis of revealing comparative advantage index (RAC).

Revealing comparative advantage indexis the most convincing indicator to measure the competitiveness of a country's products or industries in the international market. It aims to quantitatively describe the relative export performance of various industries within a country. RCA index can be used to determine which industries of a country are more competitive in export, so as to reveal the comparative advantage of a country in international trade. Balassa, an American economist, proposed the revealed comparative advantage index in 1965 [13, p. 212].

The so-called RCA refers to the ratio between the share of a country's exports of a certain commodity in its total export value and the share of that commodity in the world's total export value, which is expressed by the formula:

$$C_{ij}^{k} = RCA_{xi}^{k} \times RCA_{mj}^{k}$$

$$RCA_{xi}^{k} = (X_{ik}/X_i)/(W_k/W)$$

RCA_{mj}^{k} is the comparative advantage of country j in k products measured by imports, which is $RCA_{mj}^{k} = (M_{jk}/M_j)/(W_k/W)$.

Where, X_{ij} represents the export value of country j's export product I,X_{tj} represents the total export value of country j; X_{iw} represents the export value of world export product I, and X_{tw} represents the total export value of world [13, p. 213].

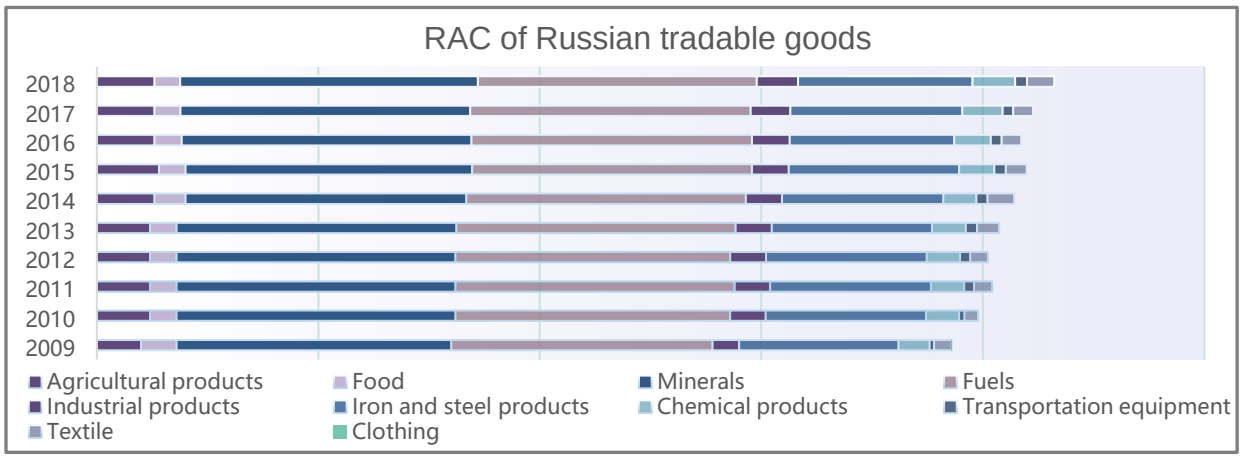

Figure 2.9 – RCA of Russian tradable goods from 2009–2018 [13, p. 214]

Generally speaking, an RCA value close to 1 indicates that a neutral relative comparative benefit without any relative advantage or disadvantage to speak of. RCA

value is greater than 1, indicating that the export proportion of the product in the country is greater than that in the world, then the product of the country has a comparative advantage in the international market and has certain international competitiveness. If the RCA value is less than 1, it means that it does not have a comparative advantage in the international market and international competitiveness is relatively weak.

Revealed comparative advantage index can reflect a competitive position in world services. If RCA>2.5, the country's services are highly competitive; if 1.25≤RCA≤2.5, the country's services are highly competitive internationally; if 0.8≤RCA≤1.25, country's services are moderately competitive internationally; if RCA<0.8, the country's services are weak competitively [13, p. 215].

1) Based on H-S classification criteria.

As shown in the figure 2.3 and the figure 2.4, China and Russia have different comparative advantages respectively. The Sino-Russian trade goods can be roughly divided into the following three categories (figure 2.10).

Figure 2.10 – RCA of China’s tradable goods from 2009–2018 [13, p. 216]

Products in which China has a comparative competitive advantage over Russia, such as clothing, textiles, industrial products, machinery and transportation equipment. China has maintained an obvious competitive advantage in four products from 2009–2018, especially in labor-intensive products such as textiles and clothing. The RCA index is basically dozens of times that of Russia.

Products in which Russia has a comparative competitive advantage over China, such as minerals, steel products, fuel, and other resource-intensive products. Among them, the comparative advantage of energy fuels such as oil, coal and natural gas is the most prominent. During 2009–2018, the fuel RCA of Russia is basically 20 times that of China.

Products in which neither China nor Russia has the significant comparative advantage, such as chemical products, food and agricultural products. In addition, from the perspective of dynamic development, it can be found that the comparative advantages between China and Russia have changed to different degrees in some products. The comparative advantages of food, agricultural products and minerals all declined, while the comparative advantages of transportation products, iron and steel products and the industrial products increased, while the comparative advantages of chemical products remained basically unchanged.

Changes in China's comparative advantages of various products are basically in line with reality that China is in the stage of optimizing and upgrading its industrial structure and accelerating its industrialization process. In addition to the increase in the comparative advantages of the agricultural products and food, the comparative advantages of other products in Russia have declined to varying degrees.

This is basically in line with the current steady growth of the Russian economy, is gradually reducing the reliance on oil, minerals and other bulk raw material exports. Moreover, in recent years, Russia's total foreign trade has been constantly rising, with total export of Russia increasing from 77.3 billion in 2009 to 290.13 billion in 2013. The continuous decline of Russia's comparative advantage of fuel and mineral products is largely caused by continuous expansion of the total export.

The economic complementarity between the two countries is improving as well. Russia China trade relations have a significant growth potential and are stimulated, among other things, by China's transformation of its trade policy. It aims to diversify its exports and imports by strengthening the ties with its trade partners from the developing countries.

2) Based on SITC classification criteria.

Table 2.11 and table 2.12 are the RCA indexes of China's imports and exports to Russia and Russian imports and exports to China from 2009–2018. It follows that:

Table 2.11– RAC of Russian trade to China from 2009–2018 [39, p. 32]

	Primary products					Labor intensive product		Capital and technology intensive products		
Date	SITC0	SITC1	SITC2	SITC3	SITC4	SITC6	SITC8	SITC5	SITC7	SITC9
2009	0.402	0.298	0.882	4.751	0.489	0.977	0.065	0.359	0.105	1.771
2010	0.289	0.221	0.776	6.399	0.289	0.887	0.059	0.371	0.087	2.169
2011	0.308	0.183	0.743	4.266	0.294	0.741	0.041	0.382	0.069	2.415
2012	0.417	0.311	0.557	5.788	0.562	0.753	0.052	0.425	0.077	1.254
2013	0.406	0.298	0.526	5.269	0.468	0.725	0.047	0.413	0.081	1.863
2014	0.326	0.315	0.519	5.025	0.374	0.812	0.049	0.441	0.085	1.957
2015	0.361	0.345	0.562	5.647	0.425	0.774	0.056	0.419	0.084	2.339
2016	0.345	0.316	0.577	5.722	0.471	0.791	0.068	0.454	0.079	2.409
2017	0.392	0.275	0.612	5.394	0.514	0.829	0.055	0.485	0.089	2.502
2018	0.425	0.307	0.622	5.811	0.484	0.898	0.061	0.475	0.086	1.948

Table 2.12 – RAC of China’s trade to Russia from 2009–2018 [39, p. 33]

	Primary products					Labor intensive product		Capital and technology intensive products		
Date	SITC0	SITC1	SITC2	SITC3	SITC4	SITC6	SITC8	SITC5	SITC7	SITC9
2009	0.435	0.153	0.196	0.128	0.053	1.235	2.153	0.448	1.437	0.024
2010	0.452	0.155	0.179	0.121	0.046	1.214	2.188	0.497	1.439	0.018
2011	0.453	0.156	0.177	0.108	0.048	1.277	2.249	0.547	1.436	0.027
2012	0.429	0.178	0.161	0.125	0.041	1.292	2.199	0.502	1.332	0.013
2013	0.421	0.169	0.168	0.127	0.045	1.281	2.214	0.523	1.424	0.019
2014	0.411	0.165	0.164	0.130	0.046	1.259	2.207	0.540	1.431	0.018
2015	0.408	0.164	0.165	0.124	0.042	1.267	2.265	0.534	1.435	0.021
2016	0.405	0.171	0.168	0.122	0.042	1.286	2.258	0.538	1.438	0.022
2017	0.405	0.174	0.169	0.127	0.044	1.288	2.269	0.544	1.440	0.028
2018	0.402	0.176	0.170	0.129	0.047	1.291	2.261	0.549	1.441	0.029

In primary products (SITC0-4 categories), China does not have a comparative advantage. In addition to food and edible live animals (SITC0 category), SITC1-4 products have a low level of comparative advantage, especially SITC3 fossil fuels

and related raw material commodities have obvious comparative disadvantage. In general, the comparative advantage of China's primary products is declining, while Russia's comparative advantage of the other four types of products is on the rise except SITC2.

