

Domestic Advances in Global Value Chain Research ——Knowledge Mapping based on CNKI(2002-2018)

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Keywords: Global Value Chain, Knowledge Mapping, CiteSpace, hotspots, trend.

Abstract. Global Value Chain is a hotspot for scholars at home and abroad. This paper is based on the papers published by domestic scholars in the CNKI database from 2002 to 2018, knowledge mapping analysis is carried out by CiteSpace software, we can know that the most important scholars, major research institutions, hotspots, connections between research topics and future research directions by some tables. This paper can clarify the development and changing trend in the field of global value chain clearly and provides ideas and directions on global value chain in the following research.

1. Introduction

Global Value Chain (GVC) was first proposed and developed in the 1990s. Professor Gereffi et al (1999) [1] introduced the concept of GVC and revealed the dynamic characteristics of industrial development. After years of research and development, its connotation has been continuously enriched and its application field has been gradually expanded. Domestic scholars have also carried out on the global value chain, Liu Zhibiao (2005) [2] pointed out that China's manufacturing industry was in the position of "international OEM" in international competition, it was based on the background of natural selection in China. Yu Rongjian (2011) [3] made an empirical research on the Yangtze river delta region in China that was embedded in global value chain governance, the results showed that a large number of local Original Equipment Manufacture enterprises had the manufacturing capabilities, but still got stuck in multinational company strategic targeting predicament. The study of global value chain becomes especially important both in theory and practice. Based on this background, Citespace software is used to present the current research situation and frontier trend of global value chain in a scientific and quantitative manner.

2. Data sources and methods

The data and literature of this study are all from CNKI. To clarify the research achievements and the history of the development of the global value chain, it is given priority to with global value chain inscription search and fixed number of year range is 2002-2018. The journal literatures sum up to 4569 (Search time is on May 26, 2018). Removing of non-academic papers such as manuscripts and notices, there are still 3276 academic papers on relevant topics. Knowledge mapping of global value chain research from 2002 to 2018 is drawn by CiteSpace measurement software.

Chen C (2006) [4] thought that knowledge mapping is based on the theory of co-occurrence analysis and co-citation analysis theory, it takes a sample of all the literature in a specific area and uses visualization mapping to show research hotspots, the mainstream themes and evolution trend of the method. Through the graphic information, people can understand the research overview and development trend of this field more clearly, so as to predict the future research hotspots and trend of this field. The larger the nodes in the knowledge mapping, the higher the frequency. The thicker the connections, the closer the cooperation between the nodes. In addition, the mediation centrality can be used to explore the key nodes.

Due to space limitations, maps of researchers and research institutions are not presented in the paper without affecting the overall understanding.

3. maps of the evolution trend of hot spots in global value chain research

Zhao Yan and Sun Tao (2016) [5] pointed out that keywords are the essence of a research field and papers, high frequency keywords are the core and hot issues in this field. Mediating centrality can be used to measure the literatures that play an important role in different clusters of networks. CiteSpace software is able to identify and record high frequency and hot keywords in this field and rank them according to the centrality of keyword mediation (table 1):

Table 1. Hot keywords on global value chain in CNKI Papers

Number	Frequency	Mediating centrality	Keywords
1	2468	0.91	global value chain
2	271	0.2	industrial clusters
3	336	0.19	industrial upgrading
4	97	0.11	value chain
5	165	0.09	upgrading
6	65	0.09	enterprise
7	61	0.09	enterprise management
8	56	0.07	local industrial clusters
9	81	0.06	global value chain division
10	38	0.06	multinational corporation
11	24	0.06	industrial clusters upgrading
12	172	0.05	manufacturing
13	45	0.05	clusters upgrading
14	37	0.05	competitiveness
15	23	0.05	comparative advantages
16	10	0.05	industry chain
17	34	0.04	governance
18	28	0.04	industrial structural upgrading
19	24	0.04	global value chain governance
20	21	0.04	productive service industry
21	64	0.03	The Belt and Road

It can be seen from table 1, the important keywords in the field of global value chain are the global value chain, industry cluster, industrial upgrading, value chain, upgrade and so on. What's more, we can see that the keyword of global value chain's frequency is also highest, which means that it is the focus that researchers pay attention to. So it is the direction of more attention from the researchers in this field of global value chain.

