

# *Impact of Digital Transformation on Enterprise Economy under the Background of Sustainable Development*

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**Abstract:** In the rapid development of information technology and the process of economic integration, business concepts and business models of enterprises are constantly changing. In the past development process, the idea of sustainable development has gradually formed a new concept. It is also a main purpose of the company's development. In the new economic situation, it is of great theoretical and practical significance to carry out marketing innovation and reform of enterprises. In the new economic period, people can exchange information in a variety of ways to promote the development of different industries. However, the long-term development of the company has also been greatly affected with the growing changes of the market in which the enterprise is located. As the development thought of today's "theme", sustainable development must be reformed in the environment of sustainable development to make it consistent with the trend of the times and coordinate with the industry, so as to achieve the goal of sustainable development. Sustainable development has become the main goal on the road of enterprise development, and also the main driving force for the development of the company. With the rapid development of information technology, the change of new technology has brought mankind into the era of "digital economy". Artificial intelligence, sharing economy and other emerging industries are supported by big data and cloud computing. In the process of competition and development, "Internet plus" and "+Internet" would become a huge development trend, and efforts would be made to carry out bold reforms in the direction of "sharing economy" to achieve better development. Based on the background of sustainable development, this paper constructed the economic evaluation system of digital enterprises. The results show that, compared with the traditional economic benefit evaluation model, the digital enterprise economic benefit model has improved 4.08% based on the sustainable development background, bringing better development to enterprises.

## 1. Introduction

In the 21st century, with the deepening of the idea of sustainable development, the business activities of enterprises are bound to integrate the strategy of sustainable development into the operation of enterprises. In the process of the development of companies, the market behavior of

enterprises directly affects the development and prosperity of companies. Digital transformation is a long-term and systematic project. Some traditional enterprises have weak digital foundation and are eager to bring significant cost reduction and efficiency improvement through digital transformation. Therefore, enterprises at different stages of development play different roles in the digital economy and need to be viewed in a diversified and dynamic way.

Now there are scholars' research on digital economy. Shkarlet Serhiy studied the operation characteristics of traditional economy and digital economy by using several elements based on the traditional way. The results show that the application of various theories of economic digitalization can solve some practical problems and play a positive role in the operation characteristics of the economy [1]. Through the research on the dynamic model of urban development, Bulturbayevich Mullabayev Baxtiyarjon found that the development of digital economy has both a driving force and a certain space-time spillover effect on future development. Through the data statistics among regions, he found that the economic development among regions showed a heterogeneous trend. Among them, the promotion effect of digitalization on regional economic development and quality benefit is more and more obvious [2]. Moroz Miroslaw believed that the digital economy referred to the changes that have taken place in enterprises and society through the use of information and communication technologies. With the growth of the number of network users, the open online business types are increasing, and new business models are gradually taking shape. Therefore, in modern society, digitalization is a very critical factor [3]. Shokiraliyevich Ganiboyev Ilhom studied the impact of digital development on productivity and its mechanism. It is found that digitalization has an "inverted U" effect on productivity, and to some extent, digitalization has played a positive role in promoting productivity [4]. Kobilov Alisher Urinovich believed that "digital economy" has been widely used, but its meaning was vague and there were some problems in the use of related terms. After reviewing and summarizing the emergence and development process of the digital economy, he came to the basic conclusion that digital technology was the basic feature of digitalization [5]. With the continuous development and deepening of digital technology and the arrival of digital economy, enterprises must continue to focus on data, promote the reform of economic development mode, and update the traditional product service concept. People must fully realize that under the digital economy, the management of modern enterprises must constantly innovate, constantly update the traditional management methods, and establish a set of scientific and reasonable enterprise management strategies.