In terms of the labor-intensive products (SITC6+SITC8), China's comparative advantage is quite prominent. In 2018, the RAC of SITC6 and SITC8 products in China was 0.898 and 0.061 respectively, significantly higher than the RAC of Russian SITC6 (1.291) and SITC8 (2.261) in the same period. It can be concluded that: China has an obvious competitive advantage in labor-intensive products because of its low cost. Although the RAC of China in labor-intensive products has declined slightly in recent years, it still maintains a high level, and there is still an obvious gap between China and Russia, which is mainly caused by the difference in the factor endowment of labor and other resources between China and Russia.

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For capital and technology intensive products (SITC5+SITC7), China and Russia have different comparative advantages. With the rapid development of China's processing and manufacturing industry and the continuous enhancement of scientific, technological strength, China's comparative advantage in the production of machinery and transportation equipment products (SITC7 category) is gradually highlighted, and the RAC shows an upward trend, rising from 0.549 in 2009 to 1.441 in 2018. The competitiveness is gradually enhanced. Russia has a comparative advantage in SITC9 unclassified products. In terms of chemicals (SITC5 category)

and related products, the comparative advantages of China and Russia are almost the same, with China slightly higher than Russia (RCA index of China and Russia was 0.549 and 0.479 respectively in 2013). The comparative advantages of China and Russia have been kept at a relatively stable level.

Through the above analysis and research, it can be concluded that in the Sino-Russian trade, the optimization and upgrading of industrial structure and the dynamic transfer of comparative advantages have been initially realized. China is gradually losing advantage in primary products, while in labor-intensive manufactured goods, China still maintains a relatively high comparative advantage. Comparative advantage in primary products is the concentrated expression of Russia's comparative advantage. In general, China and Russia have different comparative advantages, which plays a very important role in promoting the development of Sino-Russian trade and the strengthening of trade relations.

2 Analysis of complementarity of trade (TCI)

Trade complementarity index is a measure of trade complementarity between one country (or region) and other countries (or region). The index is developed from RAC, which is used to measure the trade complementarity of various commodities in Sino-Russian trade. The calculation formula is as follows:

$RCA_{xi}^{k}=(X_{ik}/X_i)/(W_k/W)$;

$C_{ij}=\Sigma[(RCA_{xik}\times RCA_{mjk})]\times[W_k/W]$

Where, RCA_{xik} represents the comparative advantage of country I in product $_k$ measured by export; RCA_{mjk} represents the comparative disadvantage of country j in product k as measured by imports; W_k represents the total international trade volume of products of category k by each country; W is the volume of trade in all products in the world [13, p. 211]

According to the trade complementarity index formula, the complementarity index of Sino-Russian trade products is calculated and given in table 2.13 and 2.14:

Table 2.13 – TCI of Russian trade to China from 2009–2018 [14]

	Primary products					Labor intensive product		Capital and technology intensive products		
Date	SITC0	SITC1	SITC2	SITC3	SITC4	SITC6	SITC8	SITC5	SITC7	SITC9
2009	0.089	0.046	3.963	4.064	0.548	0.795	0.055	0.416	0.119	0.119
2010	0.061	0.056	4.167	3.595	0.507	0.606	0.037	0.459	0.112	0.155
2011	0.094	0.065	3.562	4.416	0.714	0.831	0.048	0.348	0.127	0.102
2012	0.077	0.049	2.872	6.156	0.345	0.641	0.044	0.356	0.099	0.545
2013	0.087	0.051	2.725	4.294	0.311	0.485	0.028	0.358	0.075	1.528
2014	0.137	0.106	1.903	8.189	0.582	0.479	0.033	0.379	0.078	0.897
2015	0.126	0.094	1.924	6.276	0.514	0.466	0.031	0.368	0.073	0.848
2016	0.131	0.082	1.911	5.738	0.451	0.460	0.030	0.360	0.069	0.802
2017	0.141	0.114	1.900	5.391	0.533	0.454	0.031	0.368	0.066	0.848
2018	0.145	0.119	1.896	5.573	0.461	0.429	0.029	0.361	0.064	0.797

Table 2.14 – TCI of China’s trade to Russia from 2009–2018 [14]

	Primary products					Labor intensive product		Capital and technology intensive products		
Date	SITC0	SITC1	SITC2	SITC3	SITC4	SITC6	SITC8	SITC5	SITC7	SITC9
2009	0.912	0.301	0.171	0.013	0.073	1.132	1.909	0.512	1.556	0.033
2010	0.916	0.297	0.116	0.013	0.058	1.129	2.216	0.573	1.632	0.053
2011	0.781	0.266	0.084	0.011	0.047	1.122	2.101	0.577	1.816	0.056
2012	0.737	0.349	0.082	0.013	0.031	1.314	2.102	0.551	1.186	0.041
2013	0.729	0.325	0.081	0.012	0.036	1.309	2.007	0.549	1.318	0.037
2014	0.781	0.268	0.080	0.012	0.094	1.339	1.999	0.513	1.415	0.029
2015	0.735	0.287	0.082	0.011	0.068	1.315	2.021	0.517	1.214	0.032
2016	0.724	0.270	0.081	0.011	0.042	1.301	2.147	0.509	1.213	0.030
2017	0.719	0.269	0.080	0.010	0.036	1.309	2.007	0.504	1.318	0.028
2018	0.715	0.325	0.081	0.010	0.032	1.300	2.000	0.501	1.309	0.026

Table 2.13 and table 2.14 show the TCI of various commodities between China and Russia. It can be concluded that according to the TCI of China's exports and Russian imports, China and Russia have the strong complementary effect on SITC0 products, labor-intensive products (SITC6+SITC8), capital-technology-intensive products (SITC5+SITC7) in primary products. The TCI of SITC8

categories in labor-intensive products, SITC7 categories in capital-technology-intensive products is the most prominent.

However, it should be noted that the complementary effect of primary product exports has entered a declining channel, and the TCI of primary products has fallen to a very low level. On the other hand, the TCI of capital and technology intensive products represented by machinery and transportation equipment (SITC7) between China and Russia has entered a rising channel. It can be seen that trade structure of China and Russia is being continuously optimized and upgraded, the complementary effect of trade in capital and technology-intensive products is relatively obvious, while complementary effect of trade in primary products is decreasing year by year.

The TCI is used to analyze and measure the trade complementarity between Russia's exports and China's imports, which can reflect the degree of trade agreement between China and Russia. Among primary commodities, trade complementarities between non-edible raw materials (SITC2) and fossil fuels and related raw materials (SITC3) are most prominent.

In terms of some labor-intensive products, China and Russia have a certain degree of intra-industry complementarity. Among them, TCI of SITC6 manufactured goods trade between Russia's exports and China's imports has entered a declining channel, dropping from 1.581 in 2009 to 0.466 in 2018. The SITC6 manufactured goods TCI between Russia's imports and China's exports has been maintaining a relatively stable development level, and has shown a certain rising trend in recent years, which reflects that the bilateral economic and trade between China and Russia focuses on the complementary form between industries, which is mainly caused by difference of factor endowment. Resource-intensive products are the main products China imports from Russia, while labor-intensive products and capital-technology-intensive products are the main products China exports to Russia.

Among China's exports to Russia, the complementary effect of labor-intensive products and capital-technology-intensive products is relatively obvious, while the complementary effect of primary product exports shows a decreasing trend year by year, which reflects the trend of continuous optimization of trade structure between

China and Russia. Among Russia's exports to China, primary products are the most complementary, which reflects that the bilateral trade pattern between China and Russia is mainly based on industrial complementarity. This pattern is mainly formed by the differences in resource endowments of the two countries, and China mainly imports primary products from Russia.

3 Analysis of intra-industry trade index (IIT)

International trade can be classified into the following two categories according to product content:

Inter-industry trade refers to the fact that imported and exported products of a country belong to different industrial sectors; Intra-industry trade refers to a country (or region) imports a certain product and exports it at the same time during a certain period of time, and most of the products participating in the trade are intermediate products of the same product.

Intra-industry trade index is used to measure the degree of intra-industry trade index of an industry, is refers to the same industry in both countries trade with each other have different quality, displayed on the statistical data of the same kind and amount of goods import and export, show that in the industry has a complementary trade demand, and the more high classification shows that intra-industry trade index, the more convincing.

$$T=1-|X-M|/(X+M)$$

In the formula, X and M respectively represent the amount of export and import of a specific industry or a certain kind of commodity, and take the absolute value of X-M.The value range of T is [0,1]. When $T=0$, it means that there is no intra-industry trade. When $T=1$, it indicates that the import volume within the industry is equal to export volume; The higher the T value, the higher the degree of intra-industry trade.

In the formula, X and M respectively represent the export volume and import volume of a certain industry or a certain kind of commodity [39, p. 34].

T value is between the value range of (0,1), which measures the development level of intra-industry trade of a particular industry. T approaches 0, indicating that the level of inter-industry trade is low and the level of intra-industry trade is high. T

approaches 1, indicating a high level of inter-industry trade and a low level of intra-industry trade.IIT index, as the most widely used and representative index of intra-industry trade, divides the trade into inter-industry trade and intra-industry trade. In the face of a broad international market, a country needs to quickly adjust production capacity, which can be measured by the index of intra-industry trade and the added value of the index [54, p.188].

1) Overall trade intra-industry index

Since 2009, the Sino-Russian trade has been growing steadily year by year. This paper mainly analyzes the Sino-Russian trade from 2009 to 2018.

The level of intra-industry trade in Russia. Figure 2.13 shows the overall level of the intra-industry trade between China and Russia did not exceed 0.5 from 2009 to 2018, indicating that the overall level of intra-industry trade between China and Russia is not high and the trade between industries is the main one. The level of Sino-Russian intra-industry trade increased first and then decreased from 2009 to 2018, and reached the highest point of 0.31 in 2009.

