

The Measurement of Information Economy in Inner Mongolia

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Abstract: *With the development of information technology, information economy becomes a new economic form. The penetration and integration between traditional industries and information technology, the more heavier in output the more important it becomes in the development of enterprise. Under the new environment of economy, the information economy has become one of the important ways to industrial restructuring, transformation and upgrading. Referencing from China Academy of Information and Communication, this paper Measure information economy of our region, including the northeastern Mongolia, eastern Mongolia, eastern Mongolia, the Mongolian central and Western Inner Mongolia, based on the existing inter-regional links, town links between economic and technical, as well as natural environment similarity[1],and to analyze the characteristics and status of development. 1Classification of the main functional areas in Inner Mongolia.*

Keywords: *information economy, Measurement, GDP, Inner Mongolia.*

1. INTRODUCTION

With the computer, the Internet, e-commerce, networking and other high-tech development, information technology play important position in the enterprise increasingly, especially improving business productivity and organizational efficiency. In the early 1962, the American economist Machlup put forward the concept of "information economy", and established a set of accounting system of information industry.[2] "The knowledge production and distribution of United States."Subsequently, the information economy has been gradually developing more detailed in accounting system.at2005, The United Nations issued the Information Economy Report, reported that the information economy is not just ICT, its not only including e-commerce, but also including the wide range of social and economic impact by the proliferation and use of the Internet and e-commerce.[3] Information Economy Report by The United Nations.2015, the Chinese Academy of Information and Communication released 2015 China Information Economy Report, and described the concept of information economy, measures, effect and trend detailed.

2. THEORY

This chapter mainly introduces the related concepts, calculation methods of information economy.

2.1. Information Economy

At present, the academic definition of the information economy has not yet unified, the Chinese Academy of ICT economy given the latest definition based on the Chinese IT Development and China's national conditions. Information economy[4] is the core factor of production based on digital

information resources , running based on information network , the endogenous driving force of economic growth based on information technology , and formed the new economic form through closer integrate with information technology, products, services and other areas, contain the information industry, the integration of emerging industries, and information technology application to traditional industry output and efficiency.

2.2. Accounting Scope of the Information Economy

Production of Information economic includes information industry, mainly production and related information technology enterprise, including electronic information industry, information and communications industry, software services, and new industries due to the wide range merges of information technology. Among them, the electronic information industry including computers, network communications, digital audio, integrated circuits, components, electronics and other applications; Information and Communication include basic telecommunications services and value-added telecommunications services and so on; software services include basic software, application software , as well as information systems integration business; emerging industries including cloud computing, networking, big data, Internet finance and so on.

The application part of Information economy is some enterprises that mainly used information products, technology to improve production quantity and production efficiency .On the one hand, the development of information and communication ,Information Equipment put into all aspects of traditional industries, such as information collection, transmission, storage, processing, form new ways of production and organization to bring more capacity. On the other hand, the wide use of information technology in the total factor productivity promote production efficiency and scale in traditional industries.

2.3. Calculation Method

2.3.1. Calculation of the General Framework

The factors of production is divided into ICT and ICT capital[5], use the following Accounting framework

$$OTP_{it} = HA_{it}f(CAP_{it}^{ICT}, CAP_{it}^{NICIT}, MID_{it}, LAB_{it}) \quad (1)$$

Wherein, LAB_{it} represents labor, MID_{it} represents intermediate product, HA_{it} represents Hicks neutral technical progress, OTP_{it} represents the total output, i represents individuals, t represents time. It can get a single index of production function after various types of factors of production plus total.

2.3.2. Calculation Steps

2.3.2.1. The Calculation of Productive Capital Stock

On the basis of the perpetual inventory method, considering the time - efficiency model, it is also that the production capacity is loss as the capital put into, attenuation of relative production efficiency is different from the loss of market value, under the condition ,it will measure the productive capital.

$$K_{i,t} = \sum_{x=0}^T h_{i,x} F_i(x) I_{i,t-x} \quad (2)$$

According to Schreyer (2004) study of the ICT capital investment[6],the hyperbolic time - efficiency function, reflecting changes in the relative productivity of ICT capital, G (x) is the normal probability density function, reflecting the status of ICT capital out of service.

$$h_i = (T - x)/(T - \beta\chi) \tag{3}$$

Where, T is the maximum useful years of capital invested, x is the useful years of capital, P value is defined as 0.8.

$$F_i(x) = \int_0^x \frac{1}{\sqrt{2\pi \times 0.5}} e^{-\frac{(x-\mu_i)^2}{0.5}} dx \tag{4}$$