At present, there are scholars' researches on sustainable development. Spaiser Viktoria showed that the indicators of sustainable development that can be achieved are contradictory. He made an in-depth study of the essence of incompatibility by using the system model of dynamics, and revealed that economic growth and consumption as development goals are uncoordinated [6]. Reznichenko Sergey M used a variety of methods to comprehensively discuss sustainable development issues. In order to achieve the purpose of the Institute, he defined various conditions for regional dynamic development, and introduced information and analysis support institutions to identify issues related to sustainable development, as well as identify issues related to sustainable development at the regional level [7]. Tomislav Klarin believed that several development periods have passed since the concept of sustainable development came into being. During the development of this concept, many people are now strengthening the implementation of this concept. In its development process, this concept has been constantly combined with the complexity of today's world, but its fundamental principles, objectives and implementation issues have rarely changed [8]. Thacker Scott proposed that the infrastructure system is the mainstay of each community, providing various basic services, including energy, water, waste management, transportation and telecommunications. To ensure the construction of an appropriate infrastructure, policy makers must be guided by the development goals of sustainable development, formulate a sustainable

infrastructure system, and formulate an adaptable plan that can be verified and meet their vision [9]. Polasky Stephen believed that sustainable development promoted development, rather than giving up development to protect the environment, which was the strength of a nation and the wealth of society. Sustainable development needs to change the old mode of production and consumption, and implement a clean mode of production and use, so as to achieve higher efficiency, save resources and reduce waste. In a sense, it can be said that the "intensive" economic development model is the specific expression of "sustainable development" [10]. In general, the sustainable development system should take sustainable development as the premise and social sustainable development as the goal. The sustainable, stable and healthy development of the human centered natural, economic and social complex system should be the common goal of mankind in the next century.

Sustainable development means that in the process of development, through the comprehensive consideration of its own development and the company's specific operating conditions, the company would always maintain its leading position in the industry, so that the company's development can be better developed. To ensure the long-term development of a company in the digital era, digitalization is an inevitable choice for the company to achieve high-quality development. Digital economy should not only develop the network technology dominated by the information industry, but also promote the overall national strength to improve the world level with the digital economy.

## **2. Overview of Enterprise Economy Based on Sustainable Development**

### **(1) Meaning of sustainable development**

Only in the late 20th century did human beings truly attach importance to and realize that sustainable development is based on the premise of human development and on the ecology and resources on which human beings depend for survival, so as to achieve sustainable development of human beings. The coordination of society, economy and environment is the basic requirement for development. In modern society, with the change of industry, human beings have suffered huge social and economic losses. Human society also pays more and more attention to the maintenance and coordinated development of the environment, which leads to the concern of today's society for environmental protection and sustainable development. This concept was accepted by the international community in the 1980s, and then spread around the world.

### **(2) Overview of enterprise sustainable development**

In terms of sustainable development, there are both new ecological development and sustainable economic development strategies. On this basis, the company must have a clear business goal and a certain market, so that it can continue to develop within its own scope of competition and make its own company stand firm in the future development. Under the background of sustainable development and the condition of developing market economy, the idea of sustainable development has been paid more and more attention. However, the concept of sustainable development is relatively lagging behind. Its emergence is accompanied by the development of the enterprise's business mode. Under the constantly changing market economy conditions, in the rapid changes, few companies can fully adapt to such rapid changes in a very long period of time.

### **(3) Concept of enterprise eco economic system**

In the company's ecological economic system, the company's economic system is an important system, which is invisible and renewable. According to the theory of dualism on companies, the economic system of companies can be divided into two systems, namely, the productivity system and the production relationship system of companies, which are an organic combination. In the production efficiency system, each factor can be divided into three levels. The factors at the grass-roots level can be called "entities", which are composed of workers, means of labor and labor

objects, namely the so-called "three factors". The second level is the auxiliary component, which has no material form and can only be attached to three material elements, and is based on quality and relationship. Its most advanced component is the operation factor, that is, production and management. Its function is to rationally arrange the productivity of the enterprise. The three levels of the enterprise production relationship system are shown in Figure 1. From these three levels, people can see that one is the ownership of the means of production, and the other is the distribution structure of the company's economic output. The third is the enterprise economic management system, mainly to maintain and improve the company's production relations to meet the needs of productivity development.



Figure 1: Three levels of enterprise production relation system

#### (4) Functions of enterprise ecosystem

Enterprise ecosystem refers to the complex social economic system composed of enterprise clusters and their related ecological environment. Compared with the natural ecosystem, the enterprise ecosystem is composed of biological species members, ecological environment factors, and complex relationships among them. The company's ecosystem is a complex and open system, which emphasizes an enterprise under the comprehensive action of complex, diverse and multifactorial factors. It develops through development and adaptation to the environment.