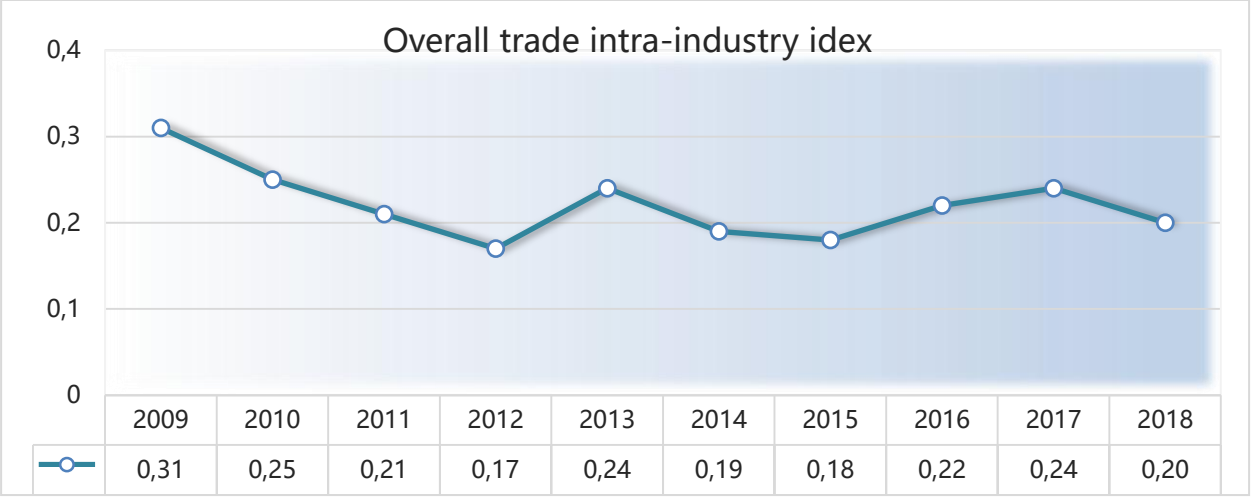

Figure 2.13 – The overall level of IIT between China and Russia [16]

In 2012, the Sino-Russian G-L index was 0.17, indicating China and Russia are mainly engaged in inter-industry trade as a whole. This reflects the trade between China and Russia from 2009 to 2018 was mainly between industries. Can use the theory of the comparative advantage and factor endowment theory to explain trade

patterns between China and Russia, because the two countries resources endowment is different: China is rich in labor, abundant natural resources, Russia in the two countries separately in labor-intensive and resource-intensive products has a greater comparative advantage, countries have special products to export abundant elements.

2) Intra-industry trade index analysis of various commodities

According to International Trade Standard Classification, trade commodities can be divided into SITC0-SITC9 categories. For the convenience of research, these 10 categories of commodities are further classified that SITC0-SITC4 are primary products;SITC5-SITC8 are manufactured products.SITC5+SITC7 with manufactured goods are further classified as capital, technology-intensive products; SITC6+SITC8 are classified as labor-intensive products.

The following is a specific analysis of industry characteristics of Sino-Russian intra-industry trade:

1) The levels of SITC0 (food and live livestock), SITC5 (chemicals and related products) within the industry are gradually rising. Table 2.15 and figure show IIT of categories of commodities of Sino-Russian trade.

Table 2.15 – IIT of categories of commodities of Sino-Russian trade [17]

	SITC0	SITC1	SITC2	SITC3	SITC4	SITC5	SITC6	SITC7	SITC8
2009	0.91	0.17	0.04	0.02	0.05	0.72	0.89	0.13	0.02
2010	1.00	0.17	0.05	0.03	0.11	0.80	0.67	0.03	0.01
2011	0.97	0.16	0.06	0.02	0.62	0.84	0.50	0.03	0.02
2012	0.92	0.16	0.06	0.02	0.62	0.84	0.50	0.03	0.02
2013	0.91	0.16	0.05	0.03	0.61	0.85	0.50	0.03	0.02
2014	0.93	0.17	0.05	0.02	0.60	0.84	0.49	0.04	0.03
2015	0.92	0.17	0.05	0.02	0.61	0.85	0.50	0.03	0.02
2016	1.00	0.16	0.06	0.03	0.65	0.80	0.54	0.03	0.01
2017	0.98	0.15	0.06	0.02	0.62	0.85	0.49	0.03	0.02
2018	0.97	0.16	0.05	0.02	0.67	0.82	0.49	0.03	0.02

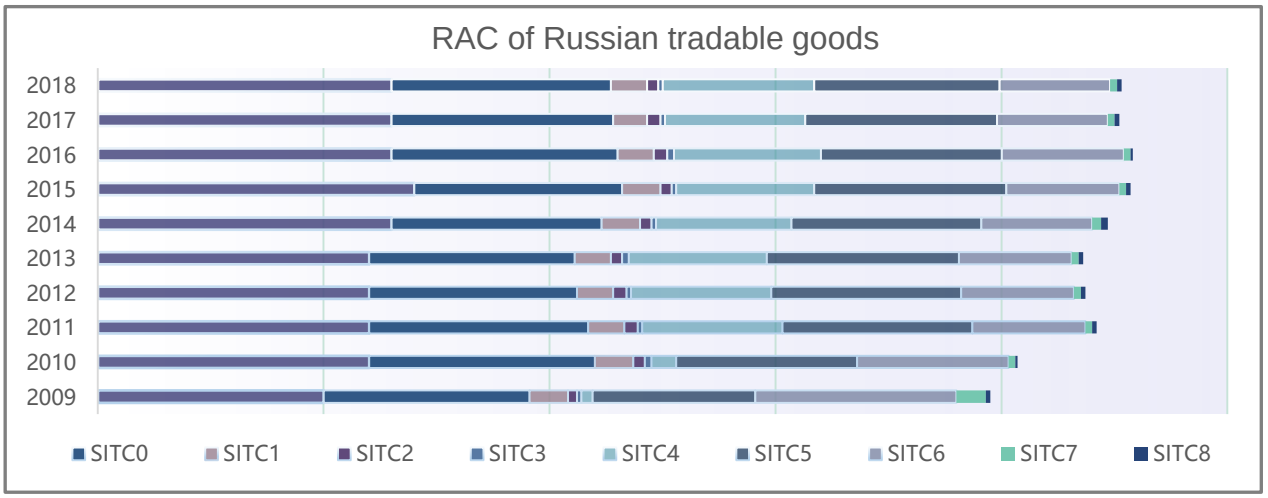

Figure 2.14 – IIT of categories of commodities of Sino-Russian trade [17]

Since 2000, SITC0 (food and live livestock) products have been dominated by intra-industry trade between China and Russia, and the level of intra-industry trade has been increasing year by year. The Sino-Russian trade in SITC5products has undergone a process of transformation from inter-industry to intra-industry. The period from 2009 to 2018 was dominated by inter-industry trade, while the period from 2009 to 2018 was dominated by inter-industry trade.

2) The SITC1 (beverages, tobacco), SITC2 (crude materials, inedible but fuel), SITC3 (fossil fuels, lubricants and related materials), SITC4 (animal and vegetable oils and waxes) and SITC8 (miscellaneous products) industries are at very low levels.

As can be seen from figure, the IIT of SITC2 (crude materials, inedible but fuel), SITC3 (fossil fuels, lubricants, related materials) and SITC8 (miscellaneous products) have been very low, indicating that China-Russia trade is dominated by inter-industry trade. Resources endowment is different, two countries separately in labor-intensive and resource-intensive products with strong comparative advantage, which determine the export products of the two countries will maintain this pattern, namely, to Russia in China represents a significant proportion of the labor-intensive products exports, Russian exports to China accounted for a larger proportion. Therefore, in general, the trade goods between China and Russia show a one-way flow of the labor-intensive products and resource-intensive products, which leads to the inter-industry trade between China and Russia. The IIT of SITC4 (animal and

vegetable oils, oils and waxes) from 2000 to 2009 has been very low, less than 0.2. China and Russia mainly trade between industries. Since 2009, the IIF has increased year by year and reached 0.62 in 2012. China and Russia take intra-industry trade as the main trade.

In the following part of this paper which construct a two-dimensional spatial coordinate axis to measure the degree of correlation between the complementarity and competitiveness of Sino-Russian trade. Among them, TCI is used to represent the complementarity of trade, while in the evaluation of the overall competitiveness of Sino-Russian trade, RAC can show the competitive advantages of goods of the two countries at the overall level.

4 Evaluation coordinate of Sino-Russian trade RAC and TCI.

In the following part of this paper which construct a two-dimensional spatial coordinate axis to measure the degree of correlation between the complementarity and competitiveness of Sino-Russian trade. Among them, TCI is used to represent the complementarity of trade, while in the evaluation of the overall competitiveness of Sino-Russian trade, RAC can show the competitive advantages of goods of the two countries at the overall level [55, p.110].

The abscissa represents trade competitiveness of two countries, and ordinate presents the degree of trade complementarity of two countries.

RAC is mainly used to analyze the competitiveness of the international market between two countries. By analyzing the comparative advantage of two countries, we try to find out the basis of the comparative advantage of trade between two countries. RAC is used to measure the market competitiveness of products between China and Russia. Combined with the import and export data of various products between China and Russia in recent years, it is concluded that the comparative advantage of China in primary products shows a downward trend, while comparative advantage of capital and the technology-intensive products shows an upward trend. The resource-intensive products are Russia's main comparative advantage.

Figure 2.15 shows the variance of the RAC and TCI of Sino-Russian trade.

