

Research on the Inner Logic, Dynamic Mechanism, and Evolutionary Path of Digital Economy Development

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Abstract:

As a significant driving force of the world economy, the digital economy takes on an extremely important role in the economic development of all countries. This paper discusses the internal logic, motivation and evolution of digital economy. Based on the understanding of the concept of digital economy, this paper explains the different digital economy from traditional economy and the role played by digital technology. Analyzing the inherent development patterns of digital economy development from the perspective of technological factors, economic factors, social factors, etc., analyzing influencing factors such as technological innovation, market demand, policy support, industrial convergence on the digital economy, discussing. And in addition, this paper also categorizes the development stages of the digital economy, puts forward the corresponding evolutionary models, and predicts the future development trend of the digital economy. Finally, it suggests the government improves data governance and social supervision so as to provide the guarantee for the sustainable development of digital economy.

Keywords: Digital Economy; Internal Logic; Driving Mechanism; Evolution Path; Intelligent Development.

1. Introduction

With the rapid development of Information Technology, the digital economy had become one of the main driving forces of global economy development, It has its own characteristics and complexity[1]. The digital economy can not only transform the traditional economic model, but also promote industrial upgrading and social change, Especially in the post-epidemic era, digital technology has rapidly accelerated digital transformation across the globe. Digital econ-

omy includes the digital products and service productions, consumptions to industrial fusion, which has extensive impact and important value. As to the digital economy, we need to reevaluate our economic frame work and see things on its own terms from the tech, economical and social sides[2]. Regarding practice level, how digital economy has an impact on traditional industries, employment market and government governance gets more and more obvious, especially when the development process of digital economy in different regions and different counties,

it makes the policy research to promote digital economy's high-quality development very important.

In recent years, research on digital economy has gradually become a hot topic at home and abroad. Foreign countries are mainly focusing on digital technology innovation and industrial restructuring, especially the innovation of digital platform, artificial intelligence, big data, etc. [3], leading to the construction and reconstruction of the global industrial chain. American scholars discussed on the roles of technological innovation and network effects on digital economy and form mature theories. European scholars mainly focus on the impact of the digital economy on society and labor market. Domestic research mainly studies the connotation of digital economy driven by technology and industrial convergence, scholars also give policy proposals such as „digital infrastructure construction“ and „data governance. „However, the existing research has the limitation of single analysis, lack of interdisciplinary research, especially the discussion on the social impact and evolution path of digital economy has not been deeply discussed. Therefore, on this basis, this study will analyze the internal logic, driving mechanism and evolution path of digital economy from multiple dimensions, and put forward feasible policy suggestions [4].

2. The connotation, characteristics and development status of digital economy

2.1 . Digital economy definition

Digital economy is a new type of economy based on digital technology, the economy promoted by digitalizing, networking and intelligentsia information. It does not only apply information technology, but also the flow of data, knowledge, and innovation, which in turn leads to innovations of industries and businesses [5]. As compared to the traditional economy, the digital economy depends on virtual and smarter assets, like big data, cloud and AI, which change economic activity and improve its productivity and innovation level. Econ 5322 Digital economy drives the global transformation and digital transformation of economy by eliminating limitations of time and space and making sure the unbreakable chain of information flow and capital flow [6].

2.2 . Analysis of the characteristics of digital economy

The digital economy is fresh, permeable, integrated and open. First, innovation is reflected in the emerging new business models under the digital technology, including sharing economy, platform economy and digital finance[7]. Secondly, the permeability can be seen from the extensive use of digital technology. Digital technologies are changing almost every aspect of society, whether it be

the industry, the manufacturing industry, the financial industry, the education and more are becoming digital. Digital economy is also very integrated. IT,BM,IF, the combination of IT,BM and IF gave rise to new industries such as intelligent manufacture and digital finance [8]. Finally, digital economy openness promotes global information exchange and cross-border cooperation, overcomes the closure of traditional economy, and drives global digital trade.

