

Analysis of Digital Economy Concepts and Measurement Methods at Home and Abroad

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Keywords: Digital economy, Concepts, Measurement method

Abstract. This paper summarizes the characteristics and measurement methods of digital economy by reviewing the development of digital economy. By comparing and analyzing the measurement methods of digital economy, the paper finds out the existing problems and provides suggestions for the scientific measurement of digital economy.

1. Introduction

At present, digital economy has become an important part of economic development. The national bureau of statistics (NBS) has proposed to accelerate the research on the standards, indicators and measurement systems of digital economy and other emerging economies, and the reasonable measurement is conducive to the government's decision-making and policy implementation. Therefore, on the basis of defining the concept and scope of the digital economy, it is imperative to formulate a statistical survey and measurement system that keeps pace with The Times.

2. Conceptual features of the digital economy

The digital economy was first proposed by Don Tapscott. With the development of Internet technology and industrial economy, the connotation of digital economy has been enriched and the boundary line has been blurred.

South Korea defines the digital economy as all economic activities based on the information and communication industry, including the Internet. Among them, including electronic transactions, Internet shopping, search services, and so on.

The UK believes that the digital economy refers to all the economic output brought about by various types of digital inputs. Digital inputs include digital skills, digital devices (software and hardware and communications equipment), and digital intermediates and services for production.

The United States and the OECD will focus on the measurement of the digital economy. The United States believes that measuring the digital economy should include new digital services in addition to the part of e-commerce. The OECD defines the digital economy as a trade in goods and services that is realized and carried out through e-commerce.

China believes that the digital economy refers to a series of economic activities that use digital knowledge and information as key production factors and modern information networks as an important driving force for efficiency improvement and economic structure optimization.

In fact, the digital economy can be understood from the narrow sense and the broad sense: the narrow sense of the digital economy can be understood as the information and communication technology (ICT). The broad sense of the digital economy includes not only the ICT industry, but also the integration part of the digital economy in its industry, which is also the most difficult part to define and calculate. At present, there is no unified standard for the concept of digital economy in the world, and there are differences in the measurement system.

But the measurement of the digital economy is inseparable from the development of information and communication technology (ICT). ICT is the foundation of the digital economy, and the concept and measurement range of the digital economy are affected by information and communication

technologies. In order to scientifically and accurately measure the scale of the digital economy, it is necessary to fully consider the three characteristics of ICT, substitution, penetration, and synergy. The characteristics of the digital economy determine that the measurement of the digital economy includes two aspects: one is the industry directly related to the digital economy, and the other is the part that the digital economy can enhance the efficiency of the traditional industry.

3. Digital economic measurement methods

Regarding the calculation of digital economy, different countries or research institutions have different standards, and each has established a corresponding indicator system. From the domestic and international research, there are mainly three methods: regression analysis, production method and expenditure method.

Regression analysis is divided into unitary regression analysis and multiple regression analysis. For example, Tencent Research uses a unitary regression analysis. The digital economy GDP is used to determine the statistical relationship by regression of the "Internet +" index, and then the scale of the digital economy is measured on the basis of "Internet +". Accenture uses multiple regression analysis. It divides the scale of the digital economy into two parts: one is the scale of the core industry such as ICT hardware and software; the other is the integration of the digital economy with other industries, and the two economies add up the total amount of the digital economy.

The production method covers a wide range and the calculation of the digital economy is relatively accurate. The measurement scope covers the core industries of the digital economy such as electronic information manufacturing, information and communication services, and software, as well as the digital economy integration. The core industry part of the digital economy calculates the total amount of core industries in the digital economy by calculating the contribution parameters of information communication and technology (ICT) inputs and multiplying the amount of ICT inputs. The digital economy integration part is measured by the corresponding relationship between the input of ICT products and services in various industries in the input-output table and the industry output.

The expenditure method can separate ICT capital from the total investment, and can also separate software services from private consumption and government consumption, and can also separate the net export of ICT products from the total net exports. This method is used by McKinsey iGDP and Boston's e-GDP. However, Boston's e-GDP spending method has a broader range of statistics, covering virtually all activities associated with ICT equipment to create production, service delivery and applications.