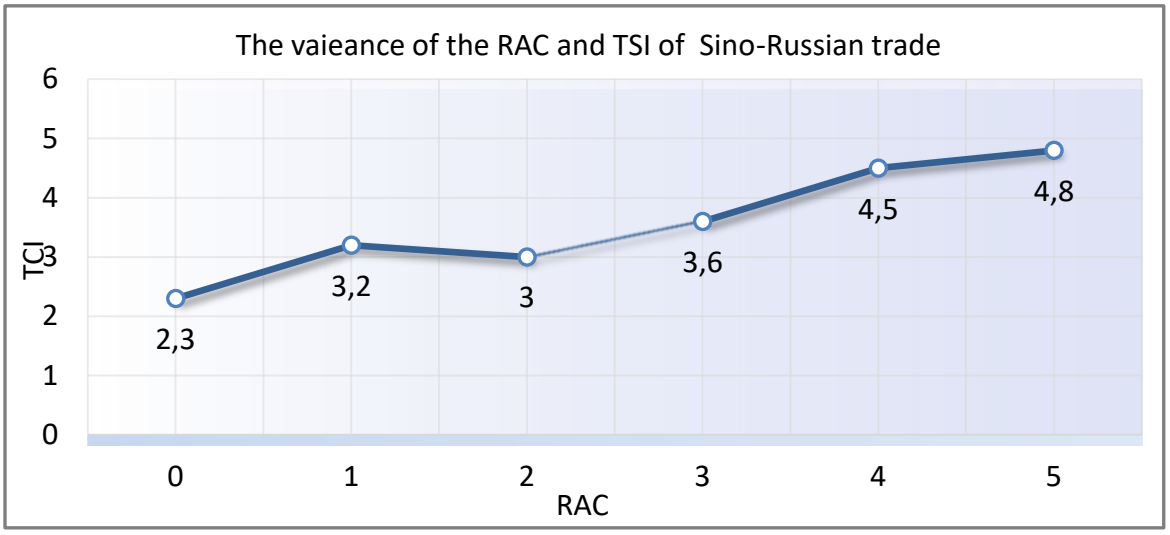

Figure 2.15 – The variance of the RAC and TCI of Sino-Russian trade [18]

TCI is used to evaluate the level of overlap between one country's main export commodity types and another country's import commodity types. The degree of overlap is in direct proportion to the index of trade complementarity between the two countries. By expanding the scale production of complementary products in the two countries, economies of scale can be generated and greater benefits can be created for the economic development of the two countries. According to the data analysis from 2009 to 2018, trade structure between China and Russia is continuously optimized and upgraded, which is shown in the products exported from China to Russia. The complementary effect of labor-intensive products, capital and technology-intensive products is relatively obvious and shows a trend of increasing year by year, while the complementary effect of primary product exports shows a trend of decreasing year by year. Russia's exports of primary products to China are highly complementary, which reflects bilateral trade pattern between China and Russia is mainly inter-industrial complementarity. The pattern is formed by differences in resource endowments of the two countries, and China mainly imports primary products from Russia.

Russian experts believe that, as the Russia–China turnover grew, the problems stemming from the different structures of their economies became more evident. As China develops in various technological areas, it is geared toward manufacturing

high value-added products. As a result, the Chinese economy is growing faster and better than Russia’s, which naturally determines the structure of trade between the two countries. Russia continues to sell mostly low value-added goods to China, in particular, mineral fuel, oil and petrochemicals, which restricts the prospects of further maximizing the advantages of trade interaction.

2.4 The inadequacy of Sino-Russian trade structure

With the rapid development of Sino-Russian trade, the trade structure between the two countries has changed to a certain extent. From export of low-level primary products to Russia in the early stage of the economic development, it has gradually transformed into a trading system in which higher-level manufactured products such as mechanical and electrical products dominate the bilateral trade. While we see that the structure of China's export trade to Russia has improved, we should also note that there are still many problems in the structure of China's trade with Russia.

1 Shortcomings in Sino-Russian trade structure.

1) The structure of import and export commodities is relatively concentrated

In the context of the continuous optimization of the trade structure between China and Russia, some problems must be paid enough attention to. For example, China mainly exports mechanical and electrical products, textiles and raw materials to Russia, and the variety of the goods exported is single. Mechanical and electrical products and textiles account for about 50 % of China's exports to Russia, while other products are less than 10 %. Such an export structure leads to a relatively concentrated export structure of China to Russia, and there are market risks to some extent. China's imports from Russia are mainly energy and resource products. Among them, energy products, wood, chemical fertilizer and other bulk commodities account for 85 % of China's total imports from Russia, while other commodities are all less than 5 %. Such import structure indicates that China's import structure from Russia is relatively concentrated, and to a certain extent, China is faced with foreign trade security risks. As the export of energy and resource products is not sustainable, the

price of products is greatly affected by international market. Once the production of raw materials in Russia decreases or domestic demand increases, or the international market fluctuates greatly, Russia's export of such products to China will be unstable [41, p. 12].

2) The supply structure is not conducive to the stability of trade.

According to the above analysis, in China's import trade from Russia, SITC2 and SITC3 categories account for a large amount of trade volume, among which the SITC3 category represented by oil and crude oil has the fastest growth in trade volume. It can be seen that Russia's export to China lays more and more emphasis on raw materials, and this trade structure is not conducive to the stability of trade between China and Russia. Mineral products and chemical products accounted for 75.8 % of Russia's export volume in 2012, and the prices of these commodities are largely dependent on the international market, and the price fluctuations in the international market will have a great impact on the trade volume between China and Russia. Once the price of the international market drops, the bilateral trade between China and Russia will be greatly negatively affected [41, p. 13].

Moreover, China's import of the raw materials from Russia still accounts for a large proportion, and China's economic development will continue to demand energy, while Russia's resource-intensive product export-oriented pattern will not change in the short term. Therefore, the trade structure between China and Russia will continue as it is now in the short term. Based on the analysis of H-S standard classification, we note that mechanical and electrical products are the fourth major export products from Russia to China. Although mechanical and electrical products do not play a major role in Russia's exports to China, it is believed that through the joint efforts of the two countries, the trade between China and Russia will certainly be improved. This is also the goal of mutually beneficial and win-win trade.

In 2020, amid the pandemic, the governments of Russia and China will make every effort to resume manufacturing and support the wellbeing of peoples, which might negatively impact major investments in foreign projects. Strict antiepidemic

measures in both countries have significantly reduced the flows of people and goods, which has complicated the implementation of joint projects [56, p. 10].

In addition, the construction of unfinished facilities has been suspended, and manufacturing deadlines have been postponed. The negative effects of the pandemic are expected to last longer for the investment than for the trade. The instability of the development of investment interaction proves that a new model of Russia-China cooperation is needed, that other promising areas of interaction need to be identified. This is further confirmed by the appearance of new areas of interaction, even though the volumes of investment are falling.

3) The bilateral trade are complementary and competitive

Based on different endowments, China and Russia have different comparative advantages, resulting in a large difference in the industrial structure between the two countries. The structure of import and export trade goods of the two countries is highly complementary, which has the typical complementary trade structure. As a populous country, China has a comparative advantage in producing labor-intensive products, while Russia, with abundant energy reserves such as oil and natural gas, high scientific and technological level and high national quality, has a comparative advantage in resource-intensive and technology-intensive products [55, p. 29].

China exports to Russia labor-intensive products such as household appliances and leather products. The export of the mechanical and electrical products has also increased rapidly in recent years and has become the largest export of goods from China to Russia. China's imports from Russia are mainly oil, natural gas, coal, wood and other resources and energy products. It can be seen that the two countries trade goods have different comparative advantages, trade complementarity is strong.

From the perspective of developing international trade, the commodities traded between China and Russia also have certain competitiveness. China relies on cheap labor, low value-added production and exports products to more, low profit of the traditional labor-intensive products, Russia in the production of similar products in the absolute disadvantage, therefore in the process of similar products to compete for the Russian market, the domestic traditional industry department in the production of

most of the products are manufactured by China gradually out the domestic market of similar products.

With advancement of China's industrialization process, introduction and use of high and new technologies and the guiding role of export-oriented foreign enterprises, Export products of China are rapidly changing from the coarse processed products to manufactured products, and the level of export commodities is constantly improving. As China's electrical, chemical, metal, mineral industries, military industry, machinery manufacturing, other sectors become more competitive, the international competition between China and Russia is being increasingly fierce. The accession of China and Russia to WTO has intensified the positive economic competition between the two countries [52, p.189].

The competition of trade goods between China and Russia has set obstacles and brought pressure to the bilateral trade cooperation, but to a certain extent, it has also prompted the two countries to constantly adjust and optimize the industrial structure and upgrade. Governments and enterprises of the two countries should consult with each other and take effective measures to avoid occurrence of vicious competition.

4) Intra-industry trade is dominated by vertical division of labor.

The characteristics of industrial division of labor between the two countries can be reflected by the structure of trade goods to a certain extent. If the trade of the same product is basically one-way, then the vertical division of labor industry is represented by the industry of the product. If the trade of the same product is two-way, then the horizontal division of labor industry is represented by the product of the industry. Through research, we find that the products and industries involved in Sino-Russian inter-industry trade are mainly vertical division of labor, has obvious characteristics. At present, China's clothing, household appliances, leather goods and other labor-intensive products are vertical division of the labor products; Russia is mineral products, chemical products, other resource-intensive products for vertical division of labor products [52, p. 190].