The function of an enterprise's ecological economic system refers to its capabilities, functions and characteristics under the relationship and function with the external environment. The enterprise ecological economic system has two different but interrelated functions, namely, the ecological function and the economic function of the enterprise, as shown in Figure 2.

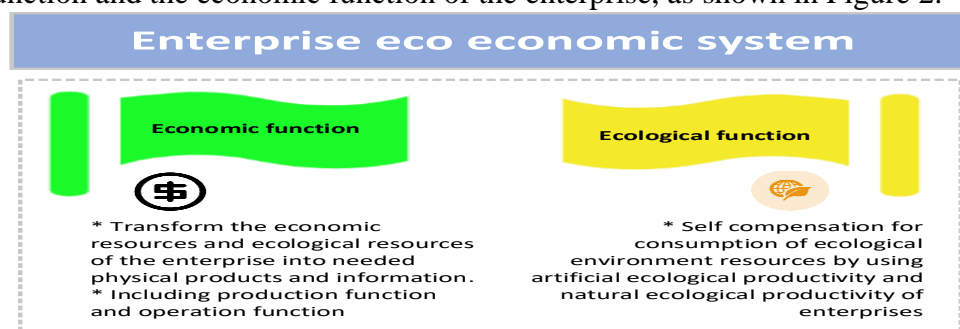


Figure 2: Two Basic Functions of Enterprise Eco economic System

#### 1) Economic function

The economic function of the enterprise's eco economic system is to process the economic resources and ecological resources invested in the enterprise through the internal and external input and output chain network of the enterprise, and transform them into physical goods and information required by various societies to meet different needs. In the realization of this function, there are often a lot of logistics, information flow and value flow. In order to maintain their own survival and development, enterprises must seek the maximum value added. Therefore, the circular value-added

function corresponding to the value flow is the core of economic functions, while the circulation and efficient operation of logistics and information flow is the premise to achieve high value flow.

## 2) Ecological function

The ecological function of the enterprise's ecological economic system refers to the function of the enterprise to provide a certain ecological environment for its life activities. When enterprises perform their economic functions, they often consume a large amount of ecological resources and discharge a large amount of waste into the ecological environment. When the consumption rate of ecological resources is higher than the supply rate of ecological resources, or the discharge amount of waste exceeds the self purification capacity of enterprises, ecological damage would occur. In essence, the ecological function of an enterprise means that the enterprise realizes its own ecological compensation through its artificial ecological productivity and natural ecological productivity. Ecological environment damage is essentially excessive consumption of ecological resources. Therefore, it is an important ecological function to make proper compensation for it as a special value-added of state-owned property.

## (5) Eco economic Efficiency and the Efficiency Target of Enterprises

The three connotations of ecological economic efficiency are shown in Figure 3, namely, the lowest energy consumption, less environmental impact and high economic value. The purpose of ecological benefits is reflected in the production activities of enterprises, mainly in the following seven aspects: reducing the intensity of raw materials and labor services, reducing the energy consumption of goods and labor services, reducing the spread of toxic substances, improving the recyclability of raw materials, maximizing the use of resources, extending the service life of products, and increasing the intensity of products and services.