2.3.2.2. The Definition of ICT Investment

In order to guarantee comparable, taking into account the actual situation of China, excluding the Home audio listening device manufacturer, electronic component manufacturing," and the electronic device manufacturing "and other projects, so the scope of ICT investment will be divided into three categories: computer, communications equipment and software. computer includes projects for the computer machine manufacture, computer network equipment and computer peripheral equipment manufacturing; communications equipment includes projects for radar and the supporting equipment manufacturing, communication transmission equipment manufacturing, communications switching equipment manufacturing, communications terminal equipment manufacturing, mobile communications and terminal equipment manufacturing, and other communications equipment manufacturing, photoelectric equipment manufacturing and radio and television programme production and launching receiver equipment manufacturing. Software includes project of public software services and other services.

2.3.2.3. Determining ICT Investment

It used investment calculation methods proposed by Akihiko Shinozaki [7](1996, 1998, 2003).The idea is based on input-output tables of the year gross fixed capital formation , combined with the output value of domestic ICT data, to calculate the average annual growth rate of domestic demand and investment in the year interval, transformation coefficient obtained by the subtraction, and then combined with the annual rate of growth of domestic demand, thus obtain the growth rate of investment, on this basis to calculate the interval year investment data. Specific formula is as follows:

$$IO_{t1} \times (1 + INF_{t1t2} + \gamma) = IO_{t2} \tag{5}$$

$$\dot{\gamma} = \dot{IO} - \dot{INF} \tag{6}$$

Among them, the IO_{t1} is the year benchmark data values from start input-output table, IO_{t2} is the year benchmark data values from end input-output table, INF_{t1t2} is domestic demand increase rate from begin to the end of the years(domestic demand = GDP - exports + imports), \dot{IO} is actual data average annual growth rate of investment between input and output table, \dot{INF} is average annual growth rate between real domestic demand data, $\dot{\gamma}$ is annual rate conversion connection coefficient. Here, the growth rate of investment in ICT =growth rate of domestic demand + annual rate conversion connection coefficient ($\dot{\gamma}$).

2.3.2.4. The Depreciation Rate

We use the United States of 0.3119, the age of 4 years to determine the useful lives and depreciation rates of hardware, software and communications equipment is 7.5 years, the depreciation rate was 0.2644; Since there is no official announcement of the relevant data for software depreciation rates, taking into account the commonality of the global market, we use the depreciation rate of 0.315, the age of 5 years.

2.3.2.5. Determining ICT Investment Price Index

The United States as a reference country

$$\gamma_{i,t} = \int (\Delta \ln p_{i,t}^u - \Delta \ln p_{k,t}^u)$$

(7)

Among them, $\lambda_{i,t}$ is difference of the predicted value sequence variation in the United States ICT and non-ICT capital investment; $\Delta \ln p_{i,t}^u$ represents the US non-ICT fixed investment price index difference; $\Delta \ln p_{k,t}^u$ represents the difference between the US ICT price index. next to smoothing regression of price differential, and then take into the next formula to estimate China's ICT price index.

$$\Delta \ln p_{i,t}^c = \gamma_{i,t} + \Delta \ln p_{k,t}^c$$

(8)

2.3.2.6. Estimate the Total Economy Information

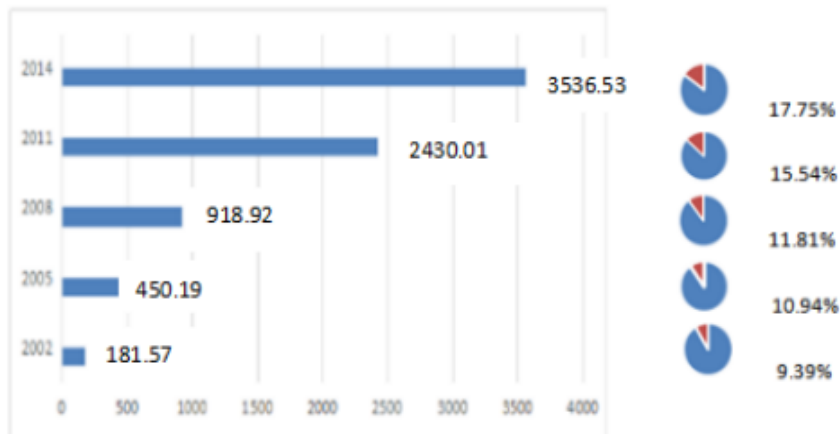
Calculate the actual investment of ICT, calculate the total capital stock of ICT and the area of Inner Mongolia capital stock, plus network infrastructure, hardware and software, new industry and information economy application part, we can get the total economy Information of Inner Mongolia.

