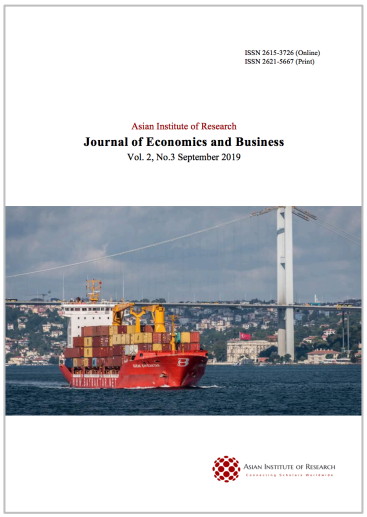

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A Study on the Role of Guangdong-Hong Kong-Macao Greater Bay Area Based on the Belt and Road Initiative

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Abstract
China's Belt and Road Initiative aims at enhancing economic connectivity and cooperation between China and neighboring countries, and promote common prosperity. Guangdong is one of the leading economic regions of mainland China. Based on the guidance of the national policy, Guangdong-Hong Kong-Macao Greater Bay Area plays its role in the construction of the Belt and Road with its strong economic foundation, unique geographical location, complete infrastructure and industrial base, convenient transportation, and global financial center status. From the perspective of the dominant competitive advantage index, this paper analyzes the competition and trade cooperation in Guangdong-Hong Kong-Macao Greater Bay Area on the basis of the Belt and Road Initiative. In addition, this paper summarizes the current situation of investment and finances of Guangdong-Hong Kong-Macao Greater Bay Area in Belt and Road Initiative and presents strategies on how to play the role of the Guangdong-Hong Kong-Macao Greater Bay Area in the Belt and Road Initiative.

Keywords: The Belt and Road Initiative, Guangdong-Hong Kong-Macao Greater Bay Area, Dominant Competitive Advantage Index

1. Introduction

In September and October 2013, President Xi proposed the Belt and Road (B&R for short), with the hope that through the construction of the "Silk Road Economic Belt" and the "Maritime Silk Road", China and surrounding countries and regions will be able to pursue common prosperity and contribute more to the global economy (Jingtong et al., 2016).

Guangdong, Hong Kong and Macao are pioneers of China's reform and opening up. Guangdong, Hong Kong and Macau have created miracles of economic growth, and the economy has grown rapidly in the past 40 years. On the occasion of the 20th anniversary of the return of Hong Kong, China government has put forward a development plan for the Guangdong-Hong Kong-Macao Greater Bay Area city cluster.The construction of the Guangdong-Hong Kong-Macao Greater Bay Area is of practical significance. Firstly, it can give a fresh impetus to China's economic growth. Secondly, taking advantage of its strong economic strength, great innovation capability and good geographical location, the Guangdong-Hong Kong-Macao Greater Bay Area would be able to serve as a strategic hub in the construction of B&R (Keqiang, 2017).

Based on the theory of international sub-regional economic cooperation and economic growth-pole, this study constructs the relative evaluation index based on the modified Balassa's dominant comparative advantage index, and calculates the trade relations index between Guangdong, Hong Kong and Macao and the countries along the routes. Combining the comparative advantages and resources in different areas of the country, it suggests integrating the resources of the Guangdong-Hong Kong-Macao Greater Bay Area and giving full play to the area in the construction of the B&R.

2. Literature Review

2.1 Theoretical basis and strategic implication of B&R

In 1993, the Asian Development Bank pointed out that "Sub-regional cooperation are well-planned cross-border contiguous economic zones of multiple countries." B&R is naturally such a cross-border economic zone. In recent years, this kind of regional cooperation has rapidly boosted due to the influence of economic globalization and regional economic integration. In terms of academic concept, cross-border regional economic cooperation refers to a number of countries in the border areas of cross-border economic men or legal persons, based on the principle of equality and mutual benefit, and carrying out a wide variety of factors of production flow for the long period of economic collaboration activities. Its essence is to promote the free flow of production factors in the cross-border sub region within certain limits, which can then result in the effective allocation of resources and the improvement of production efficiency (Sisi, 2014).

Based on the above theory, the B&R Initiative focuses on the development of economic cooperation between China and its neighboring countries. The bilateral cooperation will promote cooperation on multilateral issues and then promote international cooperation, which means that the cooperation gained in a unit will be needed and popularized in a whole area.

From an economic perspective, Nadege (2015), an economist from the National Bureau of Asian Research (NBR), is mainly responsible for analyzing the economic relationships between China and the countries along the B&R. She interpreted that the strategy will promote the export of China's excessive output. Ziming (2014) mentioned that the B&R Initiative has three functions: first, to reduce foreign exchange reserves through foreign investment; second, to mitigate excessive capacity in the infrastructure sector; and third, to promote RMB's internationalization. Another important goal of the B&R Initiative is to alleviate the imbalance in economic development between the eastern and western regions of China. The Chinese economy is mainly concentrated in coastal provinces and cities. Through the B&R Initiative, it is possible to expand the opening-up of the western China and promote economic development on the western frontier.

From the perspective of Sino-America Gaming, some think tanks in the United States regard the B&R Initiative as a strategy of China's countermeasure against the United States' return to the Asia-Pacific region, and some even compare it to the "Marshall Plan." However, many scholars do not agree to compare with both. Ling (2015) mentions that the "Marshall Plan" is the postwar U.S. aid plan for Western Europe, mainly a political and security strategy, with the aim of forming a political and military alliance in the West that has a strong sense of Cold War ideology; while the B&R Initiative follows the principle of wide consultation, joint contribution and shared benefits, which is open and inclusive rather than exclusive, focusing on connectivity, cooperation and mutual benefit.

From the perspective of Sino-EU relations, Yiwei (2015) stressed that the key issue of the strategy lies in the connection between China and Europe, because both the land-based Silk Road Economic Belt and the Maritime Silk Road are heading to Europe, and both are aimed in linking the two major markets of power and civilization.

From the perspective of the "neighboring grate", Professor Yunling (2015) advocates that the essence of the B&R Initiative is the building of a community of common destiny. There are two key points for its construction; the first point is cooperation and development, and to build an open platform of cooperation. It is important to promote a series of connected projects to benefit the countries along the B&R and finally achieve common prosperity; the second point is to foster cooperation with sustainable security and to address disputes in the spirit of justice, in order to reduce the risk of conflicts.

In short, the connotation of the B&R Initiative is to advocate a new concept of development, a new concept of security and a new concept of civilization by virtue of the spirit of mutual benefit and win-win cooperation promoted by the Silk Road and Treasure Voyages, aiming to form a community of common destiny and common prosperity without restrictions on regions, form and countries.

