ISSN 2616-7433 Vol. 2, Issue 7: 45-49, DOI: 10.25236/FSST.2020.020714

Study of the Measurement of Information Economy Scale in Chongqing

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ABSTRACT. *With the continuous evolution of information civilization, information technology has become a booster to promote the development of national economy and society, information economy has a wide and profound impact on social and economic life. This paper uses the input-output method and statistical method to measure the scale of information economy, and use this method to measure the scale of information economy in Chongqing in 2017. The study show that Chongqing's information economy of scale reached RMB 37561.5 billion, accounting for 54.76% of the total GDP. This study can provide theoretical reference for the government to make relevant policies*

KEYWORD: *Information economy, Input-output, Chongqing*

1. Introduction

Human history has experienced five major Information revolution. They are the Creation of Language, the Creation of Characters, the Invention of Paper-Making and Printing, the Invention and Popularization of Telegraph, Telephone, Radio and Television, the Popularization of Computer Applications and the Combination of Computer and Modern Communication Technology. Since entering the 21st century, the new generation of Information Technology Revolution of the five core, all embodies the theme of information, the future will be the era of data, the era of information. The world-wide Information Technology Revolution has affected people's values and social consciousness, and then changed the mode of production and management and economic structure.

The Information Economy of Chongqing is developing rapidly, and the information industry such as information equipment manufacturing and information service industry develops at an unprecedented speed. From a macro perspective, the value created by the information industry as a share of GDP has become larger and larger. with the number of employees increasing from 10.5% in 2015 to 17.24% in 2018. From a micro perspective, the value of products in the composition of the information component of the growing proportion. In Chongqing's information industry, information services have surpassed manufacturing equipment, in communications, services have exceeded 80 percent, and in the computer, software and services have exceeded 60 percent.

In addition, from 2007 to 2018, the global communications equipment industry also shows a trend of increasing year by year In addition, the information industry has become more and more involved in various industries and the relationship between the information industry and other industries has become more and closer. The proportion of information-related workers in non-information industry is increasing from 22.32% in 2015 to 29.18% in 2018.

From the above analysis, we can see that information activities are the key activities in people's production and life, and play an increasingly prominent role in Chongqing's economy. It requires us to have an accurate and scientific grasp of the relevant economic activities of information production and information resources utilization.

2. Literature Review

The literature shows that there are two different views on information economy in broad sense and narrow sense. In a broad sense, the information economy is the economic activity mode of the Information Society and the general term of all economic activities (wang, 2006; Anke, 2006). In a narrow sense, information industry is regarded as the economic activity mode of information activities, which refers to all industries related to the production, circulation and utilization of information (jing, 2003). The Information Economy is, in effect, a

ISSN 2616-7433 Vol. 2, Issue 7: 45-49, DOI: 10.25236/FSST.2020.020714

digital economy (The United States Department of Commerce, 2005). They see the digital economy as an economy based on Information Technology production, full of digital technological changes that affect every aspect of the economy. The Information Economy report of the United Nations Conference on Trade and Development States reports that the information economy is not just about ICT, nor does it include e-commerce, where ICT plays an important role. It also includes the widespread social and economic impact of the proliferation and use of ICTs, including the Internet and electronic business models.

The transboundary and permeable nature of software, IT services, communications and data management determines that they are economic ecosystems rather than discrete economic sectors (Liang, 1999). There are different opinions about the understanding of Information Economy in this country, the representative of which is the White Paper on the development of Information Economy in China published by China Information Communication Academy. In their definition, information is all the digital things, is the human society and material, energy juxtaposition of the basic factors of production. Wu (2003) argues that the information activity is all information generation, collection, processing, use and so on the activity, is for the good service in the human society development. Therefore, this paper will also measure the scale of Information Economy from a narrow point of view.

According to the research, the measurement methods of information economy scale at home and abroad can be divided into three categories, one is statistical method, the second is exponential method, and the third is econometric model analysis method. Jing(2003)put a comprehensive information industry strength method, which uses AHP (analytic hierarchy process) to determine a number of indicators, finally, the Development Status of information industry is obtained from six aspects: the Utilization Capacity of Information Resources, the Circulation Capacity of Information Resources, the Development Potential of Information Industry, the R & D Capacity of Information Products, the Balance Capacity of Information Industry and the Productivity of Information Industry. Information Index measurement method, Kiyosuke (2018) put forward the information index method to measure the degree of social information.