2.3 . Development status of digital economy

The current world digital economy is developing quickly, it takes a large proportion of the world's GDP, particularly in developed countries, where digital economy has become the main driving force for economic development. Regions like the US, China and the EU are the major drivers of the global digital economy. China's digital economy is in the fast track[9]: Support from policies and creation of digital infrastructure made digital payment, e-commerce and sharing economy to quickly develop. However, the digital economy in China is still developing, and the development still has problems such as regional imbalance, data privacy protection, network security, technical barriers, digital gap, etc. Need to be solved through technological innovation, policy support and personnel training to achieve the sustainable development of digital economy. Generally speaking, the overall global digital economy is in a stage of rapid development. The development trend varies in different regions of the world. digital economy has huge room for growth, but it also poses lots of difficulties that demand overall solutions.

3. The internal logic of digital economy development

3.1 The technical logic of digital economy development

Technological innovation is the key for the development of digital economy, and the continuous iteration and cross-field integration of technology have become the core driving force to accelerate the rapid development of digital economy. The development of information technology [10]. Internet, big data, artificial intelligence create the digital economy very malleable and adaptable. And cloud computing,combined with big data makes companies able to increase their productivity and work efficiently by relying of data driven decisions,AI helps new services to emerge by replacing traditional production through automation. The fusion of these techs has pushed quick development of the digital economy forward and given energy to the rise of new industries and business patterns [11]. Information technology and internet technology give infrastructure to the digital economy, pushing info to flow

much faster and spread out far and wide. Big data is an important resource of digital economy, which can help enterprises and government to make scientific decision[12]. artificial intelligence improves the intelligently level of digital economy, solves many complicated issues and promotes the all-round development of digital economy.

3.2 The economic logic of digital economy development

The economic logic of digital economy is reflected in the production, distribution, exchange and consumption of digital economy. Unlike traditional economy which is based on capital and labor aggregation, digital economy relies on technology innovation and data usage [13]. Through big data and cloud computing, it turns the production process into smart personalization, so companies can actually meet the demand for products and services of consumers. There have been great changes in the digital economy's exchange process. Online is now replacing offline and has replaced them more and more, online platforms have become the main exchange place for goods and services [14].

Digital economy also has the properties of economies of scales and scopes. Internet platforms can quickly expand its scale and form the market network effect, thereby lowering the unit cost and improving competitiveness. For Alibaba and Amazon for instance, productivity is achieved by way of platform based operations. Digital economy also has network externality. users using this platform increase, the total value increases, then it also enhances the virtuous cycle between platforms and accelerates the rapid development of the digital economy [15].

3.3 The social logic of digital economy development

Digital economy alters the method of economic activity, it also deeply effects the social structure and employment structure. It drives the change of social structure, the rapid circulation of information breaks the boundary of traditional regions and industries, forming multinational enterprises and global industrial chain, creating the flow of international talent [16]. Meanwhile, it's also changing people's way of consuming and raising their demand for online purchasing and virtual product, change people's attitude of consuming and promote changes in production and services.

But the development of Digital Economy also faces social problems, especially digital gap. In developing countries, remote regions, local population cannot enjoy dividends from digital economy due to poor access to information technology. Furthermore, privacy protection and data security problems have also emerged, and how to protect data security and promote the development of digital economy has become an important problem for the whole

world. How to solve it? And digital economy's underlying mechanism and institutional reaction toward social change deserves more attention too. The traditional mode of governance has encountered unprecedented problems. The government and the enterprise should meet the change of the technological environment and the governance mode should be updated. Policymakers should always be making efforts to improve regulations for the sake of the healthy development of the digital economy. At the same time, enterprises should pay attention to social responsibility, social justice, environmental protection and other sustainable progress, and promote the development of digital economy in the direction that is more inclusive, fairer and sustainable.