2.2 Guangdong-Hong kong-Macao Greater Bay Area and economic growth pole

Since the states proposed the strategy of the Guangdong-Hong Kong-Macao Greater Bay Area, many scholars have studied the problem of building the Guangdong-Hong Kong-Macao Greater Bay Area. As a specific geographical unit, the bay area exists in the coastal zone, which usually includes one or several adjacent bays and bays with coastlines facing inland depressions, as well as coastal areas composed of land regions adjacent to bays or bays and adjacent islands (Green paper, 2016).On the contrary, the bay area economy refers to a regional economic pattern formed by the development based on the port city and the coastal city and bay hinterland area (Ni, 2017).

The Guangdong-Hong Kong-Macao Greater Bay Area is a bay area and an Urban Cluster. The urban agglomeration refers to the collection of several cities and towns with different sizes, different functions, and independent but closely related to each other in a certain region. This concept originated from the concept of Megalopolis proposed by the French geographer J.Gottmann (1957).Gottman cites the phenomenon of the continuous metropolitan area in the northeast of the United States as an example, and generalizes the relevant features of the metropolitan area: good geographical location and natural conditions such as middle latitude area and plain area; located in coastal areas, along major rivers and major railway lines. A larger city is an international port city or an international metropolis. It plays a central role in the national economy and an important role in the international economy, forming a banded spatial structure and a dense network structure; a population of over 25 million, a population density of over 250 people/square kilometers; and an industrial structure dominated by the tertiary industry.

The greater bay area and city cluster of the world are the growth poles of the national and regional economies. The concept of a growth pole was first presented by the French economist F. Perroux (1955).He pointed out that growth does not occur everywhere at the same time. It appears at different intensities first at some growth points or poles, then spreads through different channels and has different final impacts on the entire economy. Glmyradal has systematically elaborated on the "growth pole" theory and its echo effect and diffusion effect, and pointed out that the diffusion effect refers to the capital, technology, talent and other factors of production through a series of transmission mechanisms from the process of constant shift to hinterland of divergent growth pole region, radiation and driving the development of hinterland region, in order to realize the overall development of region. The echo effect refers to the fact that the growth pole region will attract net population inflow, capital inflow and other factor resource inflow from the hinterland area, thereby accelerating its own development and reducing its hinterland development speed. The growth pole effect is a comprehensive effect of diffusion and echo effect (Shenglei, 2018).

Compared with world-class bay area economy, the Guangdong-Hong Kong-Macao Greater Bay Area has the following advantages: firstly, the Guangdong-Hong Kong-Macao Greater Bay Area has a large economic aggregate, good location conditions and a high degree of openness, as well as having the basic conditions for

building a world-class bay area economy. Secondly, under the framework of the Closer Economic Partnership Arrangement (CEPA), Guangdong, Hong Kong and Macao cooperation has made remarkable progress in the areas of trade in goods, trade in services and investment liberalization. Thirdly, the B&R strategy provides new support and impetus for accelerating the construction of Guangdong-Hong Kong-Macao Greater Bay Area. Fourthly, the establishment of the Guangdong free trade zone is conducive to the release of the reform dividends and creating a favorable institutional environment for the construction of the Guangdong-Hong Kong-Macao Greater Bay Area. For world-class bay areas such as the New York Bay Area and the San Francisco Bay Area, the Guangdong-Hong Kong-Macao Greater Bay Area has the following disadvantages: firstly, the world-class bay area is a multi-center group pattern, while the Guangdong-Hong Kong-Macao Greater Bay Area is still a mono-nuclear regional pattern. Secondly, the economic aggregate of the Guangdong-Hong Kong-Macao Greater Bay Area is large, but the per capita output value is low, less than one-fifth of the San Francisco Bay Area. Thirdly, the Guangdong-Hong Kong-Macao Greater Bay Area is absent from the world's top 100 innovation institutions, and its original innovation capacity is insufficient. Fourthly, Shenzhen and Hong Kong rank high in terms of global financial strength, but need to be deeply integrated (Xiaoli & Minghao, 2017).

The following section analyzes the driving role of the Guangdong-Hong Kong-Macao Greater Bay Area in B&R from the aspects of trade and investment.

3. Analysis of the Competitive and Cooperative Situation of B&R between Guangdong, Hong Kong and Macao

3.1 The Scope of Research

B&R is an open network of international regional economic cooperation with no precise spatial scope. In order to facilitate researches of the cooperation between Guangdong, Hong Kong and Macao and the B&R Initiative, the scope of research was established by 68 countries and regions along the route, covering 65 countries and regions in Central Asia, South Asia, Southeast Asia, West Asia and parts of Europe. Since Hong Kong and Macao are independent customs duty zones, serving as separate economic zones in foreign trade and other economic activities, they will be divided into two partitions. In this case, eight sectors were divided based on the regional attribution(Table 1 and Figure 1). With a total population of over 4.4 billion, the countries and regions involved in the B&R produce a total economic output of about US$21 trillion, accounting for 62.5 and 28.5% of the world respectively. In 2016, China's total trade volume with other countries along the routes was about US$953.59 billion, accounting for 25.7% of China's total foreign trade (Big Data for the Belt and Road Initiative, 2017).

Table 1. Countries (Regions) along the Belt and Road

Region	Countries (Regions)
China	Chinese mainland, Hong Kong, Macau
ASEAN Free Trade Area	Singapore, Malaysia, Indonesia, Myanmar, Thailand, Laos, Cambodia, Vietnam, Brunei and the Philippines
The Mongolia in East Asia	Mongolia
18 countries in Western Asia	The Islamic Republic of Iran, Iraq, Turkey, Syria, Jordan, Lebanon, Israel, Palestine, Saudi Arabia, Yemen, Oman, the United Arab Emirates, Qatar, Kuwait, Bahrain, Greece, Cyprus and Sinai Peninsula in Egypt
8 countries in South Asian	India, Pakistan, Bangladesh, Afghanistan, Sri Lanka, the Maldives, Nepal and Bhutan
5 countries in Central Asia	Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan.
7 CIS countries	Russia, Ukraine, Belarus, Georgia, Azerbaijan, Armenia and the Republic of Moldova
16 countries in Central and Eastern Europe.	Poland, Lithuania, Estonia, Latvia and the Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Herzegovina, Montenegro, Serbia, Albania, Romania, Bulgaria ,Macedonia

Figure 1. The Silk Road Economic Belt. Source: The China Daily

3.2Data Sources and Declaration

This article analyzes the trade data along the B&R in mainland China, Hong Kong, Macao and other 65 countries (regions). Data from mainland China, Hong Kong, Macao and other 65 countries (regions) along the B&R were collected from UN Comtrade (COMTRADE) and data from Guangdong were collected from the Statistical yearbook of Guangdong province. According to the Standard International Trade Classification (SITC)adapted by Rev.4 from the UN Comtrade (COMTRADE), all data were classified into the catalogue of imports and exports, the countries of trade, the volume of goods trade, the volume of trade, and the statistical units are in millions of dollars.