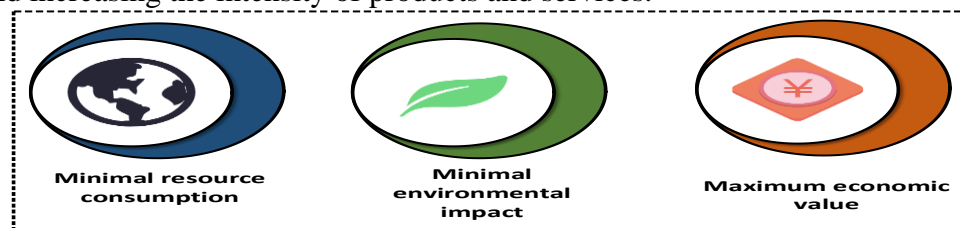


Figure 3: Three aspects of eco efficiency

Modern company theory regards the company as a link between different contractual relationships. The formulation and implementation of enterprise contracts is essentially a game between the owners of various elements. According to the assumption of economic man, each contract subject is seeking the maximum personal interest. As a whole of various contractual relationships, the efficiency goal of an enterprise should fully reflect the interests of each contract subject. However, due to the scarcity of resources and limited economic interests, the interests of all stakeholders cannot be fully satisfied. Therefore, the conflicts of interests of all stakeholders are inevitable. In this case, various companies and stakeholders have formed different game patterns in the game. Each decision-maker has its own interest objectives and strategy space, profit acquisition methods, information distribution and rules that must be followed.

## 3. Introduction to Digital Economy

### (1) Overview of digital economy

With the development of information technology, the digital economy is gradually entering people's lives, and has formed an important economic growth engine worldwide. In the 1990s, the concept of digital economy was put forward and promoted people's development to a certain extent, making people from atomic processing to information processing. In the era of digital economy,

digital network and communication technology equipment have become the communication between individuals and organizations without any gap. Digital economy refers to the trade behavior constituted by e-commerce, providing electronic products and e-commerce services. The manufacturing management of the whole process is electronic, and suppliers and users realize relevant activities through the Internet and the World Wide Web [11].

At present, the definition of digital economy by relevant scholars is not uniform. In a narrow sense, the digital economy is based on communication technology and information. Through mobile communication, the Internet of Things, the Internet and other technologies, it truly realizes the digitalization of communication, transaction and cooperation, and further promotes the high-quality progress and development of the economy and society [12]. In a broad sense, digital economy includes communication technology, information industry and other aspects, and the development of digital economy includes all aspects of economic commerce.

### (2) Characteristics of digital economic management

Digital economic management is based on the decision-making mode, model and method of two schools of management and economics. On the basis of comprehensive application of the ideas and methods of system science, it uses computer, communication, network, artificial intelligence and other advanced technologies to solve practical management problems [13]. Digital economic management should have the following characteristics, as shown in Figure 4:

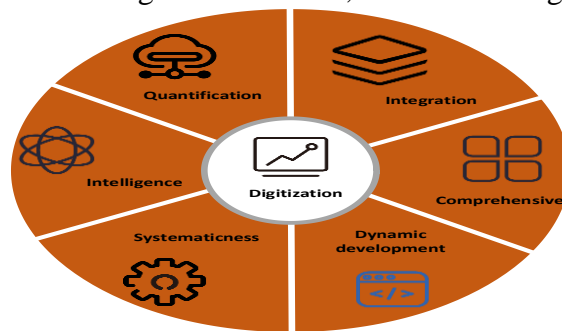


Figure 4: Characteristics of digital economic management

The first is quantitative. Digital management refers to the quantitative management of solving problems by using model-based and quantitative technologies.

The second is intelligence. Many advanced management methods and tools have been used in digital management to enable it to analyze and simulate the information processing and thinking process of the human brain, which is called artificial intelligence.

The third is comprehensive. Digital management is a comprehensive application of multiple disciplines.

The fourth is integration. Integration means to integrate the advantages and essence of various business modes, and to combine creative ideas and other intellectual elements, so as to achieve the purpose of functional integration and technical integration of the management system.

The fifth is development. Dynamic development refers to that managers need to supplement and modify the input of digital information according to the changes of internal and external environment when conducting digital management, so as to obtain the best output of new digital information.

The sixth is the system. Systematicity refers to the analysis of the relationship between different functions from a systematic perspective.

### (3) Development trend of digital economy

With the continuous development and integration of new mobile technologies, new businesses and services emerge one after another, becoming an important engine leading a new round of

economic growth and industrial transformation. The development of digital economy also presents four new trends.

#### 1) Intelligence

With the arrival of the new industrial revolution, there are many new development opportunities in the world, and various integrated business models emerge one after another, which brings huge development space to the entire industry. Now, with the advent of the digital era, the new Internet technology based on cloud computing is developing in the direction of digitalization. With the rise of the intelligent industry, artificial intelligence, intelligent commerce and intelligent manufacturing would usher in a new development opportunity.