This is a relative measure, first setting a standard level of informatization, and the level of informatization in other regions is obtained by comparison. Information Utilization Potential index model (IUP) measurement method (UNESCO,H. Borko,2003). The above can be classified as an index measurement method, and the statistical data used in such methods is generally small and easy to obtain. The calculation is simple, the operability is strong, and it is a relative concept, and the results are comparable, reflecting horizontal or vertical differences. The summation of multiple indicators can more fully reflect the extent of the development of the Information Economy. The selection of indicators is not comprehensive, it has certain subjectivity, and it has a large dependence on the indicators. The error in the actual calculation process is large. There are various methods for determining the weight of each indicator, and the weights given by different methods are inconsistent. Mark (1962) mentioned “the Knowledge Industry” and “Knowledge Economy” in the publication “The Production and Distribution of Knowledge in the United States”. He believes that the knowledge industry consists of five levels, namely research and development, information organization or institution, information equipment, communication and media, and education at all levels.

The above two points are the core of Mark Lupu's information economy theory and one of the cores of measurement. He used the final demand method to measure the production and distribution of American knowledge. Adam (2019) argues that ers's economic-information activity-related analysis method uses variable regression analysis to measure the correlation between economic development and information activities, and finally determines three factors to measure the information economy level of each country. While Dale (2000) reflects the socio-economic impact of information activities, social and economic development is reflected by GNP, which aims to explain the impact of socio-economic development on the Information Economy. The method is generally a combination of qualitative and quantitative analysis, the data is easy to obtain, the method is simple, the workload is small, and the method is operable. However, it requires a high degree of integrity and accuracy of statistical data, and requires high choice of methods. Improper selection will affect scientificity. The above describes the measurement methods of eight kinds of information economy scales at home and abroad, most of which are qualitative analysis, and some are quantitative analysis based on qualitative analysis. Because the standards for dividing the information industry are not uniform and the division is more complicated, so at present there is no particularly sophisticated way to measure (Li 1994). This paper adopts a combination of input-output method and statistical method. The measurement method is simple and operability. It can be widely used in the measurement of Information Economy in different regions and has strong practicability.

3 Method

In this paper, the input-output method is chosen to calculate the scale of information economy. First,

ISSN 2616-7433 Vol. 2, Issue 7: 45-49, DOI: 10.25236/FSST.2020.020714

scientific. This method is based on the production theory of social products and the general equilibrium theory, which was founded by Leontief, the Nobel Prize winner.

The second point is applicable to structural analysis. Because the input-output method is based on the input-output table, the structure of the input-output table determines that the structural analysis can be carried out. One is the structure of each department, and the other is the internal structure of the Department.

Third, it reflects all aspects of economic operation. The first quadrant reflects the production process; the first and second quadrants reflect the distribution process; the second quadrant reflects the consumption process; the second and third quadrants reflect the exchange process.

Fourth, mature economic analysis methods. 1, Second, input-output method is one of the methods recommended by the United Nations for national economic accounting; third, input-output method is a common method for industrial structure analysis. The core of using input-output method to calculate the scale of information economy is to work out the input-output table. The input-output table has the following three characteristics, so it makes the information economy scale calculated by the input-output method more accurate.

(1) The scale of information economy obtained by input-output method is absolute, not relative. At present, in the measurement method of information economy, some scholars use the index method. The advantage of the index method is that it can comprehensively study all levels of economic activities. The index index index is a relative concept, which can be compared according to the results. That is to say, it needs two or more samples to make sense. It is not applicable to study a certain region alone, so it cannot be clearly understood The development degree of information economy scale. Compared with some relative numbers, the input-output table provides absolute values, which are of more reference and practical significance for studying the scale of information economy.

(2) The input-output table shows the annual data, so the annual information economy scale can be calculated. In measuring the information economy, some scholars adopt the method of econometric model. For example, the measurement method adopted in the white paper on the development of China's information industry is the production function, which is a econometric model. The sample is a time series, so the result of the econometric model is the average value over a period of time, rather than the value in a certain year. Because the information industry has the characteristics of rapid development and strong comprehensiveness, it is not accurate to measure the annual information economy scale with a period of information economy scale. On the basis of input-output table, using annual data to measure, we can get relatively accurate results.