3. SCALE AND CHARACTERISTICS OF INNER MONGOLIA'S INFORMATION ECONOMY

3.1. Proportion and Total of Economy Information Rapid Quickly

After calculation, the total economy information reached 356.353 billion yuan in our region in 2014, annual real growth rate of 12.48%, total GDP was 17769.51 yuan, annual GDP growth rate of 5.57%, it is significantly higher than GDP growth, the annual average increase is 1.43 percentage, accounts for 17.75% in GDP total, that show the information economy has become an important force driving economic growth in the national economy in a long time today and future. Under the background of industrial transformation and upgrading, the information economy has become our region's inexhaustible power in industrial transformation and upgrading.

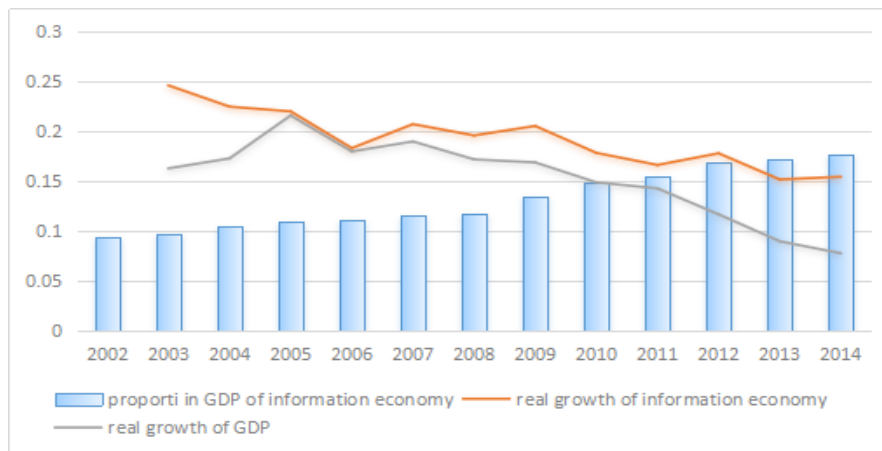
Table1. Information economy and the proportion of GDP



3.2. Development and Characteristics of our Region's Information Economy is Significant

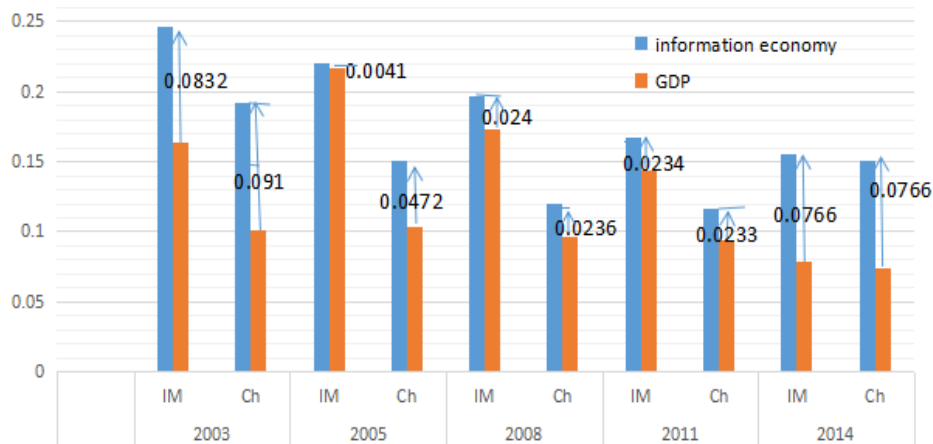
In the interval of 2002-2014, we can be drawn: The information economy grew faster than GDP. even after the 2008 global financial crisis, the growth of the information economy is higher than GDP growth. From 2007, rate of GDP growth has been declining, the economy appears weak especially in recent years, as economic growth has gone new normal, the growth of information economy is also lower, but in 2013 the trend begin upward that lead growth rate gap with the GDP become more and more big. it shows that the information economy has become the active force of economic growth in the future period.