#### 2) Refine

Digital economy emphasizes personalized and customized products and services, fully reflects the idea of "people-oriented", makes full use of massive information, accurately grasp customer needs, and provides customized services for customers, thus greatly improving the overall service level of enterprises. Information technology drives business innovation. To win customers' love, people must understand customers' needs. To understand the needs of customers, it is necessary to master customer information and accurate calculation methods. Customers are "God". The competition between major companies is to see who can grasp the consumers' mentality, attract their attention, and then successfully seize the market.

#### 3) Sharing

Sharing has been an effective innovation. Sharing economy introduces the dimension of time into the use cycle of products, so that users can concentrate appropriate (massive) resources in a relatively fast time, and enable suppliers to obtain more value added. This is the best way to realize the digital economy.

#### 4) Data

Data is the fundamental guarantee for enterprise development. "Data+" provides enterprises with new products, new models and new services to promote the transformation and development of the industry. From the perspective of industrial integration, the current development focus has shifted from the infrastructure to the content analysis and application level. Today, as costs continue to decrease, many companies are actively using various big data analysis methods to manage production costs, users' willingness to purchase, human resource management, and data resource centered industries are booming.

#### (4) Impact on enterprises in the digital economy

##### 1) Promote more energy knowledge reserves of the company

The future planning and development of a financial company cannot be separated from strong resource support. Therefore, enterprises must collect a lot of information, and the application of theory would greatly promote the development of the company. With the popularity of big data, the products and services of enterprises have also changed, and the development of financial enterprises shows a diversified service characteristics. In this process, there would be cooperation in different industries and new knowledge would be accumulated from multiple perspectives.

It breaks through the traditional single choice, so that the product can face a wider range of people, can use big data to launch the most suitable product for the public, and make the product closer to the needs of customers. Big data technology can be used to establish a data warehouse, so that the enterprise's information resources can be effectively used, so that the enterprise's information resources can be effectively used, thus improving the enterprise's information level.

Through a large amount of data analysis, people can collect a variety of user information, and query users on other platforms to understand their different needs, and integrate these information into the enterprise's product production. At the same time, it can also develop users' personalized products and links with other information platforms, so that businesses can explore more

information. It can lay the foundation for the company to make the next decision and formulate a reasonable and scientific strategic plan.

#### 2) Deep mining of the company's internal information

In the past, the internal data of a company was very complex. However, with the development of the times and the emergence of big data, people's management mode has changed. The management of human resources, material resources and funds has become more reasonable, and data management has become more efficient.

Taking the energy company as an example, in its internal procurement and management, it has established a digital economy platform, abandoned the traditional paper documents, conducted data integration and analysis, reduced procurement time and improved procurement efficiency. Big data technology can be used to analyze the purchase quantity, so as to effectively improve the efficiency of purchase utilization, realize the management of material resources, and enhance the control over the enterprise. It can effectively provide effective assistance for the transformation of enterprises, thus greatly reducing the production costs of enterprises.

In the fierce competitive environment, the development of the financial industry provides a strong support for the company's competition. It can be seen from this that enterprises can actively improve their own development space, integrate various resources required by the company, and conduct in-depth mining of internal management resources of the enterprise when using the role of big data. It can sort and classify wrong and outdated data, sort and classify data on a large scale, and combine internal and external data to form an efficient connection to help the internal development of the company. This can provide the latest data and data for the external of the enterprise, and update the data in a timely manner. People should grasp the law of market development, make full preparations for the next stage of work, and realize the effective allocation of various resources.

#### 3) Make more accurate decisions within the company

For the development of a company, the company's internal plan must be accurate enough, must have a vision, and must grasp the law of market development. So big data is a very important aspect. Big data can enable enterprises to establish a good information platform. At the same time, it can also collect the negative impact on the market, understand the relationship between the market and customers in a timely manner, adjust the company's product prices, provide strong support for the company's decision-making, and formulate a reasonable plan for the company. With the support of real and reasonable information, it can provide powerful help for the company's next work, and has an absolute advantage in the market, which is also the company's high-quality decision.