(3) By using the input-output method, the composition of information economy can be made clear. Through the sector classification of the input-output table of information economy, the sector composition of the input-output table of information economy can be clarified. Through the observation of the second phenomenon of the input-output table of information economy, the composition of the use of information economy can be made clear. Through the observation of the third quadrant of the input-output table of the information economy, the composition of the added value of the information economy can be made clear. Through the observation of the first and second phenomena in the input-output table, we can make clear the output and consumption structure of information economic activities.

4 Measurement of Chongqing's Information Economy Scale in 2017

The construction of the input-output table in 2017 requires the preparation of an input-output table every 2. 7 years according to the requirements for the preparation of the input-output table. Two points need to be explained. First, the determination of the information industry sector in the input-output table for 2017. The classification of information industry departments in 2017 is obtained, as shown in the following table. The second point is the determination of information coefficient. In calculating the information coefficient, the data of “the country's employment population by education level and industry category” is used. The data set does not directly relate to the division of departments in the input-output table for 2017, and needs to be consolidated before calculation.

At present, the definition of information industry by experts and scholars is divided into two kinds, narrow definition and broad definition. In a narrow sense, the information industry is basically defined as “an industry related to activities such as information generation, collection, storage, processing, dissemination and utilization”. Simply put, it is an information industry based on numbers and networks. The information industry in a broad sense is “the industry related to all economic activities in the information society”. For the narrow sense of the information industry, Chongqing's Tencent, Jingdong, Alibaba, Baidu, Netease and other Internet companies undoubtedly belong to the category of information industry. Traditional industries such as mining, manufacturing, and even agriculture, forestry, animal husbandry and fishery also have information activities within these

ISSN 2616-7433 Vol. 2, Issue 7: 45-49, DOI: 10.25236/FSST.2020.020714

industries, but these information activities are used for internal consumption and do not enter the market for trading. However, a large part of their output value is brought by information activities. The added value generated by these information activities should also belong to the category of information economy. Some information industries should also be separated from traditional industries. The information industry in a broad sense has the characteristics of the times and corresponds to the information age and information society.

There are 139 departments in the input-output table. If we want to study the information economy on this basis, we must first distinguish which of these departments are information departments. The division of information departments here should be based on our own understanding of information production The definition of industry, as well as the existing industry classification standards, combine the two to determine a more reasonable allocation of departments.

Experts and scholars have different opinions on the information industry and the information service industry. This article is based on the 'Classification of Productive Service Industry (2017)' and the 'Provisional Regulations on Statistical Classification of Information Related Industries' issued by the National Bureau of Statistics.(See attached table) The two industry classification standards and the opinions held by most experts and scholars define the information industry from a narrow perspective based on the principle of accurate measurement as far as possible. In a narrow sense, the information industry is large,it is divided into two types, information industry and information service industry. The classification of information industry and information service based on 2017 input-output table is as follows:

Table 1 Classification of Information Services Sectors in the 2017 Input-Output Table

Information service industry
Information transmission, software and information technology services
Scientific research and technical services
Education
Culture, Sports and Entertainment
Public Administration, Social Security and Social Organizations

The determination of departments in the input-output table of the information economy will be consolidated in 2017. According to the calculation method, Chongqing's information economy of scale reached RMB 667.88billion, accounting for 34.25% of the total GDP in 2017.At the same time, it also means that under the current social background, the information economy has grown rapidly and has become an important part of the social economy. Although the total amount of information service industry has been improved, its share in the information economy has shown a downward trend. The share of information service industry has declined, and the share of information service industry and virtual information sector has increased slightly.

5. Conclusion

The impact of information activities on the national economy is growing. It is necessary to measure the scale of information economy scientifically and accurately, so that people have a clearer understanding of the scale of information economy. Therefore, this paper focuses on the measurement of the scale of information economy. Through a series of methods, we construct the input-output tables of information economy in 2017. According to the data of two input-output tables of information economy, we get the scale and composition of information economy in 2017, the position of information economy in national economy and the position of three information industries in information economy. In 2017, the total amount of information economy was 667.88 billion, accounting for 34.25% of the total GDP in 2017.