There is an obvious complementary relationship between China and Russia in factor endowment, so the development of the horizontal intra-industry trade between

China and Russia is restricted to a large extent. Moreover, the quality and level of vertical intra-industry trade are lower than that of horizontal intra-industry trade. The division of labor between China and Russia is mainly based on vertical trade, which restricts the long-term development of bilateral trade, the depth and breadth of bilateral economic, trade cooperation, and can not meet the objective requirements of world economic development. Therefore, we should vigorously develop the horizontal intra-industry trade between China and Russia, optimize the trade structure between China and Russia, and promote the trade between China and Russia to a higher level.

5) The imbalance of trade structure leads to long-term deficit.

While the total trade volume between China and Russia is growing rapidly, China's imports from Russia are also rising rapidly, and China's trade with Russia has been in surplus and deficit for a long time. However, in recent years, the trade deficit between China and Russia has changed, and Russia's trade with China is in surplus position and deficit position. In 2018, Russia recorded a trade surplus in its foreign trade, but it remains in deficit in the long term. In the period of economic transition, the bilateral trade between China and Russia is very unstable [54, p. 189].

2 Analysis on the influencing factors of Sino-Russian trade structure.

1) The scale of mutual investment is small and the level is low.

International direct investment and international trade complement each other, and to some extent there is a strong complementary relationship. To develop and expand foreign trade and optimize and upgrade the trade structure of a country, to some extent, it needs to be completed through international direct investment. Make full use of FDI is pulling a country or region an important means of rapid economic development, a country or region in the introduction of foreign investment, on the one hand, can increase the capital accumulation, make up for the lack of domestic capital elements, on the other hand can also be based on the advanced technology and management experience of the accumulation of intangible assets such as update of its industry layout, promote the technology level of domestic industry.

Direct investment can promote the development of trade to a large extent, but the scale of mutual direct investment between China and Russia is small and the level is very limited, which has become an important factor restricting the development of Sino-Russian trade and the optimization of trade structure. In recent years, with the support of Chinese and Russian governments, China-Russia investment cooperation has achieved rapid development, but the scale of Russian investment in China is still relatively small [54, p. 190].

The mutual direct investment between China and Russia is mainly concentrated in low-technology manufacturing industry, while the proportion of technology-intensive products mainly in high-tech manufacturing industry is very low. Therefore, it fails to bring advanced technology to China and promote the technological progress of relevant industries and the improvement of production efficiency, leading to the low efficiency of China's use of Russian capital.

Moreover, export orientation is the main participation way of Russia's direct investment in China. This investment mode has certain irrationality, which leads to low level of import and export commodities between China and Russia, structural imbalance and small benefit, and restricts the strategic upgrading of the China-Russia economic,trade cooperation and the optimization of trade structure. Therefore, the Sino-Russian economic and trade cooperation and the optimization of trade structure need to optimize the utilization of Russia's foreign capital structure, capital structure of direct investment in Russia to a greater extent.

2) The difference of industrial structure between China and Russia.

Industrial structure and trade structure influence each other. A country's level of productivity decided to a development level of industrial structure, which influence the development level of a country's trade structure, in turn, the development level of a country's foreign trade also have a big impact on their production capacity in the process of a country's economic development, its trade with other countries of the commodity structure will change as the country's industrial structure adjustment and adjust corresponding change, reasonable

industrial structure can promote optimization and upgrading of trade structure and enhance the competitiveness of foreign trade [54, p. 191].

Since founding of the People's Republic of China in 1949, China has carried out recovery, reconstruction of national economy, implemented a highly centralized planned economic system, vigorously promoted the rapid development of the heavy industry, machinery manufacturing, initially established an industrial manufacturing system, a national economic system, thus accelerating the process of industrialization in China. But at the same time, the development of China's light industry and the tertiary industry was very slow in this period, the development of various industries was seriously unbalanced, and industrial structure was very unreasonable. Compared with developed countries, China is still a backward agricultural country [41, p.160].

Since the beginning of the 21st century, Chinese government has put forward a new path of development, namely, a new path of industrialization with Chinese characteristics. The path calls for the coordinated and simultaneous development of primary, secondary and tertiary industries, with economic growth as goal, scientific research and development and management concept reform as the means. Led by the heavy chemical industry, the real estate, finance and telecommunications industries have become backbone of China's economic development. Meanwhile, the chemical industry, non-ferrous metals, steel and electric power industries have also witnessed rapid development.

In period of the Soviet Union, Stalin advocated giving priority to development of heavy industry, especially the rapid development of military industry. Traditional pillar industries such as agriculture and light industry were placed in a secondary position, and the development of the tertiary industry could almost be ignored. Under the guidance of ideology, the Soviet Union accelerated its industrialization process and realized industrialization in a short period of time, but it also left Russia with an unbalanced industrial proportion, bad industrial structure, unreasonable trade structure and a deformed economic structure with strong characteristics of the militarization economy. Yeltsin after the implementation of the New Deal, he dominated government intentions through the «shock therapy» economic

transformation, change the plan economic development model, quickly establish a market economy system «shock therapy» makes a great change of the industrial structure, a significant reduction in the proportion of the first, second industry compared with the proportion of the tertiary industry is obviously rising trend. From the surface, the industrial structure of Russia is similar to structure of market economy. However, from the perspective of industrial operation and development, industrial structure is seriously deformed, especially the secondary industry. The original planned economy is still the dominant one. The energy and raw material industries with the comparative advantages have gradually become the focus of the development of heavy industry, and the proportion of the production sectors of this kind of products in the industry has increased. The development of tertiary industry is mainly reflected in the development of low-end catering service industry and trade and retail industry [19, p. 85].

The development and change of Sino-Russian trade structure is determined by industrial structure characteristics of China and Russia respectively, the differences of industrial structure can directly affect trade structure of the two countries. Russia is rich in energy resources and advanced military science and technology, and has strong advantages in resource-intensive industries and military industry. However, China has abundant labor resources and rapid development in processing and manufacturing industry. Therefore, capital and technology-intensive products such as mechanical and electrical products and primary processed and finished products are the main products China exports to Russia. Russia's exports to China, on the other hand, mainly include resource-intensive products and military products. The industrial structure characteristics of the two countries determine that the import and export commodity structure of the two countries has a strong complementarity, this industrial structure characteristics are difficult to change in the short term, so the trade in the short term is still dominated by inter-industry trade.

At present, between China and Russia to consolidate the trade capacity, on the basis of giving full play to comparative advantage, increase investment in science and technology at the same time, improve traditional industry technology innovation

ability, to develop the high value-added and high technology content of trade in goods, to develop the intra-industry trade between the two countries, so as to promote upgrading of the structure of trade between the two countries.

3) The challenge of Sino-Russian trade in the context of COVID-19.

The COVID-19 pandemic that broke out in early 2020 has posed a serious challenge to Moscow–Beijing relations. The growing uncertainty in the international relations, coupled with the global recession and the intensification of global and regional problems mean that Russia and China need to coordinate their stances and courses of action more closely. Additionally, COVID-19 has shown that Russia and China need to expand cooperation in combating non-conventional security threats and developing reliable mechanisms for joint action in emergencies [22, p. 32].

The epidemic has also put a halt to economic ties and educational, touristic and cultural exchanges between the two countries, with numerous interaction formats having been suspended. Under the new circumstances, Russia and China should make full use of the potential of new technologies and actively develop e-commerce and online payments, distance learning and the similar formats. It is vitally important to ensure that the pandemic does not have a negative impact on mutual trust and interest in cooperation.

Processing trade refers to a country purchases foreign raw materials or parts through a variety of channels, uses its own production technology and processing capacity to process and manufacture high value-added commodities, and sells them abroad, so as to obtain more profits. Processing trade is a re-export business, which is characterized by processing and manufacturing, such as processing with supplied materials, processing with supplied samples and assembling with supplied parts.

In the late 1970s, processing trade began to rise in China, divided into five stages of development, its content is also constantly enriched and developed, from the original «three to one supplement» to the present small import and large export. The main business model of China's processing trade is that capital and technology intensive products such as mechanical and electrical products are the main export products, Western developed countries are the main export markets, countries with

abundant resources or high technology level are the main source countries of imports. The rapid development of processing trade has made outstanding contributions to the development of the national economy, the adjustment of industrial structure and the adjustment of the foreign trade structure. At present, processing trade has gradually become the main way for China to develop foreign trade [23, p. 54].

China has a large working population, low labor costs, favorable social and economic environment and relatively sound infrastructure conditions, which provide favorable conditions for foreign enterprises to engage in processing trade in China. Russia's processing trade in China is dominated by labor-intensive products, as well as some capital and technology-intensive products. These products are processed and manufactured in China and then sold back to Russia. As a result, the proportion of manufactured goods in China's exports to Russia has gradually increased, and trade structure has changed a lot compared with before. China's mechanical and electrical products are mainly exported to Russia in the form of processing trade. Among many processing trade products, those exported to Russia in the form of processing trade account for the largest proportion in China's export to Russia.

4) The improvement of China's international division of labor.

International division of labor is the basis for countries or regions in the world to carry out the international trade and economic relations. With the development of modern machine production, social division of labor, international division of labor arises at the right moment. It is the inevitable requirement of social productivity and economic development to a certain stage, it is the trend of production socialization to international development. International division of labor, mainly from two aspects to determine occurrence and development: one is social and economic development of each country, including productive forces and scientific and technological strength of each country, the development degree and scope of domestic market, the number and quality of the population and social and economic structure; Second, the natural conditions of each country, including climate conditions, soil conditions, natural resources, the size of the territory, etc. Among them, the development of productivity is the decisive factor, and the direct factor is the progress of science and technology.