Using the UN Trade Data to calculate the relative dominance comparative advantage of 0 to 9 categories of commodities in mainland China, Hong Kong, Macao, Taiwan and other 65 countries (regions) along the B&R, there is a capability of analyzing the trade status of Guangdong, Hong Kong and Macao by Revealed Comparative Advantage and trade relations between Guangdong, Hong Kong and Macao and countries along the B&R.

According to the SITC, the commodity structure of a country's foreign trade includes two major categories, primary products (Categories 0-4) and manufactured goods (Categories 5-9). Details are shown in Table 2.

Table 2. Detailed Structure of SITC

Category	**SITC**	**Commodity structure**
	SITC0	Food and live animals
	SITC1	Beverages and tobacco
The primary product	SITC2	Crude materials, inedible, except fuels
	SITC3	Mineral fuels, lubricants and related materials
	SITC4	Animal and vegetable oils, fats and waxes
	SITC5	Chemicals and related products.
	SITC6	Manufactured goods classified chiefly by material
Industrial Products	SITC7	Machinery and transport equipment
	SITC8	Miscellaneous manufactured articles
	SITC9	*Commodities and transactions not classified elsewhere in the SITC*

Source: UN COMTRADE.

Categories 0-4 products are generally considered to be of low technical content and low added value, which are typical resource-intensive products. However, Categories 5-9 have a high technical content, especially SITC 7- 8, which is considered a high value-added product.

The research is based on data of countries' exports volumes in the world market in 2014 and 2015. Due to lack of data, 10 countries including the Philippines, Afghanistan, Bhutan, Iran, Iraq, Syria, Uzbekistan, Turkmenistan, Tajikistan, and Lebanon were not included in the analysis; in addition, 16 countries with a total export volume of less than US$16 billion were not included either. This is because we insist that small export volumes are difficult to make a significant impact on our research and perhaps, may lead to some calculation errors.

Finally, the total number of countries (regions) actually carrying out trade data analysis was 41. In order to facilitate comparison with the data of countries along the B&R, the amount of classified goods exported from 2014 to 2015 was analyzed according to the 'Guangdong Statistical Yearbook' and was converted into the SITC Rev.4 based on HS standards.

3.3 Empirical Model

There is a competitive-cooperative combo relationship in the economy among Guangdong, Hong Kong, Macao and countries (regions) along B&R. To study this kind of relationship, we use the Balassa index, which is a measure of the revealed comparative advantage (RCA) to reflect the trade status of a country in the international market (Chengwen, 2014). The revealed comparative advantage is an index used in international economics for calculating the proportion of the country's exports to the proportion of world exports. The formula is as follows:

$$RCA_{ij} = \frac{X_{ij}/X_i}{W_j/W} \qquad (1)$$

X_{ij} represents the exports of product j from country i, X_i represents the total exports from country i, W_j represents the total exports of product j from B&R, and W represents the total export from B&R.

According to Balassa(1965),on the basis of this index, a country is defined as being specialized in exports of a certain product if RCA> 2.5; if 2.5≥RCA≥1.25, it means that a country has a fairly strong comparative advantage; 1.25≥RCA ≥0.8 indicates that a country has a medium comparative advantage; while RCA <0.8 means a weaker advantage. If we need to compare the comparative advantages of trade between the two countries, we can calculate the absolute value of the RCA between the two countries. The higher the absolute value, the greater the difference in comparative advantage between the two countries in a particular product is. In this case, the two countries can strengthen trade complementarity.

The calculation of RCA adopted in this paper is different from that of the traditional form due to the particularity of the research area in this paper; that is, the research object is only the countries along B&R. In the RCA index formula, X_{ij} represents i country's j product exports to the world, X_i represent i country exports to the world, W_j represents all the B&R countries' j products export, and W represents the total amount of all the B&R countries exports to the world, hence the calculation of RCA values reflect the comparative advantage of all B&R countries around the world. However, compared with most developed countries in the world, most B&R countries lack comparative advantage in most products; that is, the RCA index will be exceptionally low, which is beyond the scope of this paper. However, if the adjusted molecule X_{ij} is calculated as the total export of j products from country i to B&R countries, then we will ignore the fact that country i may export a lot of j products to B&R countries (especially China), but very little to other countries around the world. The reason is that comparative advantage products of all B&R countries may be mostly low value-added products, while actively importing those that are not comparatively advantageous products of B&R countries in China. Thus, China's trade policy can easily affect our analysis results; perhaps, the Chinese government encourages the development of trade between B&R countries and increases imports of certain types of products, not i country's j product of the relative comparative advantage with China.

On the other hand, B&R is a policy that has been vigorously promoted since 2015, and the data we obtain is relatively limited, if the export statistics of molecule X are restricted to B&R countries, which are more susceptible to accidental or non-market factors.Considering our further analysis and processing, we hope to obtain a comparative advantage of products along B&R countries compared with China in the case of a free competitive market. So we chose the better approach, which is that X is the sum of exports of country i to the world, and the denominator W is the sum of exports of all the B&R countries to the world. The advantage is that export value can reduce the influence of accidental or non-market factors affected by trade policy, especially China's policy. Such processing will not affect the rest of the analysis or conclusions of this article, as our goal is to obtain RCA of Guangdong-Hong Kong-MacaoGreat Bay Area compared with other B&R countries (or regions);that is, the relative value of RCA reflects the comparative advantage of Guangdong-Hong Kong-Macao Great Bay Area with B&R countries. Although this does not express a comparative advantage of B&R countries in the world, but it can tell us which products should be exported or imported to the B&R countries in Guangdong-Hong Kong-Macao Great Bay Area,which is one of the paper's conclusions.

Table 3 below shows the computation of the RCA index for Guangdong, mainland China, Hong Kong, Macao, Taiwan, China and other 56 countries along the B&R in 2015. It reflects the comparative advantages of various countries and regions. To further facilitate the analysis below, Guangdong, Hong Kong and Macao were computed as a whole.