Table2. growth of Inner Mongolia's information economy compared with GDP



3.3. Difference in Information Economy between Inner Mongolia and China

Table3. *Difference in information economy, GDP between Inner Mongolia and China*

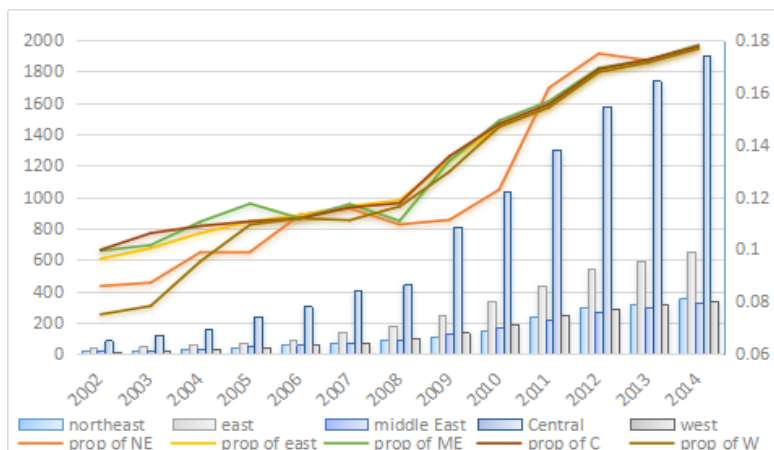


As shown, the information economy growth of our region and the country are higher than the GDP growth, and our region's growth is higher than the national level. The reason is that, compared with other parts of the country, our region's foundation is weak and the total amount is relatively lower, but the actual growth rate is faster. From 2002 to 2014, the actual growth rate of national information economy has been maintained at more than 12%, the amount of information economy increases 14.942 trillion yuan; economic growth in our region information has been maintained in more than 15% and the total increase 338.196 billion yuan. In 2003, the real growth of the information economy is highest, is about 25%, after fluctuations; the lowest in 2008, about 12%, in 2011 started slow growth. Compared with country, our base is weak, start low, but the growth rate was significantly higher than the national level, gap is relatively large between 2003-2008, but after 2009, after the restructuring in industries, the government pay more attention to the development of the information economy that led to the gap between the nation and our region became smaller especial in 2014. Therefore, in the future a longer period of time, the information economy and technology is the key to encourage and support in our region, maintaining the growth of the information economy is driving force for economy.

3.4. Development and Characteristics in Regional Information Economy

To reveal the characteristics of regional information economy further, it measures the "Northeastern Mongolia, eastern Mongolia, Centraleastern Mongolia, Central Mongolia, West Inner Mongolia section"; Northeastern Mongolia includes Hulunbeier and Hing'an; eastern Mongolia includes Tongliao and Chifeng, Centraleastern Mongolia includes xilingol and Wulanchabu; Central Mongolia includes Hohhot, baotou and Ordos; West Inner Mongolia includes La shan, bayinnaoer and wuhai.

Table4. *The characteristics of regional information economy*



As it can be seen from the graph, in 2002 to 2014 between the five major regions, the amount of information economy and proportion of GDP have tended to increase. Information economy is 20 billion yuan insufficiently in 2002, doubling in ten years, especially in the central region, from 85 billion yuan to 189.912 billion yuan between 2002 to 2014, although other region is not as good as the central region, but also increased gradually. Due to foundation of the information economy in Inner Mongolia is weak, it accounted for less than 11% of GDP in 2002, only it appeared slightly lower in 2008 to 2011, after the proportion reached steadily 17 percent in 2014, information economy become the new engine of growth under the economic weakness.

4. CONCLUSION

Through the above measure results, to ensure structural adjustment and enhance the quality of information economy, it is concluded that information economy as a new driving force will become an inevitable choice under the transformation and upgrading of the transitional period. Give full play to the optimization and integration of the Internet in the adjustment of industrial structure, the depth fusion of information economy and the technology in various fields forms a new mode of production, industrial form, business model, and economic growth.

Affected by the global economic situation, the development zone from rapid growth to the high-speed economic development, the development of economy has entered a new normal. In this situation, it need more to maintain economic stability, to ensure the rest of the economy falling too fast, leading to a sharp economic turmoil.

In the long future at our district, the information economy will play important sense in maintaining economic stability, structure optimization, economic growth under the new normal. The integration of Information economy and modern manufacturing industry and producer services innovation will provide for environment at masses entrepreneurship and innovation, so the public entrepreneurship and innovation can become a reality.

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SOURCE PROJECT

- [1] Inner Mongolia Youth Science and Technology Excellence Support Program (NJYT-15-B08)
- [2] Central Universities Fundamental Research Funds for the project (RW2015-12)
- [3] Inner Mongolia University for scientific research projects Industry (SK201305)

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