4. Emerging trend analysis

Burst means a sudden increase in the number of research results that use the keywords as a topic in a given period of time, which reflect the core and research hotspots in this time period. It received widespread attention and exploration from scholars. In the summary table of burst keywords (table 2, table 3 and table 4), strength represents emergent strength, which is positively correlated with the number of published literatures. The red line segment is on behalf of the increase of scholars' contributions in the corresponding years. The interval between the beginning and the end years represents the duration of a sudden increase in the literature. On the basis of summary of burst key words' start time and end time, the burst key words are divided into three stages, so that the research hotspots of scholars and development trends in different stages can be seen.

The first stage was the basic research stage of global value chain (table 2). In this stage, industrial cluster, upgrading, local industrial cluster, etc. are the key words with strong emergence intensity. In

the six years from 2004 to 2009, the research on industrial clusters as the key word increased dramatically, which indicated that scholars' research hotspots were centered around industrial clusters. In the context of global value chain, the upgrading of industrial clusters has always been the focus of scholars. Ren Jiahui and Wang Chengzhang (2005) [6] analyzed the transformation and upgrading process of China's IT industry from the perspective of GVC based on the upgrading of high-tech industrial clusters, and gave relevant Suggestions. Duan Wenjuan (2007) [7] investigated the risk problems of industrial cluster upgrading in China and measures under the background of GVC. Then, they gave some Suggestions and measurements to avoid risks that were discussed. In 2004-2008, scholars conducted a large number of researches on upgrading as a key word, and the research lasted for a relatively long time. The research interest lasted for 5 years. Therefore, it can be seen that the researchers are very concerned about how to realize transformation and upgrading in the global value chain. Zhang Jie and Liu Zhibiao (2008) [8] analyzed how China's local industrial clusters realize transformation and upgrading in the process of embedding the global value chain from the perspective of institutional constraints. Liang Wenling and Li Peng (2008) [9] took China's textile industry as the research object and used the theory of global value chain management to analyze the path and strategic choice of textile industry upgrading. In general, the research hotspots of global value chain in this stage are mainly on cluster and upgrading.

Table 2, Burst keywords summary table (the first stage)

Keywords	Year	Strength	Begin	End	2002 - 2018
manufacturing	2002	3.7959	2002	2003	
upgrading	2002	20.867	2004	2008	
enterprise	2002	10.438	2004	2009	
local industrial clusters	2002	16.6716	2004	2009	
Enterprise management	2002	10.2413	2004	2009	
industrial clusters	2002	26.167	2004	2009	
Clusters upgrading	2002	9.8329	2005	2009	
governance	2002	9.1516	2005	2008	
Clusters	2002	4.4906	2005	2007	
global value chain governance	2002	5.3261	2005	2012	
innovation	2002	4.5076	2005	2009	
OEM	2002	3.5048	2005	2006	
Enterprise clusters	2002	4.7077	2006	2007	
independent innovation	2002	5.3866	2006	2009	
competitive advantages	2002	3.5245	2006	2010	
economic globalization	2002	4.1182	2006	2007	

The second stage was the period of rapid development (table 3).The key words with large burst included industrial structure upgrading, upgrading path, industrial cluster upgrading, industrial upgrading and so on. During the five-year period from 2007 to 2011,the research on industrial structure upgrading as the key word increased sharply. In the second stage, the biggest intensity of emergence was the industrial structure upgrading, which indicated that it was the research hotspot in that period and has been widely concerned by scholars. Huang Yajin (2009) [10] From the perspective of global value chain, through comparative analysis of industrial structure upgrading model, it provided strategic choices for dongguan industrial structure upgrading. The study of upgrading path as the key word was also the focus of attention of scholars in the second stage. The sudden appearance time was from 2008 to 2012,which has been a hot research topic in these five years. Huang Yongchun (2012) [11] analyzed the Yangtze river delta export-oriented path and barrier factors of industrial clusters based on the global value chain research perspective, which aims to promote the Yangtze river delta export-oriented path industrial cluster upgrading and towards the high-end segment. Gao Shan and Shi Jianwei (2010) [12] took China's traditional Chinese medicine industry as an example, they analyzed its upgrading path selection and policy Suggestions under the background of global value chain theory. Duing 2009-2012, there were lots of industrial cluster