Table 3. The RCA Index of Countries (Regions) In 2015

Product Classification		Primary Commodity						Labor Intensive Commodity			Capital or Technology-Intensive Commodity			
Country(Region)		*0*	*1*	*2*	*3*	*4*	*Synthesis*	*6*	*8*	*Synthesis*	*5*	*7*	*9*	*Synthesis*
Guangdong-HongKong-Macao		0.227	0.561	0.101	0.027	0.016	0.187	1.014	1.393	1.203	0.456	1.580	1.403	1.146
Taiwan,China		0.226	0.284	0.490	0.244	0.032	0.255	1.057	0.899	0.978	1.475	1.481	0.369	1.108
10 ASEAN Members	Brunei	0.016	0.052	0.067	5.499	0.001	1.127	0.061	0.059	0.060	0.276	0.077	0.046	0.133
	Burma	5.343	0.304	2.225	2.424	0.010	2.061	0.773	0.810	0.791	0.011	0.009	1.763	0.595
	Indonesia	1.502	1.220	3.854	1.363	13.223	4.232	0.998	1.055	1.027	0.850	0.356	0.333	0.513
	Malaysia	0.683	1.007	1.237	0.974	6.779	2.136	0.702	0.842	0.772	0.989	1.131	0.181	0.767
	Singapore	0.336	1.943	0.340	0.744	0.063	0.685	0.298	0.683	0.491	1.729	1.384	2.140	1.751
	Vietnamese	2.416	0.599	1.143	0.182	0.196	0.907	0.764	2.384	1.574	0.322	1.012	0.135	0.489
	Thailand	2.463	1.205	1.937	0.233	0.157	1.199	0.918	0.730	0.824	1.235	1.212	0.629	1.025
8 countries in South Asian	Bangladesh	0.459	0.398	0.420	0.033	0.061	0.274	0.483	6.801	3.642	0.055	0.034	0.001	0.030
	Sri Lanka	4.438	1.813	1.273	0.105	1.308	1.787	0.922	3.863	2.392	0.206	0.173	0.000	0.126
	Pakistan	3.738	0.103	1.388	0.071	0.316	1.123	3.132	2.153	2.643	0.508	0.041	0.008	0.185
	India	1.939	0.744	1.593	0.702	0.387	1.073	1.896	1.163	1.530	1.737	0.442	1.010	1.063
7 CIS countries	Armenia	1.074	0.457	0.103	5.158	1.029	1.564	0.115	0.018	0.067	0.213	0.012	0.660	0.295
	Belarus	2.854	0.993	1.098	1.723	0.428	1.419	0.944	0.440	0.692	2.282	0.335	1.361	1.326
	Russian Federation	0.721	0.576	1.608	3.716	0.552	1.435	0.922	0.130	0.526	0.738	0.146	1.254	0.712
	Ukraine	4.706	2.385	6.631	0.076	9.469	4.653	2.070	0.321	1.195	0.633	0.325	0.157	0.372
18 countries In Western Asia	Bahrain	0.341	1.564	1.819	2.694	0.006	1.285	1.354	0.761	1.058	0.638	0.346	0.549	0.511
	Egypt	3.629	0.824	1.999	1.057	0.615	1.625	1.474	0.799	1.137	1.856	0.246	1.345	1.149
	Greece	2.923	4.405	1.814	1.762	3.093	2.800	1.166	0.532	0.849	1.337	0.273	0.825	0.812
	Israel	0.514	0.128	0.585	0.047	0.049	0.264	2.404	0.655	1.529	3.047	0.778	0.363	1.396
	Jordan	3.531	2.462	3.736	0.008	0.107	1.969	0.644	1.858	1.251	3.686	0.257	0.260	1.401
	Kuwait	0.165	0.138	0.120	5.269	0.014	1.141	0.047	0.072	0.060	0.641	0.073	0.139	0.284
	Oman	0.699	0.919	0.804	3.666	0.705	1.359	0.506	0.050	0.278	1.069	0.061	4.628	1.919
	State of Qatar	0.040	0.004	0.323	4.895	0.003	1.053	0.068	0.028	0.048	0.156	0.070	3.924	1.383
	Saudi Arabia	0.315	0.188	0.244	4.488	0.131	1.073	0.192	0.042	0.117	1.880	0.097	0.061	0.679
	Turkey	1.940	1.458	1.173	0.177	0.643	1.078	1.801	1.451	1.626	0.732	0.738	2.310	1.260
	The United Arab Emirates	3.629	0.824	1.999	1.057	0.615	1.625	1.474	0.799	1.137	1.856	0.246	1.345	1.149
16 countries in Central and Eastern Europe	Bulgaria	2.034	3.123	2.944	0.628	1.139	1.974	1.597	1.057	1.327	1.235	0.552	1.383	1.057
	Croatia	2.055	2.600	3.530	0.645	0.263	1.819	1.146	1.254	1.200	1.500	0.654	0.411	0.855
	Czech Republic	0.714	1.468	1.006	0.174	0.356	0.744	1.154	0.949	1.051	0.763	1.507	0.091	0.787
	Estonia	1.644	2.104	3.251	0.648	0.362	1.602	0.999	1.177	1.088	0.663	0.854	2.191	1.236
	Hungary	1.286	0.616	0.747	0.136	0.578	0.672	0.753	0.663	0.708	1.410	1.526	0.783	1.240
	Latvia	2.438	6.848	6.103	0.366	0.241	3.199	1.333	0.767	1.050	0.997	0.634	1.454	1.029
	Republic of Lithuania	2.812	4.469	2.182	0.964	0.438	2.173	0.778	1.224	1.001	1.871	0.491	0.743	1.035
	Poland	2.085	2.816	0.986	0.196	0.301	1.276	1.369	1.170	1.269	1.127	1.056	0.061	0.748
	Romania	1.304	3.230	1.810	0.264	0.381	1.398	1.181	1.150	1.166	0.588	1.182	1.155	0.975
	Serbia	3.038	5.618	1.522	0.168	1.296	2.328	1.564	1.023	1.294	1.075	0.788	0.535	0.799
	Slovakia	0.657	0.264	0.820	0.217	0.210	0.434	1.215	0.760	0.987	0.595	1.608	0.095	0.766
	Slovenija	0.722	0.819	1.679	0.314	0.099	0.727	1.531	0.819	1.175	2.203	1.013	0.145	1.120
5 countries in Central Asia	Kazakhstan	0.718	0.576	2.341	4.005	0.111	1.550	1.031	0.042	0.536	0.828	0.036	0.168	0.344

Source: *UN COMTRADE*

For a more intuitive analysis of the trade advantages of the region of Guangdong, Hong Kong and Macao compared with countries along the B&R, we propose to show the relative comparisons of the region of Guangdong, Hong Kong and Macao by obtaining the difference between the RCA index of the region of Guangdong, Hong Kong and Macao and the RCA index of i country (region) along the B&R Advantage index ($RRCA_i$). The formula is as follows:

$$RRCA_i = RCA_{GHM} - RCA_i \qquad (2)$$

RCA_{GHM} represents the RCA index of Guangdong, Hong Kong and Macao, and RCA_i represents the RCA index of country i; both data come from Table 3. If $RRCA_i<0$, it indicates that Guangdong, Hong Kong and Macao lack a comparative advantage in trade with country i, while when $RRCA_i> 0$, it means that Guangdong, Hong Kong and Macao have a comparative advantage.