In addition, it can also provide efficient decision-making for business management. Big data can reasonably configure the information database, achieve efficient work, handle information well, and provide efficient data and information for enterprises. It provides effective data and information for enterprises and provides effective management services for enterprises. It formulates the next strategic plan for the enterprise to avoid risks and reduce economic losses incurred by the enterprise.

### 4. Evaluation Index System of Enterprise Ecological and Economic Benefits

As a kind of neural network, BP (Back Propagation) neural network has become a more practical and effective training method because of its good characteristics. Therefore, it is feasible to apply it to the weight of enterprise informatization economic evaluation indicators. The enterprise is a composite system with information benefits as its output, and its corresponding input is a set of indicators, namely

$$w = f(y_1, y_2, \dots, y_n) \quad (1)$$



$$w = f \left( \sum (f \sum (\sigma_{ki} - a_1)(\sigma_{kj} - a_2)) \right) \quad (2)$$

$w$  represents the benefits of informatization,  $y_1, y_2, \dots, y_n$  represents various economic indicators of the enterprise, and  $\sigma$  represents the network weight.  $a_1$  and  $a_2$  represent the deviation,  $i$  and  $j$  represent the number of nodes in the input layer,  $k$  represent the number of nodes in the hidden layer, and  $f$  represent the informatization benefit target of the output layer.

The calculation method of exponential weight value by using BP neural network is as follows:

A three-layer network enterprise ecological economic benefit evaluation model is constructed, and the input layer is the index items of enterprise ecological economic benefit evaluation index,  $y = [y_1, y_2, \dots, y_3]$ . These indicators include labor productivity, information input rate, enterprise management level, etc; Among them, the node target of the middle layer of enterprise ecological economic benefit evaluation index is determined by the following formula:

$$T = \sum_{n=0}^{i=1} C_k^n \quad (3)$$

Randomly select a set of sampling indicators and calculate the error  $E$

$$E = \frac{1}{4} \sum_{n=1} (t - x)^2 \quad (4)$$

If the error accuracy requirements are met, the training is completed, and the weight value at this time is the reasonable weight value of each index; Otherwise, it would be weighted according to the following formulas:

$$\Delta \sigma_{ki} = \lambda E_k y_i \quad (5)$$

$$E_k = f(w) \sum E_j \sigma_{jk} \quad (6)$$

When comparing the relationship between reference data, it is difficult to draw a conclusion directly, which requires using similarity to compare the differences between different curves and the points on the benchmark curve, namely

$$\varphi_i = \frac{\Delta \min + \Delta \max}{|y_1(k) - y_i(k)|} \quad (7)$$

The general expression of its absolute correlation degree is:

$$\Delta \varphi = \frac{1}{2} \sum_{n=1} \varphi(ki) \quad (8)$$

## 5. Enterprise Economic Benefit Evaluation Results

### (1) Error analysis

This paper selects 10 sample data to test the economic benefit evaluation data of enterprises. The comparison between the error of the evaluation method based on neural network and the target value is shown in Figure 5. The results show that the artificial neural network can be used to

dynamically adjust the weight of each index, thus effectively overcoming the errors in the traditional weight calculation.