upgrading as the keyword research. Deng Aimin and Zhang Chunlong (2012) [13] studied the logistics industrial cluster upgrading, taking Hunan industrial cluster upgrading as a case study, which aimed to provide the upgrade path and the suggestions. This stage was subdivided on the basis of the first stage and the upgrading problem was studied. It can be seen from the key words of burst that the research at this stage was more specific, from the macro-level to the medium-level industrial level and even the micro enterprise level.

Table 3, Burst keywords summary table (the second stage)

Keywords	Year	Strength	Begin	End	2002-2018
industrial structural upgrading	2002	9.6399	2007	2011	
globalization	2002	3.1046	2007	2010	
industry	2002	4.7903	2007	2010	
global value chain theory	2002	3.5901	2007	2010	
upgrading path	2002	9.4529	2008	2012	
functional upgrading	2002	3.2075	2008	2010	
industrial competitiveness	2002	4.0237	2008	2011	
industrial upgrading	2002	8.7893	2009	2011	
automotive industry	2002	5.1722	2009	2014	
enterprise upgrading	2002	8.5037	2009	2011	
governance model	2002	3.8879	2009	2012	
small-medium enterprises	2002	3.3587	2009	2010	
product division	2002	2.9038	2009	2013	
value chain governance	2002	5.2806	2009	2012	
industrial cluster upgrading	2002	8.8064	2009	2012	
export	2002	3.1352	2010	2014	
productive service industry	2002	6.1651	2010	2014	
service outsource	2002	4.4808	2010	2013	
OEM companies	2002	5.4944	2010	2014	
motion mechanism	2002	3.3683	2010	2011	
multinational corporation	2002	3.8489	2010	2013	
sporting goods	2002	3.3683	2010	2011	
OEM	2002	4.4933	2010	2011	
strategic emerging industries	2002	5.2482	2011	2013	
domestic value chain	2002	8.1409	2011	2014	
low-end lock	2002	2.9355	2012	2014	
influencing factors	2002	5.6132	2012	2016	
technological innovation	2002	5.1476	2012	2015	
international division of labor	2002	5.0954	2013	2016	
added value trade	2002	5.2856	2013	2015	

In the third stage (table 4), the research of global value chain is more inclined to globalization and connects with the world. Key words such as The Belt and Road, value-added trade, service industry, world input and output table, etc. are strong emergence intensity. On September 7, 2013, during a visit to Kazakhstan, chairman of the Xi Jinping advocated of Asian and European countries jointly build economic belt "silk road", the silk road economic belt of relevant countries, especially the central Asian countries are actively involved. The initiative on March 28, 2015 by the national development and reform commission, ministry of commerce, the ministry of foreign affairs authorized by the state council issued "the drive to build the silk road economic belt and the 21st century the vision and action of the Marine silk road" was proposed formally and systematically. Zhang Monan (2016) [14] pointed out that "The Belt and Road" global value chain cooperation mechanism should include four mechanisms: the construction of infrastructure, energy trade related for the construction of the park, the industrial transfer, cooperation and partnership constructions, which aimed to promote China's industrial upgrading and prosperity of the global trade. Meng Qi (2016) [15] realized that the