According to SITC, products in Categories 0-4 with low technological content and additional value are typical resource-intensive products; products in Categories 5-9, especially Categories 7-8, with high technological content are considered as high value-added products. In order to visually distinguish the low value-added products from the high value-added products, we classify the different product categories into different numerical values, denoted as X_i;that is,SITC0, SITC1, SITC2, SITC3 and SITC4 can be denoted as -4, -3, -2 and-1; SITC5, SITC6, SITC7, SITC8, SITC9 can be denoted as 1, 2, 3, 4 and 5. If $X_i> 0$, it represents a high value-added product, while $X_i<0$ means a low value-added product.

Using the $RRCA_i$ of the comparative advantage index of 65 countries along the B&R as the ordinate, and assigning X_i as the abscissa, we obtain a scatter diagram (Figure 2).

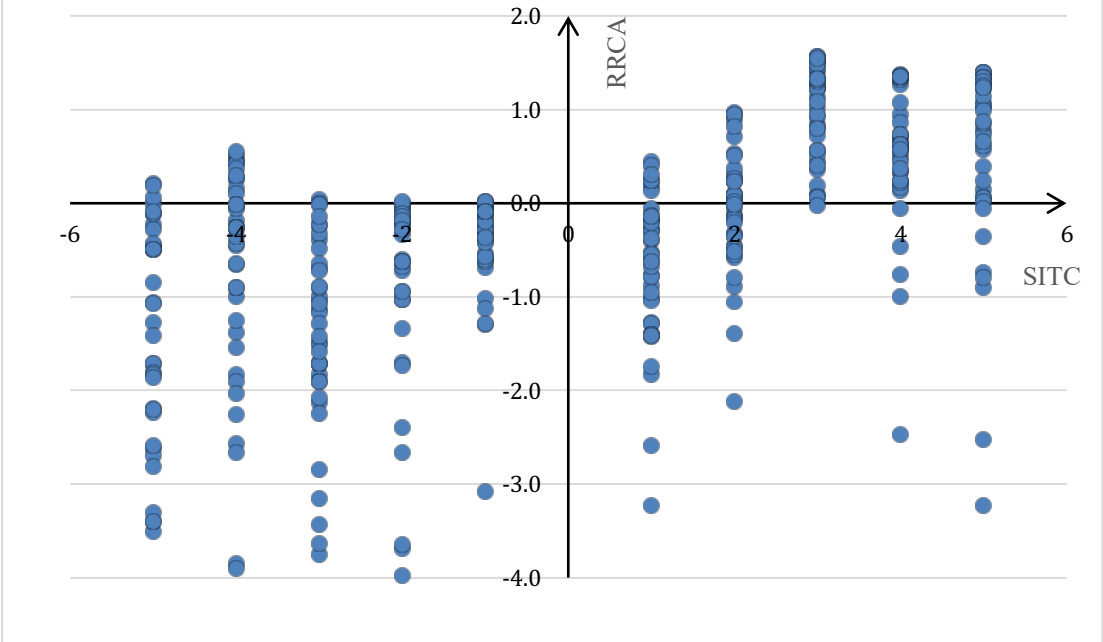

Figure 2. Scatter Diagram of RRCA Index.
Source: UN COMTRADE database

As mentioned above, it can be considered that the points in the first quadrant of Figure 2 represent that Guangdong, Hong Kong and Macao have a comparative advantage over high value-added products in countries along the B&R, and the third quadrant represents that Guangdong, Hong Kong and Macao lack comparative advantages in low value-added products.

As can be seen from Figure 2 above, almost all points of the low value-added products (left side of the figure) fall in the third quadrant, meaning that Guangdong, Hong Kong and Macao are in a low level in low value-added products compared to countries along the B&R. On the contrary, bifurcations are found in high value-added products (on the right side of the figure); Guangdong, Hong Kong and Macao have a comparative advantage in labor-intensive products in SITC6 and SITC8, SITC5 and SITC9 compared to countries along the B&R; Hong Kong and Macao have a strong revealed comparative advantage over the capital and technology-intensive manufactured products in SITC7.

It is worth noting that in Guangdong-Hong Kong-Macao Greater Bay, developed coastal cities such as Shenzhen and Zhuhai enjoy obvious comparative advantages with their strong background in trade and hi-tech. However, during the evaluation process, it was difficult for us to obtain their regional import and export data, which made us to underestimate the comparative advantage of the Greater Bay in evaluated value. Nevertheless, the result is remarkable that the Greater Bay theoretically has a strong comparative advantage to carry out the export of high-value-added products between countries and regions along the B&R.

According to the theories of the international division of labor, the regions of Guangdong, Hong Kong and Macao are no longer suitable for the export of low value-added products. At the same time, more attention should be paid to the production and export of high value-added products. Specific performance should be maintained on SITC5, SITC6, SITC8 and SITC9 products, or the current export volume should be moderately expanded, and the export of capital and technology-intensive manufactured products in SITC7 should be vigorously promoted so as to give full play to the advantages of the B&R Initiative.

3.4 Findings

Based on the previous calculation of the comparative advantage index (Table 3) and the scatter diagram (Figure 2), we find that there is a huge difference in the comparative advantages of each country and region.