The structure of goods in international trade is greatly affected by international division of labor, and the structure of goods in import and export of each country depends largely on the status of each country in the international division of labor. Western developed countries have a high level of science and technology, strong independent innovation ability, and a high level of product production and processing. They are at the high end of the industrial chain and occupy a leading position in the international division of the labor. Their products have strong competitive advantages compared with similar products of other countries, so import and export commodity structure is at a high level. With the development of the science and technology and the improvement of productivity, developed countries transfer some of obsolete industries and some high-processing industries to some middle-ranking countries for production and manufacturing. Most of products are general processed and finished products with weak competitiveness. Countries at the low end of the industrial chain have weak domestic scientific and technological strength, low level of industrial development, single export commodity structure, and mainly export of the primary products that lack competitiveness, which belongs to the lowest level of export commodity structure.

Before reform and opening up, China's economic development is slow, the production efficiency is low, the residents' consumption level, lack of money for economic development and the effective support of raw materials, while the Chinese government put forward the developing heavy industry, but due to weak industrial system, science and technology level is low, most of the products belong to a lower level of general processing industry production, low value-added products, It does not have export competitiveness. In the early years after the founding of the People's Republic of China, and primary products were the main export products in China's foreign trade, accounting for more than 80 % of the total export volume. Light textile industrial products such as clothing, textiles and daily necessities are the main export products in China's foreign trade, while means of production such as machinery, equipment, fuel and metallurgy are the main products that China imports from other countries. China is at the lowest end of the industrial chain and international division

of labor. Since the implementation of the reform and opening up policy, China's position in the international division of labor has been significantly enhanced with the continuous improvement of production efficiency, the continuous enhancement of scientific and technological strength, continuous adjustment of economic structure and the promotion of the optimization and upgrading of industrial structure [27, p. 28].

In the new century, with the continuous improvement of China's position in the international division of the labor, China has not only maintained its advantages in producing and exporting labor-intensive products, but also made new breakthroughs in some products with high technological content and high added value, especially in technology-capital-intensive industries: electronics, communications. China imports spare parts and other products from developed countries for assembly, processing and re-export, which to a large extent drives the development of China's processing trade and constantly increases export share of capital and technology-intensive products, mainly mechanical, electrical products, thus promoting the adjustment and upgrading of China's trade structure with Russia.

Chapter 3 Suggestions on the optimization of Sino-Russian trade structure

3.1 Strengthening strategic interaction in the new era

As important trading partners, China and Russia both play a important role in their foreign trade. At present, China and Russia should not only pay attention to the expansion of the bilateral trade scale, but also pay attention to the optimization and upgrading of bilateral trade structure, which is related to whether the two countries can achieve long-term and stable development of trade, and whether they can grasp more initiative in foreign trade. The paper made a simple analysis of the development status of the trade structure between China and Russia, the main problems in trade structure and the factors affecting the optimization of the trade structure. Based on it, this chapter will put forward some countermeasures and suggestions for promoting the optimization and upgrading of Sino-Russian the trade structure, in the hope of optimizing and upgrading the trade structure of the two countries and developing in a sound way.

The optimization of Sino-Russian trade structure is guarantee for the sustained and stable development of Sino-Russian trade. According to the foregoing analysis and research, the main influencing factors of Sino-Russian trade structure include: research and development input, comparative advantage, intra-industry trade index, etc. Indicators are used to measure comparative advantage, industrial characteristics, policy environment and international finance respectively. Therefore, to optimize the Sino-Russian trade structure of the countermeasures and the suggestions, mainly from science and technology, industry, policy, investment four aspects to elaborate.

1 Enhance the support of relevant policies.

In order to optimize Sino-Russian trade structure and promote the development of the bilateral trade, China and Russia should coordinate the industrial policies and investment policies between the two countries for the purpose of mutual benefit and win-win. From China's point of view, for the export of commodities, the government should implement a diversified policy and improve the quality of products.

1) Improve foreign trade policies and coordinate investment policies.

China should build on existing export advantages of labor-intensive products and use technology to transform them so as to enhance international competitiveness of its export products. At the same time, China and Russia should increase the variety of trade products and expand exports to Russia in order to achieve the trade balance. China should focus on supporting the export of high-quality products, upgrading the product mix, organizing the production of products in accordance with international standards, and creating famous brand products that can be highly competitive in the Russian market as well as in the world. At the same time, China and Russia should also increase cooperation in credit, tax, price, technology, talent and other aspects, will be conducive to the smooth development of China-Russia trade and eventually expand the scale of bilateral trade.

2) Negotiate a settlement of trade barriers.

Although Russia has also joined the WTO, there will be a long transition period for the reduction of its trade barriers. The existence of trade barriers will hinder the free flow of production factors, which is not conducive to the optimization of Sino-Russian trade structure. China and Russia should solve problem through consultation. (1) Both sides should conduct coordination under the principle of mutual benefit and win-win, and have a clear understanding of each other's trade development strategies and objectives; (2) To coordinate the trade and tariff policies of both sides within the WTO framework. China should strengthen its grasp of WTO principles so that it can have a strong position in negotiation process with Russia. The Russian side should treat China's market economy status in an objective and fair way and give national treatment to China's exports. (3) The two countries should follow the trend of trade liberalization and further reduce or eliminate trade barriers to facilitate the smooth development of bilateral trade [58, p. 22].

In 2020, amid the pandemic, the governments of Russia and China will make every effort to resume manufacturing and support the wellbeing of peoples, might negatively impact major investments in foreign projects. Strict antiepidemic

measures in both countries have significantly reduced the flows of people and goods, which has complicated the implementation of joint projects.

In addition, the construction of unfinished facilities has been suspended, and manufacturing deadlines have been postponed. The negative effects of the pandemic are expected to last longer for the investment than for trade. The instability of the development of the investment interaction proves the new model of Russia-China cooperation is needed, that other promising areas of interaction need to be identified. This is further confirmed by the appearance of new areas of interaction, even though the volumes of investment are falling.

2 Improve the effect of direct investment.

As mentioned above, mutual direct investment plays a promoting role in the optimization of trade structure between the two countries. It is also analyzed that the low level of mutual direct investment between the two countries and the lack of deep cooperation have become an important factor restricting the optimization of trade structure between China and Russia. Therefore, it is necessary for China and Russia to make joint efforts to improve level of mutual direct investment between the two countries.

1) The optimization strategy of Russia's investment in China.

Want to through the way of foreign direct investment in China, the realization of the Russian exports to China trade structure optimization and upgrading of the implementation of Russia's investment activities in China to increase economic benefits, enhance the investment main body status in China, the Russian government and enterprise should according to the China investment policy changes timely adjust their investment orientation, investment mode and implement the correct regional investment strategy [54, p. 192].

Adjust direction of investment in accordance with policy of the attracting investment of China.

As for the adjustment and change of China's policy of attracting and utilizing foreign capital, the Russian government and enterprises should pay close attention to and follow up at all times, and adjust the direction of investment in China in a timely

manner. Russian enterprises should try their best to participate in the all-round and diversified investment fields which are labor-intensive, capital-intensive, technology-intensive and knowledge-intensive, so as to constantly enrich investment structure and occupy a favorable position in the increasingly fierce competition in the Chinese market. In terms of specific industries, China and Russia can focus on the fields of cooperation in the future, including chemical industry, automobile, aviation, shipping, communications and other industries. In addition, at present, the development of the tertiary industry in many provinces in China lags behind. With China's accession to the WTO, the Russian enterprises can seize opportunity to increase the investment in communication, banking, insurance and other service industries.

Adjust the investment model according to China's requirements.

At present, China requires the enterprises to invest in China not only to have advanced machinery and equipment and advanced science and technology, but also to master scientific management concepts and management modes. Therefore, medium - and long-term strategic investment should be regarded as the main business model adopted by Russian enterprises in the process of investment in China, rather than the short-term business model aimed at pursuing immediate economic benefits. At present, China's government has been set up and improve the related to investment promotion and capital introduction policy and laws and regulations, to phase out some of the past allowed into foreign conditions of domestic and foreign business model, and those who rely on government to attract foreign investment and provide preferential policies as a long-term development of the profit of a foreign-capital enterprise also must change its development mode. Therefore, according to the changes of Chinese government's policy and conditions of investment introduction, Russian government and enterprises should timely adjust their investment mode and business strategy, actively adopt advanced science and technology and management experience, and establish investment strategy of all-round integration of research, production, supply and marketing.

Implement the right regional investment strategy.

In eastern China, developed economy, infrastructure, science and technology strength and convenient transportation, for investment provides a good investment environment, attract countries flocked to the investment, central and western regions because of the market capacity is relatively small, backward economic development adverse conditions, such as great difficulty in attracting foreign investment. Chinese government in order to realize the coordination and balance of regional economic development, achieve common progress, east midwest by the providing preferential policies to guide our orientation in foreign capital directly the Midwest and northeast, encourage and support multinational companies to the western and eastern advantage industry and investment in the high-tech fields of in order to narrow the development gap between different regions. Russia's investment in China should seize favorable development opportunity, and on the basis of the development of original investment regions in the past, actively carry out cooperation in various trade fields such as services with the western regions, carry out cooperation with the western regions, and effectively expand and implement the regional investment strategy in the central and western regions of China [27, p. 27].

2) Optimizing strategies for Chinese investors.

In the process of introducing Russian investment, Chinese government should firstly focus on the construction of large projects. Secondly, it is necessary to increase the technical strength of Chinese enterprises and enhance the market competitiveness of the enterprises by introducing middle and high technology projects from other countries. Only in this way can Russian enterprises be more effectively attracted to invest in the following three industries in China, namely the leading industry, the basic industry and the high-tech industry.