global value chain upgrade needs to build a new global value chain. Fortunately, the implementation of “One Belt One Road” strategy provide opportunities. On the basis of manufacturing industry in the “One Belt One Road”, according to the industrial competitiveness index of the United Nations Industrial Development Organization, she calculated the manufacturing competitiveness of “ One Belt One Road ” sub regional, founding that China has the ability to build the global value chain. It can be seen from the research of scholars that the research direction of global value chain is closely related to the national policy guidelines, which indicates that the research of global value chain closely follows the national policy hotspots. Under the system of global value chain division of labor, the traditional trade statistics seriously distort China's trade situation. More and more scholars begin to question the traditional trade accounting methods and start to use value-added trade to measure it. Chen Wen and Li Qiang (2014) [16] used value-added trade accounting method to calculate the value added export scale of various industries in China. Lv Yue, Lv Yunlong and Bao Qun (2017) [17] studied the enterprise value-added trade from the perspective of global value chain, it was based on the micro-level enterprise data. With the booming development of China's economy, China's service industry has also been embedded in the division of labor of the global value chain. The research on the key words of service industry has surged in 2016-2018. Li Huijuan and Cai Weihong (2017) [18] used the non-competitive input occupation output model to study the relationship between China's service industry and the global value chain from the two aspects of foreign manufacturing goods and intermediate service goods. Chai Jingyu (2016) [19] analyzed the situation of the competitiveness of service industry in the global value chain in China through the calculation of the global value chain of China's service industry participation and location index, the results showed that China's service industry still had a lower position in the global value chain. Qiao Xiaoyong, Wang Geng and Zheng Chenxi (2017) [20] pointed out that the service industry of the United States and Japan have relatively high global value chain participation, however, generally speaking, China's service is still in the middle and lower reaches in the global value chain, while global value chain position index and participation index display reverse change on service industry segments such as information technology and scientific research and development.

Table 4, Burst keywords summary table (the third stage)

Keywords	Year	Strength	Begin	End	2002-2018
value-added trade	2002	20.2561	2014	2018	
international competitiveness	2002	3.0033	2014	2016	
competitiveness	2002	3.2734	2014	2016	
international division of labor status	2002	8.6796	2014	2018	
transformation upgrading	2002	5.0159	2014	2016	
China manufacturing industry	2002	4.4797	2015	2018	
People's Republic of China	2002	6.699	2015	2016	
World Input-Output Table	2002	9.6826	2015	2018	
foreign direct investment	2002	8.3623	2015	2018	
value added	2002	5.6196	2015	2018	
trade value-added	2002	12.3535	2015	2018	
global trade	2002	5.7236	2016	2018	
equipment manufacturing	2002	9.1772	2016	2018	
service industry	2002	11.8735	2016	2018	
The Belt and Road	2002	24.706	2016	2018	

5. Summary

With the development of economic globalization and integration, the international division of labor refinement, the participation of various countries in global value chains is also deepening and the scope is gradually expanding. Then how a country occupies an advantageous position in the global value chain has become the main task of economic and trade development in various countries.

Therefore, the study of global value chain is also a hot topic that scholars keep paying attention to, which has very important theoretical significance. In this study, Citespace was used to analyze the research on global value chain of Chinese scholars, which revealed the current situation, hotspots and trends of global value chain research vividly and clearly. Visual analyzing of the literature by domestic scholars in the field of global value chains from CNKI databases, thus the data, method and results of the research have certain practical value. Through the map scholars can intuitive understand the relevant knowledge in the field. Industrial cluster, upgrade and upgrade path are a hot research topic in the field of global value chain in the past years. With the evolution of the time, the research area and focus will also be different. In current days, foreign direct investment, trade value-added, equipment manufacturing, service industry and The Belt and Road are gradually welcomed by the domestic researchers. The Belt and Road is combined with the global value chain, which shows that the current research is closely linked to the policy of our country and follows the trend of The Times.

In particular, burst keywords can also predict the emerging trends in this field, and the future research directions of global value chain can be seen. Thus it provides ideas for scholars. However, this paper also has certain limitations, such as data sources. This paper mainly conducts quantitative analysis on domestic literatures, but does not involve foreign scholars' literature measurement on global value chain. In addition, this study is based on the theme of global value chain as the search documents, the scope of the search may be relatively large and broad, and certain studies in the field have not been specifically analyzed. So researchers can set out a more systematic and concrete bibliometric analysis of research in the field of global value chains from Chinese and English literature databases at home and abroad in the future research, which aims to provide a better understanding of the development of the global value chain.

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