Guangdong, Hong Kong and Macao have a dominant position in the capital and technology-intensive manufacturing industries. Most countries along B&R have unique advantages in primary products and labor-intensive manufacturing. We will further analyze some representative countries (regions) as follows:

(a) To strengthen the cooperation of oil, gas and mineral resources in the Middle East and Central Asia:
As can be seen in Table 3, the RCA index of Saudi Arabia in the Middle East for Category 3 commodities (including fossil fuels such as coal, natural gas and petroleum) is 4.48. Saudi Arabia has the world's largest oil reserves, production and export volume. With the improvement of China's economic development, the demand for energy has increased year after year. China's oil imports have surpassed those of the United States and have become the world's largest oil-importing country with a foreign dependence of over 60%. Therefore, it is necessary for China to strengthen cooperation with energy-based countries. In addition, Central Asia is also a vital area for China's energy cooperation. Central Asia is rich in mineral resources such as oil, natural gas, coal and uranium. Kazakhstan has an extremely strong revealed comparative advantage in Category 3 commodities with an RCA of 4.01. Kazakhstan holds the world's reserves of mineral resources and the highest volume of extraction, of which chromium ore reserves rank second place in the world, second only to South Africa. The demand for chromium in China ranks first in the world, but the annual extraction volume is only about 100,000 tons, which needs to be imported in large quantities from abroad. Moreover, Kazakhstan has the highest tungsten, uranium and copper reserves in the world. By establishing regional value chains with these countries, China should take full advantage of those countries with abundant resources and innovate the mineral resource exploitation cooperation model so that the economic development of those countries with rich energy resources along the B&R will be stimulated by means of developing and utilizing resources.

(b) To strengthen cooperation with Ukraineon animal and vegetable fats and oils:
As the world's largest exporter of sunflower oil, its sunflower seed oil output accounts for 25% of global output. China’s main source of sunflower oil is Ukraine, and China has become the second largest importer of sunflower seed oil.

(c) To strengthen cooperation with India in agriculture and animal husbandry:
India, with 10% of the world's arable land, is one of the largest food producers in the world. India has a comparative advantage in Category 6, mainly due to its industrial base in the cotton textile industry. India is the second largest exporter of cotton in the world and ranks third in cotton acreage. Its textile and clothing industry output accounts for 14% of India's total industrial output value, accounting for 17% of India's total exports; therefore, it is necessary to strengthen cooperation with India in agriculture and animal husbandry.

(d) China has wide scope for cooperation with Malaysia and other countries in the electronics and information industries:
For instance, the total bilateral trade between China and Malaysia amounted to US$97.312 billion in 2015. In China's import and export to Malaysia, the share of electronic products takes the first place (Anonymity, 2016).The cooperation in the bilateral trade of the information technology industry between China and Malaysia will have better prospects sooner or later.

(e)Taking advantage of China's high-speed railway and communication technology to strengthen cooperation with countries along the B&R in infrastructure construction:
The cooperation in the construction of China-Pakistan Railways, Haramain Express Train, Trans-Asian Railway and others have boosted the economy of countries along the B&R.

4. Analysis of Investment and Financing Situation of Guangdong, Hong Kong and Macao in the B&R

To give full play to Hong Kong and Macao, in addition to strengthening the economic and trade cooperation of countries along the B&R, it is necessary to strengthen investment and financing cooperation. The concrete analysis is as follows:

4.1 Guangdong's Investment in the B&R

In 2014, Guangdong’s actual investment amount in the B&R was US$1,720 million. By 2016, it was up to over US$4 billion, with an increase of 65.3% over the same period last year. Corporations such as Huawei, Midea, GREE, ZTE, TCL, Rising, Guangdong Power Group Co., Ltd., have already gained a firm foothold abroad (Haifei, 2016).

According to the Guangdong Provincial Office, SAY, Guangdong enterprises actively conduct their "go global" strategies. As of May 2017, there were 1,457 Guangdong enterprises reaching out to the world, 648 more than in 2014, of which 45% chose to invest in countries along the B&R. In recent years, there has been a growing tendency of investments by private enterprises in Guangdong along the B&R, which have become the main force of investment. As of the end of March 2017, a total of 309 Guangdong enterprises have invested in countries along the B&R, of which 111 were overseas-funded private enterprises, accounting for 35.9% of the total number of investors, with a total investment of US$880 million, accounting for 49.1% (Hanqing, 2017).

The reports from the Department of Commerce of Guangdong Province indicate that Guangdong Province will continue to promote the construction of overseas economic and trade cooperation zones and will build a cluster of "going global" platforms. It will focus on the major traffic node cities and ports of Indonesia, Thailand, Singapore, Pakistan, UAE, Saudi Arabia, the United States, Canada, Brazil, Chile, Australia, Germany, Kenya and other countries and regions to jointly construct industrial parks in processing and manufacturing, resource development, technical research and development, as well as logistics parks (Hanqing, 2017).

4.2 Guangdong's Financing in the B&R

As a financing-developed province, Guangdong has a leading position in credit, cross-border RMB business, etc., and its economic strength will boost the construction of the B&R. According to the data from Guangdong Banking Bureau, as at the end of March 2017, there were 172 projects that supported the construction of the B&R by the banking industry of Guangdong (excluding Shenzhen), with a total credit amount of 286.26 billion RMB. For

instance, Guangzhou Branch of the Bank of China established a key project library of the B&R and focused on supporting 49 Guangdong priority projects, with an aggregate amount of 8.25 billion RMB (Haifei, 2017).

4.3 Guangdong is promoting the internationalization of RMB

With the Guangdong enterprises actively “going global”, the demand for cross-border RMB settlement businesses in Guangdong along the B&R is also on the rise. According to the Guangzhou Branch of the People's Bank of China, the cross-border RMB settlement of Guangdong and the countries along the B&R reached 373.68 billion RMB in 2016, with an increase of 24.2% over the same period from last year. The settlement business of direct investment was 23.3 billion RMB, with an increase of 191.8% over the same period of the previous year. The Chinese RMB gradually becomes one of the major currencies and its status continues to improve. At the end of March 2017, the cross-border RMB settlement was US$880 million, accounting for 49.1% of the total. From the changes in the settlement currencies, the RMB settlement has been increasing year after year. In the first quarter of 2017, the settlement amount accounted for 84.0%, with an increase of nearly 10% compared with 74.3% in the same period of the previous year.

Guangdong financial institutions also make innovations in cross-border RMB business and expand the use of RMB in countries along the B&R. In February 2017, United Company RUSAL Plc registered and issued 1 billion RMB in Panda Bonds on the Shanghai Stock Exchange, with the intension of remitting funds raised overseas. This is the cross-border RMB settlement business for Panda Bonds raised by province-owned enterprises along the B&R, which will help improve the service capability of cross-border investment and financing of commercial banks across the country (Haifei, 2017).

In April 2016, after the announcement of the cross-border RMB business policy in the Guangdong Free Trade Zone (Guangdong FTZ), the banking institutions in Nansha and Hengqin were allowed to issue RMB loans to countries along the B&R and other overseas countries and regions, and the countries in the border areas received more extensive financial support.