4. Driving mechanism of digital economy development

4.1 Technology innovation drive

Digital technology innovation is one important driving forces of digital economy development. As companies are investing more and more in research and development, governments' policies provide for the fast pace of development for digital technology. with the development of science and technology, especially breakthroughs made by artificial intelligence, big data, cloud computing, Internet of things and so on, digital technology keeps promoting the digital transformation of all walks of life. For example, enterprises can increase their investment in R&D to use new digital technologies to promote the improvement of enterprise production efficiency, and bring about many new industrial types, such as digital finance, intelligent logistics, and intelligent manufacturing[17]. Technological innovation leads to enterprise products that have constantly enhancing added values. Enterprise supply chains need to be improved through optimization and the growth of demand.

The support of government policy gives a good environment for the development of digital economy. many countries and regions formulated and issued policy regulations and policies for digital tech innovation such as offering financial subsidies, tax reductions, technology R&D grant money for enterprises and so on to encourage digital tech innovation investment by enterprises. Technological innovation raises production efficiency and pushes forward the conversion and upgrading of traditional industry. Especially because the application of big data technology makes it possible to predict the market demand more accurately and adjust the resource allocation during the production process, so as to greatly improve the overall production efficiency and the speed of responding to the market.

Table 1. Industrial Development Driven by Digital Technology Innovation

Field of technological innovation	Emerging industries driven	Main function
Artificial intelligence	Intelligent manufacturing, autonomous driving, robotics, etc.	Improve production efficiency, optimize industrial chain and reduce labor cost
Big data	Smart City, Intelligent Logistics, Precision Medicine	Enable data-driven decision-making and improve service accuracy and efficiency
Cloud computing	Digital finance, cloud service platform, etc.	Flexible computing resources to reduce business operating costs and increase agility
Internet of things	Smart home, Smart city, Smart transportation, etc.	Improve the quality of life and facilitate the digital transformation of society and the economy

It can be seen from table 1 that digital technology innovation promotes the development of new industries, which have a great impact on improving production efficiency and serving quality. And it also changes its competitive situation. application of technical innovation creates new market space for enterprises and makes traditional industries gain new vitality in constant change.

4.2 Driven by market demand

The market demand is also a key driver of the digital economy. With the growing demand for digital products and services, especially in areas like smartphones, internet finance, and e-commerce platforms, the market demand drives the rapid development of the digital economy. Now, consumers expect to be served more conveniently, easily, and personally. The innovation and upgrading of traditional products and services has become the mainstay

of business development [18]. With the popularity of 5G and artificial intelligence, consumer demand for real-time and personalized services is also becoming more diverse. The change makes companies rush to grow digital goods so as to meet the individual demands of customers.

Although demand brings forward the development of digitization. For example cross-border e-commerce booming, and this kind of business may cause frictions between countries, there would be regulations such as tariffs, data privacy. Although there are so many problems, but the overall positive effect of market demand to such as the acceleration of digital innovation, global communication, the transformation of production and sales model, is greater than the negative impact of market demands. Since companies are continuing to change and adapt to the digital economy, it will probably be a big part of how money grows between all the countries.

Table 2. Impact of changes in market demand on the development of digital economy

Changes in consumer demand	Promoting the digital economy	Impact areas
Personalized service requirements	Promote the emergence of customized products and services to increase the added value of products	ECommerce, Digital Marketing, Intelligent Hardware, etc.
Efficient and convenient service demand	Promote the development of online payment, instant messaging and other services	Digital payments, online education, online healthcare, etc.
Globalization requirements	Promote the in-depth integration of cross-border e-commerce platforms and international market	Cross-border e-commerce, logistics and distribution, digital trade, etc.

Table 2 shows that changes in consumer demand drive the digital economy in many fields. Consumers are demanding more tailored and efficient services, so companies are constantly improving consumer experience by updating their digital products and services, which is fueling the fast growth of the digital economy.

4.3 Driven by policy

Government policies are very important for the development of digital economy. various countries and regions have introduced different policies to promote digital

transformation, offering financial support for technology innovation, and introducing tax benefits and industry regulations as well. And such policies improve upon the development of industries and help in reducing the cost operations of companies[19]. the fast growing digital economy mainly depending on the guidance and facilitation of these policies. Governments carry out thorough development plans and sector-specific rules, setting up a steady framework of policy development for digital growth. Besides, good tax policies bring about good financial support as companies go through digital transformation, which also leads to more investments in digital technology.