Adjust investment direction.

Among them, the high-tech industry with the high technology content, the low resource consumption, low environmental pollution and other advantages, with its unique advantages become the object of the world to compete for development. Our government for investment in China's enterprises should strictly according to the industry access conditions, resolutely put an end to blind investment and low-level

redundant construction, the technical level is low or polluting production enterprises in a timely manner to stop or control, introduce new and high technology industries as the focus, to encourage and priority support advantage industry, high-tech industry development as well as the sunrise industry [23, p. 36].

Encourage investment in central and western regions.

China actively guide large Russian enterprises with strength to participate in investment in central and western regions of China, give full play to the advantages of resources and environment in the central and western regions, and promote the economic development of the central and western regions and the improvement of the economic interests of the investment enterprises. At the same time, it actively guides Russian enterprises to invest and develop in high-tech industrial development zones, free trade zones and export processing industrial zones, so as to form the large-scale industrial parks, so as to achieve higher investment efficiency, economic efficiency and social efficiency.

Strengthening the operation, management of foreign-funded enterprises.

In order to further enhance the attraction of Russian investment, China should further strengthen the management and service of Russian investment enterprises on the basis of the providing a good investment environment for them. Across China government department should according to local actual situation, investment from Russian companies formulate corresponding management regulations and rules and regulations, the Russian company recruitment conditions, operating conditions and environmental protection to set rules, the terms to make the investment and business operation activities of the company conforms to the standard of our country. While strengthening the operation and management of Russian-funded enterprises, Chinese government should also improve service and management level of Russian-funded enterprises, implement measures such as lowering the credit threshold of the banks, improving infrastructure, increasing the channels for exchange of foreign currency, sufficient electricity supply and low electricity price, and facilitating the registration of children in school. As Chinese government continues to deepen its requirements on the operation and management of Russian-funded enterprises and improve service

and management level, it is believed that in the future, it will become more and more attractive to Russian-funded enterprises and Russian direct investment in China will also increase.

The cooperation between Russia and China in the field of science, technology and innovation (STI) has a set of specific features. While military-technical exchange between the two countries is extensive and highly promising. The «Post-Soviet» stage of Russia–China science, technology and innovation dialogue began in 1992, when parties signed an intergovernmental agreement on technical cooperation that laid the groundwork for further partnership [26, p. 22].

The 2000s and 2010s saw an expansion, albeit with the serious exceptions, of contractual and trade relations in the field of high technologies. According to Russian experts, the relations were characterized by a pronounced imbalance. China imported advanced technologies, equipment and materials from Russia, placed orders for the design work, collaborated with Russian specialists in the mechanical engineering, electronics, new materials, bio and nanotechnologies, instrumentation, medicine and agriculture. Russia, on its part, mainly imported Chinese products, equipment and, to a lesser degree, components and technologies in information and communications, manufacturing, the food industry, pharmaceuticals and biomedicine.

Mutual investment helps to improve the current situation of single structure of export commodities and low level of export technology structure between China and Russia, while trade and investment liberalization is conducive to improving the investment environment of both sides, enhancing the level of the bilateral trade cooperation and thus expanding the trade scale. Due to historical factors, Russia's light industry develops slowly and is the main field of foreign investment. Therefore, China should make use of its own labor-intensive advantages to increase investment in Russia's light industry and expand the scale of investment. This will not only reduce trade frictions caused by trade surplus between China and Russia, avoid setting up technical barriers to Chinese exports, but also help Chinese enterprises «go global».

The strengthening of investment between China and Russia is conducive to the optimization of the import and export commodity structure between China and Russia. To improve the investment environment and implement the investment projects, the government should increase investment support; Import and export of commodities under investment cooperation projects are less affected by the international market and can stabilize the growth of the trade volume. Enhancing product quality and reputation is conducive to the stable development of Sino-Russian trade and the trade between the more developed areas of the two countries. Under the background of «One belt and one road», China should increase investment in Russia's infrastructure, so as to realize the steady growth of bilateral trade and achieve mutual benefit and win-win results [28, p. 12].

In 2019, Russia and China continued to make their financial markets more open and introduce innovations in the financial services sector. The two countries are expanding the use of national currencies in bilateral trade and investment, and they encourage the signing of the rouble-and yuan denominated foreign trade agreements. Russia and China continue to develop cooperation in payment systems, banking cards, and online payments. Certain improvements in Russia–China regional interaction are also emerging, which will ensure a solid foundation for development moving forward.

3.2 Promote the improvement of the industrial structure

A country's trade structure and industrial structure have the characteristics of mutual promotion and influence. The industrial structure determines trade structure, and the upgrading of industrial structure will drive the continuous optimization of the trade structure. Nowadays, with the rapid development of the economic globalization, international trade and industrial transfer around the world have also promoted the industrial upgrading and trade structure optimization of the developing countries. The tradable goods are changing from low added value and low technology content to high added value and high technology content. At present, trade structure shows the following characteristics: China mainly exports manufactured goods to Russia, which

are mainly labor-intensive products, but the proportion is decreasing year by year, while the proportion of capital and technology-intensive products is increasing year by year. Russia exports mainly primary products, mainly minerals, to China. The trade structure between China and Russia does not completely conform to changing trend of trade structure in the world. Therefore, in order to optimize the Sino-Russian trade structure and expand Sino-Russian trade, China needs to take measures in terms of industrial structure [58, p. 25].

1) Change extensive industrial development and trade growth mode by using innovative industrial policies.

Although the trade between China and Russia has been developed, the products in the trade between China and Russia are still dominated by extensive production mode and trade growth mode.

China's exports to Russia are mainly manufactured products. But the labor-intensive products still account for a large proportion of the manufactured products, although the proportion is decreasing year by year. The grim reality is that on the one hand, China's labor-intensive products face the competition from other developing countries in the Russian market. At home, on the other hand, China's labor-intensive products face cannibalism caused by overcapacity. In the international division of labor system, the tradable goods between China and Russia are basically in the middle and lower reaches of the industrial chain, with low added value, shallow processing depth and weak competitiveness.

Due to the strong complementarity of Sino-Russian trade, the level of Sino-Russian intra-industry trade has been low for a long time. Behind the rapid growth of China's exports of mechanical and electrical products to Russia, we should also see clearly a fact that the rapid growth of mechanical and electrical products and other products has caused a certain degree of damage to domestic environment. Most of China's major export industries are classified as «high pollution, high energy consumption and high emissions». The rapid development of the industries has led to environmental deterioration in our country, which cannot be measured and cannot be reflected in cost of products. Foreign trade has been accompanied by «externality».

According to externality theory in economics, in order to maintain rapid development of export, governments at all levels, trade departments and export enterprises spend a lot of resources, brings huge negative «externalities» to China's economy. If this goes on in the long run, it will certainly affect the development of foreign trade [25, p. 6].

2) Looking for the combination of the comparative advantage and competitive advantage industry, carry out strategic competition and cooperation.

At present, industrial structures of China and Russia are highly complementary, but the two countries should not be satisfied with this. The optimization of the trade structure between China and Russia should not only promote the improvement of the product technology level and the optimization and upgrading of industrial structure of the two countries, but also improve the status of the two countries in international industrial chain, which is conducive to the two countries to cope with regionalization and trade protectionism of the bloc. The two countries should pay attention to the combination of comparative advantage and competitive advantage in their respective industrial structures, so as to promote the development of the two countries' industries and make the two countries' industries compete in a benign way. At the same time, the efficient integration of the production factors should be realized to obtain new comparative benefits. In industrial cooperation, the two countries learn from each other, maximize their complementary advantages and promote the joint optimization and upgrading of their industries [21, p. 23].

3) Adjust the development strategy of export industry sector according to the changes of Russian industrial structure and trade policy.

In the future trade between China and Russia, China can adjust its industrial development pattern according to the changes of Russia's industrial structure and trade policy. In terms of trade policy, Chinese export enterprises should grasp the changes of Russia's trade policy, adjust the production of export products in time according to the changes, make the production of products more targeted, and better carry out the export to Russia. In terms of industrial policy, China can selectively encourage large Chinese enterprises to go out and set up the factories in Russia to promote development of Sino-Russian trade by taking advantage of the opportunity

of the industrial transformation in Russia. In order to promote the transformation of the economy from resource dependence to innovation, Russia puts forward five directions for the development of the innovative economy: the development of new medical technology, pharmaceutical technology; development of space technology and communications systems; development of information technology; develop new energy sources; improve energy efficiency. China should take the initiative to seek cooperation with Russia in these areas and expand bilateral trade.

3.3 Further promoting technological innovation

At present, the Chinese products exported to Russia are facing more and more competition. To ensure China's market share in Russia and increase exports to Russia, the only way to do this is to improve scientific and technological content of Chinese products and enhance the competitiveness of products. The upgrading of the products and technologies is also conducive to the optimization of the China-Russia trade structure and the sustained and stable development of China-Russia trade [19, p. 82].