4.4 The investment and financing roles of Hong Kong and Macao in B&R

First of all, Hong Kong is an important source of foreign investment in the Mainland and an important destination for overseas investment from mainland China. At the end of 2016, 44.7% of the mainland China's approved foreign investment projects were related to Hong Kong. The actual use of foreign capital from Hong Kong amounted to US$913.7 billion, accounting for 51.8% of the total foreign investment of Mainland. Hong Kong is also the prime location for outbound direct investment. As of 2015, mainland China’s direct investment in Hong Kong amounted to US$656.9 billion, accounting for 59.8% of the total overseas direct investment (Yuanlong, 2017).

Secondly, Hong Kong is an important window for the internationalization of Mainland China’s capital markets and an important fund-raising platform, as well as an asset management center in the world. In 2016, Hong Kong was listed for a total amount of 195 billion Hong Kong dollars and ranked No.1 in the world. Hong Kong is the gateway to the world. Since the "Shanghai-Hong Kong Stock Connect" launched in November 2014, total transactions from the Mainland to Hong Kong (southbound transactions) has been increasing, and the proportion of the transactions in Hong Kong mainboard has increased from 1% -2% to 12%. After the second anniversary of the successful operation of "Shanghai-Hong Kong Stock Connect,""Shenzhen-Hong Kong Stock Connect" was officially launched. On May 16, 2017, the People's Bank of China and the Hong Kong Monetary Authority decided to introduce a bond trading link between Hong Kong and the mainland (dubbed “Bond Connect"). "Shanghai-Hong Kong Stock Connect", “Shenzhen-Hong Kong Stock Connect” and "Bond Connect" accelerate the process of internationalization of mainland China capital markets, and attract foreign funds into China's stock market and bond market in order to promote the internationalization of capital markets of mainland China (A’meng, 2017).

Thirdly, Hong Kong is the world's leading offshore RMB center. Hong Kong CNH-Hibor and the spot rate of off-shore RMB are the most influential offshore RMB market rates and reference rates in the world. The RMB settlement of cross-border trade between the Mainland and Hong Kong is ranked first in the world and the size of

the RMB cash pooling is also the largest in the world. 70% of the RMB business of the Bank of China (Hong Kong) Limited are conducted in Hong Kong, and the daily RMB transactions amount to15,000 deals with an amount of 800 billion RMB. Hong Kong plays an important role in promoting the internationalization of the RMB (FX168 Finance Group, 2017).

Finally, Hong Kong remains a bridge for mainland China to invest overseas. As a first-class international trade and business service center, Hong Kong, with the advantages of the predominant business environment, legal perfection, fair competition and high degree of internationalization that has attracted enterprise and investors from all over the world, is an excellent area where multinational corporations have established headquarters or offices. According to statistics, nearly 8,000 international and Mainland companies established regional headquarters and local offices in Hong Kong. Hong Kong plays an essential role of communication in helping mainland enterprises invest overseas and attracting international enterprises to invest in the Mainland. It is an important bridge for Mainland enterprises to exploit foreign markets and go global.

5. To play the role of Guangdong-Hong Kong-Macao Greater Bay Area in B&R

The total area of Guangdong, Hong Kong and Macao is about 56,000 square kilometers, accounting for less than 1% of the total land area of China; while the population of this area is 66.34 million, accounting for less than 5% of the total. Guangdong-Hong Kong-Macao Greater Bay Area is dominated by advanced manufacturing and modern service industries. The added-value of the service industries in Hong Kong and Macao accounts for about 90% of GDP; nine cities in the Mainland, with a strong manufacturing foundation, have formed a dual-drive industrial system of advanced manufacturing and modern service industry (Xuejun, 2017). Guangdong-Hong Kong-Macao Greater Bay Area, with two districts and nine cities, is not only an urban agglomeration with the largest population in the world, but also has a large total economy. In 2016, it generated 9.34 trillion Yuan of GDP, accounting for 12.6% of the total. Its GDP is twice that of the San Francisco Bay Area, which is close to the New York Bay Area. Therefore, Guangdong-Hong Kong-Macao Greater Bay Area has world-class resources that are worth integrating their resources and exerting their role in the B&R Initiatives.

5.1 Construction of a Financial Center

Shenzhen is an important capital market in China. With the reform and opening up, Shenzhen stock market has been developing continuously, and its trading volume is as high as about 200 billion RMB per day. As the world's largest IPO market, Hong Kong is the largest offshore RMB fund center, the hub of financing, fund management and distribution in the region. If we add up the financial and economic scale of Hong Kong and Shenzhen, under the leadership of Hong Kong and Shenzhen, with the support of Guangzhou and Foshan, it is possible to form a global financial center with a vast hinterland in Asia. Therefore, Guangdong, Hong Kong and Macao should strengthen their financial cooperation; optimize the allocation of financial resources to realize the comprehensive utilization of capital, financial products and financial infrastructure, and to create a complementary and interconnected financial market community. More concrete suggestions are as follows: Firstly, to build a global financing system based in Hong Kong and Shenzhen so as to strengthen business ties with all countries and regions along the route, give full play to Hong Kong's financial markets with diversified advantages, and provide different kinds of funds for the construction of the B&R Initiatives. Secondly, to make use of Guangdong's foreign trade, foreign investment, combined with Hong Kong's RMB offshore market advantages of expanding the RMB trade settlement, increasing the investment project, increasing the RMB loan, financing, and denominated in RMB international stocks, bonds, etc., gradually forming a currency area of unified pricing and settlement in RMB, thus promoting the process of RMB internationalization.