Another important role of supporting policies is that while developing the digital economy, government also strengthens regulation to keep the development of digital economy and social stability moving forward together. As technology advances, big data and artificial intelligence continue to develop, which means that data privacy and network security have become very important issues. The government's supervision and protection of digital economic security must be strengthened with strong policies.

4.4 Driven by industrial convergence

Industrial Convergence is an important cause of the digital economy. Digital technology is widely used which leads to the integration of the digital economy and traditional industry becoming more prevalent. Digital technology gives substantial adjustments to the production process, operation mode, and business model of conventional industry yet strengthens the market competitive strength of such industry. Take GE for example, it applied digital technologies in manufacturings, which made production efficiency increase by 20% and cut operational cost by 15%. With the assistance of digital technology, enterprises can improve production efficiency and lower operational costs via industry convergence to broaden market scope[20].

The Industrial integration brought strong vitality into the digital economy and promoted the intercommunication and resource sharing of all kinds of industries. With industrial integration, the digital economy will improve the competitiveness of traditional industries, create soil for the emergence of new industries, and promote digitalization and intelligence of the economy. If you follow the "checklist", your paper will conform to the requirements of the publisher and facilitate a problem-free publication process.

5. The evolution path of digital economy development

5.1 Division of digital economy development stage

Development of digital economy experienced several

stages of development. Learn from the relevant theories and practices, we can see the development of the digital economy has gone through several distinct stages. The first stage is the digital infrastructure construction stage, mainly focusing on the promotion of the use of information technology and Internet technology. In this phase, the major task is to build the infrastructure, with extensive Internet coverage, smooth data transmission channels, and basic application of cloud computing and Big data technology. At this time point, the digital economy is still unable to form an industrial chain system, what it mainly focuses on is basic research for technology and informatization mobility.

Stage 2 is the initial development stage of the platform economy: With the development of digital infrastructure, many Internet platforms such as e-commerce platforms, and social platforms have been developed. They also became an important part of the digital economy. such as in China, Taobao has changed online shopping, and in the world, amazon, these have become factors leading to the success of E-commerce. In this phase, we begin to see digital technology being applied to consumptive fields too, not just the more traditional industries. Internet platform economy is developing rapidly, business model innovates, new business modes emerge, such as new modes of sharing economy represented by Uber and Airbnb and also online payment systems represented by Alipay and PayPal. Companies have improved their market competitiveness through platform-based operations and achieved economies of scale:

The third is the stage of intelligent development: In this stage, the application of artificial intelligence, Internet of Things, blockchain, and other technologies are all penetrating into all walks of life, and the digital economy has entered a new intelligent stage. The essence of the digital economy is no longer just about moving information around; it is using big data analysis and innovation to upgrade industries smartly. Intelligent manufacturing, smart city, and digital finance these emerging industries now have taken shape. Digital technology permeates into all the layers of society and brings about new thrusts for the transforming of social production and lifestyle.

Table 3. Development Stage and Characteristics of Digital Economy

Stage	Characteristic	Develop priority
Infrastructure construction stage	Network infrastructure construction and technology popularization	Realize the popularization of internet and data transmission and build the foundation of digital economy
Preliminary development stage of platform economy	Rapid Development of Internet Platform and Innovation of Business Model	Develop e-commerce platforms and social platforms to promote online payment and sharing economy
Intelligent development stage	Deep application of digital technology and intelligent upgrading of industry	Promote artificial intelligence, Internet of Things, etc., and promote industrial intelligence and upgrading

Table 3 lists the three major stages in the formation of the digital economy that have different focuses. Digital economy is from infrastructure construction, to the platform economy development phase, to intelligent upgrading, all in all every step of the way, has different technological breakthroughs and application products, these all promote society and economy to go in the direction of being more efficient and becoming more intelligent.