4. Problem analysis

Regarding the calculation of the digital economy, the methods adopted by different regions or institutions are different, mainly because of differences in the understanding of the digital economy. However, from the current calculation methods, regression analysis, production method, and expenditure method all have certain limitations.

Regression analysis is widely used not only in the field of digital economy, but also in other fields. However, it should be noted that the effectiveness of the regression analysis method depends on the meaningful independent variables and the actual regression statistical relationship. In the process of measuring the scale of the digital economy, the relationship between the digital economy and Internet + does not necessarily satisfy the linear statistical relationship, so there are problems in its premise assumption. For example, the unitary regression analysis method of tencent research institute shows that the "Internet + index" itself is not a meaningful "base", and its numerical value is not necessarily proportional to the development degree of "Internet +". Since different Settings will affect the stability of the regression coefficient, the statistical relationship obtained may not be reliable.

The production method not only counts the direct contribution of ICT industry, but also measures the indirect contribution of ICT industry to traditional industry. But the scale of the digital economy measured by this method is still not accurate enough. For example, when measured from the perspective of production method, the additional added value derived from the productivity

improvement of intelligent technology is uniformly assigned to the traditional manufacturing industry and cannot be separated into the digital economy.

The expenditure method measures the final results of regional production activities in a certain period from the perspective of final use. This method is only applicable to measure the economic aggregate generated by ict-related economic activities, and cannot accurately reflect the value increase of traditional industries. For example, many modern agricultural production uses ICT and other technological means. Due to the high nutritional value and good quality of agricultural products, the selling price of agricultural products is higher than that of ordinary agricultural products. There is definitely a contribution of ICT technology here. However, under the expenditure method, these contributions are classified as "non-ICT consumption".

It can be seen that ICT is an enabling technology that can be widely used in various industries of the national economy. The direct part related to the digital industry is easy to measure, while the integration with other industries is difficult to measure because it is difficult to separate. At present, there is no way to directly and accurately measure.

5. Suggestions

5.1 Strengthen theoretical research

Theoretical research is the foundation of effective measurement of digital economy. Only by strengthening the theoretical research of digital economy measurement and evaluation and establishing a complete theoretical framework of digital economy measurement and evaluation can it have academic value and influence. Therefore, on the basis of existing studies at home and abroad, it is of great significance to put forward a theoretical framework with Chinese characteristics and in line with China's reality for the effective measurement of the digital economy.

5.2 Jump out of GDP measurement limits

GDP is the result of production, but the economy is not only production, but also includes consumption, distribution, investment, and international trade. The digital economy estimates not only to measure production, but also to cover a larger scope. Even if it is produced, it is not only measured from the amount of value, the amount of money, but also the amount of physical material. The complement of such indicators can more accurately reflect the scale of the digital economy and provide a more comprehensive understanding of the digital economy.

5.3 Build a statistical indicator system for the digital economy

First, encourage the government, research institutions and enterprises to jointly participate in the design of the statistical indicator system of the digital economy, accelerate the establishment of a scientific and comprehensive indicator system for the dynamic changes of the digital economy, and lay a foundation for the scientific measurement of the digital economy. Second, we will pilot the application of digital economy measurement methods in some representative industries and enterprises, and improve the measurement methods in practice. Third, an effective data collection platform should be established to collect accurate and perfect data indicators as far as possible, so as to provide data support for the construction and development of the statistical indicator system of the digital economy.

Acknowledgement

This research was financially supported by Shandong Provincial Federation of Social Sciences (Grant NO. 18-ZC-JJ-04, Research on the Development Path of the Integration of Digital Economy and Real Economy in Shandong Province) and the Shandong Provincial Social Science Planning and Management Office (Grant NO.770, Research on the Mechanism, Evaluation and Countermeasure of the Integration of Digital Economy and Real Economy in Shandong Province).

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