References

[1] Adam Pawlicz (2019). Pros and cons of sharing economy regulation. Implications for sustainable city logistics,Transportation [J].Research Procedia, no.39, pp.398-404.
[2] Ana Zorio-Grima Paloma Merello(2020). Consumer confidence: Causality links with subjective and objective information sources[J].Technological Forecasting and Social Change, pp.150.
[3] Chen Shuxiang (2004). Thoughts on Chongqing's industrialization driven by informatization[J]. Journal of Chongqing Technology and Business University: Western Economics Altar, no.1, pp.12-13.
[4] Chen Yu Xie Kang (1997).Macleup Knowledge Industry Theory and Its Influence [J]. Library and Information Work, no.7, pp. 9-13.

ISSN 2616-7433 Vol. 2, Issue 7: 45-49, DOI: 10.25236/FSST.2020.020714

[5] Chia-Chen Chen Ya-Ching Chang(2018). What drives purchase intention on Airbnb? Perspectives of consumerreviews, information quality, and media richness [J].Telematics and Informatics, no.35, pp.1512-1523.
[6] Chihiro Watanabe Kashif Naveed Yuji Tou (2018). Pekka Neittaanmäki, Measuring GDP in the digital economy: Increasing dependence on uncaptured GDP. Technological Forecasting and Social Change, no.137, pp.226-240.
[7] OECD (2002). MEASUSING THE INFORMATION ECONOMY 2002[R], pp.75.
[8] Deng Jingyi Luo Weiqi (2002). Preliminary analysis of the input-output of information industry in Guangdong Province[J]. Journal of Jinan University and Medical Edition, pp.5-6.
[9] Hamid Sepehrdoust (2018). Impact of information and communication technology and financial development on economic growth of OPEC developing economies[J]. Kasetsart Journal of Social Sciences.
[10] Jing Jipeng, Ma Zheming (2003). Analysis and evaluation of information warping measurement method [J] Information Science, vol.21, no.8, pp.785-791.
[11] Li Jingwen Komatsu Sakisuke (1994).The origin of informatization and its economic meaning [M]. Informatization and economy Development. Social Sciences Literature Press.
[12] Li Lianyou (2005). The Theory and Method of Information Industry Accounting [M]. China Financial and Economic Publishing House.
[13] Li Xiaodong (2000). Informatization and economic development [M]. China Development Press.
[14] Liang Haili, Yu Hongbin (1999). Research on the Measurement of China's Informatization Level Index[J]. Information and Information Work, no.4, pp.12-13.
[15] Mark Bolat, Li Bixiang, Zhong Huayu (1987). Information Economics [M]. Hunan People's Publishing House, 1987.
[16] Mark Lupu (2007). American Knowledge Production and Distribution [M]. Renmin University of China Press.
[17] Matheus Albergaria Charbel José Chiappetta Jabbour (2020).The role of big data analytics capabilities (BDAC) in understanding the challenges of service information and operations management in the sharingeconomy: Evidence of peer effects in libraries[J].International Journal of Information Management，pp.51-52.
[18] Oliner&Sichel (2000). The Resurgence of Growth in the late 1990s: Is Information Technology the Story[J].The Journal of Economic Perspectives, vol.9, no.14, pp.3-22.
[19] Petteri Vihervaara, Pier Paolo Franzese, Elvira Buonocore (2019). Information, energy, and eco-exergy as indicators of ecosystem complexity[J].Ecological Modelling, no.395, pp.23-27.
[20] Samuel Guérineau, Florian Léon (2019). Information sharing, credit booms and financial stability: Do developing economies differ from advanced countries [J].Journal of Financial Stability, no.40, pp.64-76.
[21] Schultz, Charles, Mackie, Christopher (2002). Price: Conceptualizing and measuring cost-of-living and price indexes[J].Washington D.C: National Academy Press.
[22] Victoria L (2019). Crittenden William F Crittenden Haya Ajjan.Empowering women micro-entrepreneurs in emerging economies: The role of information communications technology [J]. Journal of Business Research, no.98, pp.191-203.
[23] Wang Xin, Jing Jipeng, Wang Gang (2006). A summary of measurement methods for information industry at home and abroad [J]. Information Science,vol.24, no.2, pp.903-908.
[24] Xiao Jinghua (1999). Measurement and Comparative Analysis of Guangzhou Information Economy[J]. Information Theory and Practice, no.2, pp.12-13.
[25] Zhaorui Jing, Jinman Wang (2020). Sustainable development evaluation of the society–economy–environment in a resource-based city of China:A complex network approach[J].Journal of Cleaner Production, pp.263.