5.2 The evolution model of digital economy development

The development of the digital economy can be understood through different evolutionary models. the first is the technology model driven by technology, and technological innovation is the main driver of the development of the digital economy; This model puts a great stress on constant technological leaps and pushes their application to spark industry transformation. For example the breakthrough in big data and AI has contributed to the growth of intelligent manufacturing and Digital finance respectively. This model has its merits because it has great productive gains. But it might run into problems like uneven technological development from sector to sector.

The second is the market force model, where changes in market demand and consumer behavior become the main driving force for the development of the digital economy. In this model, the creation of the digital economy depends on people buying the new products and services. Enterprises adapt by innovating technology and upgrading their digitals. A major strength of such market-driven model is the ability to very quickly adapt to changes in the market, however this also means it is very prone to fluctuations and instabilities in the markets.

Lastly, the policy-driven model shows that governments need to give supportive policies and a regulatory environment for the growth of the digital economy. A government supports can help lower business barriers and maintain the long-lasting of digital economy. but too much policy will stifle markets from driving innovation.

Three models are not mutually exclusive, but rather interdependent. Policy support can push technological innovation by creating favorable environments and providing funds, and market demand can also force companies to adopt new technology. and together makes a compound effect that makes progress on the digital economy faster.

5.3 Future trend of digital economy development

With the continuous progress of digital technology and expanding application fields, new features of the digital economy's development trend can be observed. Firstly, future digital economy will focus on smart and personal development more; Artificial Intelligence, Big Data and Internet of Things technologies are becoming more wide-

spread, the digital economy will further drive the intelligent upgrade of industries and improve the production efficiency and resource allocation efficiency. Intelligent production, smart city, and digital medical care will be the main direction of digital economy development in the future.

Second, the globalization trend of digital economies will become increasingly clear. Digital technology overcomes the constraint of time and space and makes the appearance of multinational enterprises and rise of global digital trade. In the future, with the development of cross-border e-commerce, global digital payment and other business activities, the digital economy will have an even closer connection around the world and enable the economic development of each country to mutually integrate.

Finally, the digital economy still has some new problems to be solved when the digital economy is developing, such as how to balance data and privacy, how to solve problems caused by the existence of monopolies, how to make up for the technology gap. Therefore, it is necessary for policymakers to strengthen regulatory measures to promote the healthy development of the digital economy. And promote the development of the digital economy. In the future, government should improve data governance, complete relevant laws and regulations of digital economy to provide strong guarantee for sustained development of digital economy.

From analyzing the development trend in the future of digital economy, it can also give very important policy proposals to governments and businesses in every country, which will also help governments and businesses in every country seize the opportunities of the development of the digital economy and be able to face the challenges that may be faced in the future in a timely manner.

6. Conclusion

In the research, through studies, it explains the internal logic, driving force, and the evolution of the digital economy. Firstly, digital economy is based on the progress of digital technology and continuous development and use of the Internet provide huge power to adjust and optimize the economic structure, promote industrial upgrading.

Second, market demand and policy can also foster the digital economy. The market demand for emerging service and product innovation pushes the transformation of enterprises and the government's policy support gives institutional assurance to the healthy growth of digital economy.

Moreover, the development stage of digital economy can also be divided according to the evolution process, namely the stage of infrastructure construction, platform economy, intelligent development, etc., and different countries and regions are different. The progress of promotion is different.

This research has some practical value. It benefits com-

panies in understanding the driving force of the digital economy and making more scientific transformation decisions. It gives policymakers a reference to make up more pointed policies to foster the healthy growth of the digital economy.

But there are also some deficiencies in this study. Because the digital economy is complex and the speed of change is fast, we may overlook something.

Looking forward to the future, further research could delve into the specific interaction mechanisms of the various stages of the path of digital economy development. More attention should also be given to the digital economy development in different industries, so as to give more targeted guidance for industry-specific development.

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