5.2 Construction of an Innovation Center

In terms of resources, dominated by the tertiary industry, enterprises in Hong Kong and Macao have a strong financial and high-end services industry. Huawei, ZTE, BYD, Gree, and Midea and other large enterprises in Guangdong, all have strong technological innovation capabilities and high-end manufacturing base. There are famous colleges and universities in Guangdong, Hong Kong and Macao, such as the University of Hong Kong,

the Hong Kong Polytechnic University, Sun Yat-sen University, the University of Macao and Jinan University, all of which have concentrated large numbers of talents in all walks of life. Therefore, Guangdong, Hong Kong and Macao should deepen innovative cooperation, carrying out scientific and technological innovations in the fields of information technology, smart society, new energy vehicles, smart home appliances, biopharmaceuticals and marine engineering. First of all, it is necessary to establish an innovation system of Guangdong, Hong Kong and Macao to make an innovation alliance of Government-Industry-University. The government should set up a scientific and technological innovation cooperation committee, formulate a long-term development program, promote sharing of scientific and technological personnel resources, form research teams and encourage enterprises to increase investment on R&D. In this case, the cohesion of innovation can be cultivated to lead the international trend of innovation. Secondly, the geographical advantages of Guangdong-Hong Kong-Macao Greater Bay Area should be exploited to the fullest to deepen international cooperation in innovation. The superior conditions of Hong Kong and Macao help to attract international high-end scientific and technological talents. By recruiting world-class talents to carry out teaching and research, talents will be introduced and retained. It is necessary to provide a good research environment and work together with other innovation partners through cooperation in academic researches and exchanges, joint studies and co-development. Above all, the intimate relationship with other developed countries in scientific and technological achievements is conducive to the formation of an open international innovation system and acceleration of the development of innovation.

5.3 Constructing Shipping Centers

From a geographical point of view, the Guangdong-Hong Kong-Macao Greater Bay Area is a must-have for the routes to Southeast Asia, South Asia, the Middle East and Europe, and other countries along the B&R. The East is the western strait economic zone; the west is the Beibu Gulf Economic Zone and Southeast Asia; the north is the Hunan, Jiangxi and urban agglomerations in Middle-China. The Guangdong-Hong Kong-Macao Greater Bay Area is a significant transportation hub both at sea and onland, which has three global ports, including the world's third-ranked Shenzhen Port, the fifth Hong Kong Port, and the seventh Guangzhou Port. Besides, the well-developed road network is still being improved. There are nine highways in the Greater Bay Area; the Pearl River Delta light rails are under construction and the Hong Kong-Zhuhai-Macao Bridge will be fully connected to the east and west of the Pearl River Estuary.

A good geographical location and an excellent transport infrastructure are the basic preconditions, as well as the future targets for the construction of B&R port logistics center in the Greater Bay Area. It must also be a shipping center, an airport and a railway freight forwarding center. Moreover, it must be a multi-freight forwarding center, as well as a logistics and supply chain management center. The Greater Bay Area should promote terrestrial, maritime, air and cyberspace connectivity to build a global hub.

5.4Constructing a High-End Industrial Base

Guangdong, Hong Kong and Macao have a good industrial foundation. Pearl River Delta, in particular, attracts a large number of outstanding enterprises, such as BYD, Huawei, ZTE Corporation, which have come to the forefront of China and the world. Modern industry, strategic emerging industries, and the future industry are developing rapidly in Shenzhen (Table 4). The shipbuilding industry in Guangzhou and the aircraft industry in Zhuhai are developing vigorously. Therefore, they should be fully utilized to develop the emerging industry and high-end manufacturing such as the new energy automobile, smart IT, bio-pharmaceutical, intelligent household electrical appliances, oceanographic engineering and the aerospace industry.

Table 4. Shenzhen's Development of Manufacturing Industries in 2016 (Billion RMB)

Category	*Industry*	*Value added (billion RMB)*	*Increasing rate (%)*
Modern industry	Modern service industry	8278.31	11.6
	Advanced manufacturing industry	5428.39	8.5
	High-tech industry	4762.87	9.8
Strategic emerging industry	New generation of information technology	4052.33	9.6
	Internet industry	767.50	15.3
	New material industry	373.40	19.6
	Biotechnology industry	222.36	13.4
	New energy industry	592.25	29.3
	Energy conservation and environmental protection industry	401.73	8.2
	Cultural creative industry	1949.70	11.0
Future Industry	Marine industry	382.83	-9.0
	Aviation industry	84.68	5.8
	Robot, wearable devices, intelligent devices industry	486.42	20.2
	Health industry	72.35	17.9

Source: Comprehensive Sorting (Yuge, 2017)

During the development of recent years, the urban agglomerations of Guangdong-Hong Kong-Macao Greater Bay Area have formed a number of industrial agglomerations and key enterprises. To form a high-end industrial base, a cluster-based development route must be followed. For instance, by establishing a public service platform and improving production facilities, it is possible to attract Fortune Global 500, state-owned enterprises, top ten companies in different industries and other related industries. In this way, a batch of significant projects such as cloud computing, big data, LED, new energy, shipbuilding, aviation manufacturing and biomedicine will settle in Guangdong-Hong Kong-Macao Greater Bay Area, turning a new leaf to the support of industries and cluster development. The government should formulate corresponding industrial development plans, carry out industrial guidance purposely and form high-end industrial clusters with distinctive features. Enterprises should introduce talents, technologies and accelerate innovation. Hong Kong and Macao can strengthen their financial support to related enterprises to exert their advantages in financing and opening up the market.

5.5 Building a Global Value Chain

After the reform and opening up, Guangdong enterprises are capable of exploring foreign markets and participating in global competition. In this case, the enterprise can take advantage of the B&R strategic platform to make use of the bridges in Hong Kong and Macao to invest overseas. It is a way of exploring the international market and building a global value chain in order to make use of the comparative advantage of the global division of labor. This also helps to reduce the cost, improve production efficiency and product competitiveness. Guangdong enterprises can participate in the infrastructure construction, create industrial parks overseas, produce famous and special products in Guangdong, and expand the market and trade volume. They can also set up resource development enterprises with the local enterprises to develop local resources and increase the supply of raw materials. For the developed countries and regions, in addition to cooperation in production and development, research and running of schools, learning of foreign knowledge and advanced technologies can also be carried out to enhance innovation capability.

6. Conclusion

The main contribution of the paper is to deepen the theory of regional economic cooperation. With the theory of economic growth pole, this paper discusses the construction of the Guangdong-Hong Kong-Macao Greater Bay Area, and plays its role as a financial center, innovation center, shipping center and high-end industrial base, as well as having function of the bridgehead of Chinese enterprises heading global. This paper presents concrete measures of strengthening regional economic cooperation. The main shortcoming of this paper is that, since the import and export data of individual provinces are difficult to obtain and the statistics are not comprehensive, the quantitative analysis is not accurate, which is different from the actual economic and trade situation. Furthermore,

the quantitative analysis only performs static analysis and lacks dynamic analysis, which is what should be improved in the future.

The Guangdong-Hong Kong-Macao Greater Bay Area is an important node of B&R. How to strengthen the integration between Guangdong, Hong Kong and Macao, integrate their resources, unleash their unique advantages, strengthen economic cooperation with countries and regions along the B&R, and drive the economic prosperity of all countries is the focus of future research. More scholars are expected to participate in the research and propose newer and better views.

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