Chinese enterprises can take advantage of the China's comparative advantage in labor force, use advanced technology to transform, upgrade China's labor-intensive industries, and improve the scientific and technological content and international competitiveness of the labor-intensive products, so as to expand exports to Russia. Chinese enterprises can first study the characteristics of Russian demand and adjust their products according to Russian demand, so as to make Chinese products high-end and diversified and have stronger competitiveness in the Russian market. China should establish high-tech industry as the leading industry with preferential policies to promote its development. To be specific, it can take the form of establishing new and high-tech development zones to form new and high-tech industrial clusters, and support the development of new and high-tech industries through capital market and policy measures such as finance, taxation and government procurement. Focus on the cultivating a number of key high-tech export enterprises, to assist them to establish competitive advantages, enter international market, but also to promote the upgrading

of the domestic industrial structure. While fostering new and high-tech enterprises, we will encourage them to create own brands and raise their awareness of intellectual property protection such as trademarks, patents, proprietary technology and origin marks. Specific measures in using science and technology to optimize China-Russia trade structure:

1) Enhance technological innovation capacity.

Technological innovation plays an important role in promoting the upgrading of a country's industrial structure. China should focus on the technological innovation and use it to promote the optimization and upgrading of industrial structure, so as to promote the optimization of Sino-Russian trade structure and improve China's status in the middle and lower reaches of the industrial chain in the international division of labor. At present, trade between China and Russia is dominated by the inter-industry trade, and the level of intra-industry trade is low. The transformation of trade pattern and the change of position in the international division of labor all need to rely on technological innovation and the application of new technology. Therefore, China should further increase the proportion of scientific research investment in GDP and increase the intensity of scientific research investment to encourage technological innovation. Through the application of advanced technology to improve production mode of products, increase the added value of products, gradually enhance the level of the intra-industry trade of high-tech products of China and Russia, improve the position in the international industrial chain [19, p. 85].

China can take the following measures to enhance its technological innovation capacity: strengthen the independent research and development capacity in certain high-tech advantageous fields, encourage and promote the cooperation of the large enterprises in science, industry and trade, establish strategic alliances, the most China eventually establish a scientific research, development and technological innovation system dominated by the core enterprises and large groups; establish complete infrastructure and attract multinational corporations to set up R&D centers in China with credit and tax policies. At the same time, Chinese enterprises should pay close attention to the development status of international advanced technology and improve

their technological level; support and encourage large enterprise groups to set up research, engineering research centers, post-doctoral workstations and post-doctoral technological innovation centers, develop China's own scientific and technological innovation system.

2) Increasing the application of high, new and green technologies.

New and high technologies mainly include electronic information technology, new material technology, biological engineering technology, new energy technology, aerospace technology, the advanced manufacturing technology, nuclear application technology, Marine technology and environmental protection technology. And «green technology» is the term of «pollution-free» or «less pollution-free» technologies, processes and products that follow ecological principles and ecological economic laws, save resources and energy, avoid, eliminate or reduce ecological environmental pollution and damage, and minimize ecological negative effects. Among high-tech green technologies, green high-tech is more important to the economic development of a country. Most of China's existing technologies cannot provide sustainable support for competitiveness of enterprises in the future. Under existing technical conditions, the production process of enterprises is mostly linear and non-cyclic [28, p. 32].

3) Strengthen China-Russia cooperation in the field of technology.

Both China and Russia are undergoing the industrial adjustment. In the new economic growth points of both countries, there are industries and technologies that can grow together, such as environmental protection industry, biotechnology industry, new energy, new materials industry, aerospace industry, etc. China and Russia have own advantages and potentials in the development of emerging industries. Therefore, the two countries should strengthen cooperation in emerging industries, add vitality to the development of the emerging industries and make them a real new economic growth point. From the point of view of market economy, there are great differences between industrial generic basic technology and competitive product technology and major special key technology. But generic basic technology of industry is the basis of

technical upgrading of industrial structure, which is of great importance to strategic structure upgrading of an industry [58, p. 26].

Industrial generic basic technology is the core technology with the global and universal nature, which can make the industrial technology take a qualitative leap. Reality, every industry influence and restrict the structure upgrade the common basis of technology, such as chemical industry, building materials industry clean production technology, iron and steel industry in continuous casting technology, supercritical unit design, manufacture technology in power industry, non-ferrous metal industry in hydrometallurgy technology, machine tool industry in high static processing machine tool manufacturing technology.

At present, industrial technology upgrading competition is quite fierce. In the process of industrial restructuring in China and Russia, if the two countries work alone, it often takes a lot of effort and a lot of time, which may lead to missing the best opportunity for development. Therefore, it is the best measure to solve common basic technology in the upgrading of the industrial institutions through cooperation between the two countries. In this way, we can not only make the breakthroughs in common basic technologies as soon as possible, accelerate the pace of the industrial structure upgrading of the two countries and take a certain share in the international market, but also have independent intellectual property rights and improve the trade structure between China and Russia [58, p. 27].

Under the «One belt and one road» initiative, the two countries are actively seeking new ideas and methods to promote the development of bilateral trade to a higher level. Take energy cooperation as an example. The traditional oil and gas trade between China and Russia has been replaced by the crude oil transportation pipelines. There may be new cooperation between China and Russia in energy in the future. The economic and trade cooperation in agriculture is no longer just traditional way of the cooperation, but investment in agricultural technology. The commodity structure has been in an unreasonable state. In the future trade development, the two countries will pay attention to commodity trade structure, drive the transformation and optimization of the trade structure of the two countries with economic structure,

learn from each other, and promote the economic structure through trade structure, so that the two complement each other. In the future, the degree of the bilateral trade between China and Russia is expected to further deepen.

Sino-Russian relations occupy a special position in the diplomacy of the major countries with Chinese characteristics, are a model of stable, healthy and mature inter-state relations, an important force in maintaining world peace and stability, promoting the construction of an open world economy, as well as a microcosm of the successful practice of the diplomacy of the major countries with Chinese characteristics. China stresses that China and Russia are all-round strategic cooperative partners in the same boat, and is ready to work with Russia to plan for the next step in bilateral relations and lead China-Russia relations into a new era.

Conclusion

In the 21st century, trade between China and Russia has entered a new period of rapid and steady development, with a 19-fold increase from 5.8 billion in 1999 to more than 110 billion in 2020. Trade structure between China and Russia is highly complementary, which lays the foundation for the two countries to carry out trade. But for a long time, Sino-Russian trade has been hovering at a low level, the overall scale is still small, far behind import and export volume between China and Russia and other countries. The unreasonable trade structure between China and Russia has always been one of the important factors restricting continuous expansion of Sino-Russian trade.

China and Russia, as major political and economic powers in the world, the stability of their relations not only promotes the regional development of the two countries, but also plays a certain role in boosting the development of the world. The two countries should seize the current development of the world economy and further promote the development of the world economy while safeguarding the interests of both sides. Sino-Russian relations occupy a special position in the diplomacy of the major countries with Chinese characteristics, are a model of stable and mature inter-state relations, an important force in maintaining world peace and stability, promoting the construction of an open world economy, as well as a microcosm of the successful practice of the diplomacy of major countries with Chinese characteristics.

In recent years, China-Russia political mutual trust has reached a new level. The heads of state of China and Russia have held many meetings on bilateral and multilateral occasions, pointing out direction for the future development of bilateral relations. China-Russia relations featuring equality, trust, mutual support, common prosperity and friendship from generation to generation have maintained a high level of performance. However, there are still unreasonable factors in the overall structure of Sino-Russian trade. Through the study of the above article, we find that the main problems are as follows: The structure of import and export commodities is relatively concentrated; The supply structure is not conducive to the stability of trade; The

bilateral trade are complementary and competitive; Intra-industry trade is dominated by vertical division of the labor; The imbalance of the trade structure leads to long-term deficit.

The first chapter mainly elaborates the development process of Sino-Russian trade. In addition, this chapter also describes the historical evolution of Sino-Russian trade, and the influence factors of Sino-Russian trade are summarized.

The second chapter is mainly about the Sino-Russian trade and trade structure to do basic data analysis. The second chapter analyzes the comparative advantages of the two countries and the status and structure of intra-industry trade between China and Russia by using RCA index, TCI index, IIT index. The conclusion is that Sino-Russian trade structure is unreasonable: in China's exports to Russia, manufactured goods account for a large proportion; In the finished industrial products, capital and technology-intensive products accounted for a relatively small proportion but showed an increasing trend, while labor-intensive products accounted for a relatively large proportion but showed a decreasing trend. Russian trade with China is still dominated by mineral products, while China and Russia are dominated by inter-industry trade with a low level of intra-industry trade. The trade structure between China and Russia has a slight competitive advantage. Finally, the paper puts forward the problems of Sino-Russian trade structure: export commodities are concentrated, there are foreign trade security risks; The current supply structure of both sides is not conducive to the stability of bilateral trade; The level of trade between China and Russia is relatively low, is mainly based on inter-industry trade. Labor-intensive goods still account for a large proportion of China's exports to Russia.

The third chapter is mainly to optimize the Sino-Russian trade structure of the countermeasure service. The third chapter puts forward countermeasures to optimize the Sino-Russian trade structure from the aspects of government policy, science and technology status, industrial characteristics, comparative advantage and investment.

Therefore, we should take these following measures: strengthening strategic interaction in the new era; promote the improvement of industrial structure; further promoting technological innovation. China-Russia pragmatic cooperation has made a

new breakthrough. The two sides will give full play to the cooperation mechanism, enterprises in various fields, dig deep into complementary advantages and cooperation potential, continuously optimize bilateral trade structure, steadily increase investment stock, advance cooperation on strategic large-scale projects in the fields of the energy, nuclear energy, aerospace, infrastructure, continuously tap new growth points such as agricultural trades, cross-border e-commerce, small and medium-sized enterprises, finance and high-tech cooperation. They have actively discussed Arctic development, digital economy and Far East cooperation, fully activated the potential of small and medium-sized enterprises and local cooperation, and promoted the gradual upgrading of Sino-Russia pragmatic cooperation.

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