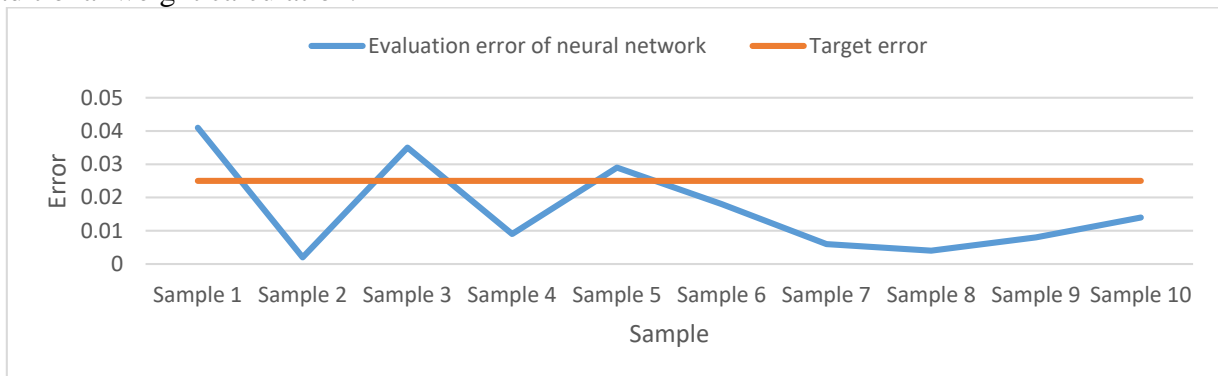


Figure 5: Error comparison between evaluation method based on neural network and target value

(2) Target error

The comparison between the eco economic efficiency goal and the enterprise’s efficiency goal is shown in Figure 6. The results show that the eco economic efficiency goal is roughly consistent with the enterprise’s efficiency goal.

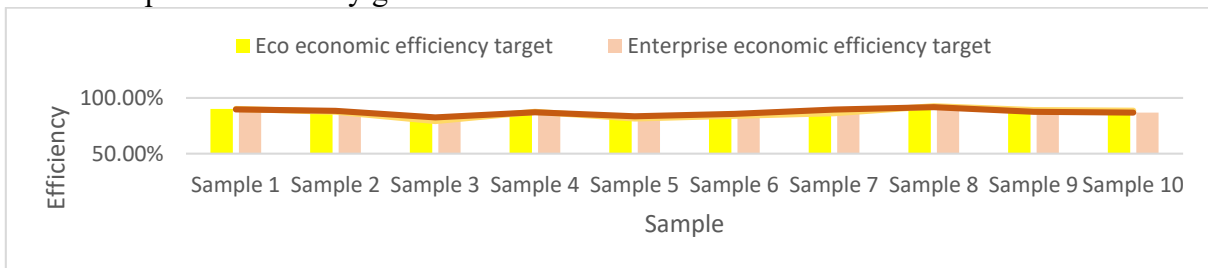


Figure 6: Comparison between the efficiency target of ecological economy and that of enterprises

(3) Index evaluation

The systematicness, relativity, typicality, collection difficulty, quantity and quality of evaluation methods play an important role in the use and reliability of the network. Therefore, people can better evaluate it objectively only by comprehensive analysis. This paper compares the digital input rate, enterprise management level, enterprise labor productivity, ecological management level and social contribution rate. The impact of each indicator on the economic efficiency of the enterprise is shown in Figure 7. It is found that the higher the informatization investment rate is, the higher the economic benefit of the enterprise is, that is, the informatization investment rate is in direct proportion to the economic benefit of the enterprise.

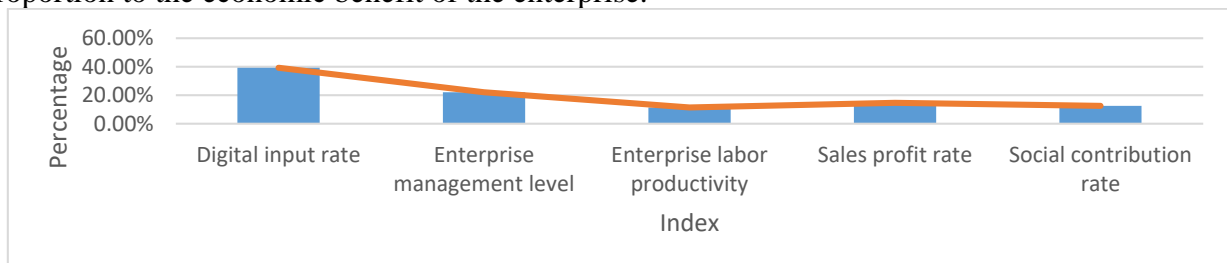


Figure 7: Proportion of the impact of each indicator on the economic benefits of the enterprise

(4) Comparison of economic benefits

The comparison between the traditional economic benefit evaluation model and the digital economic benefit evaluation model is shown in Figure 8. Compared with the traditional economic

benefit evaluation model, based on the sustainable development background, the digital enterprise economic benefit model has increased by 4.08%, bringing better development to enterprises.

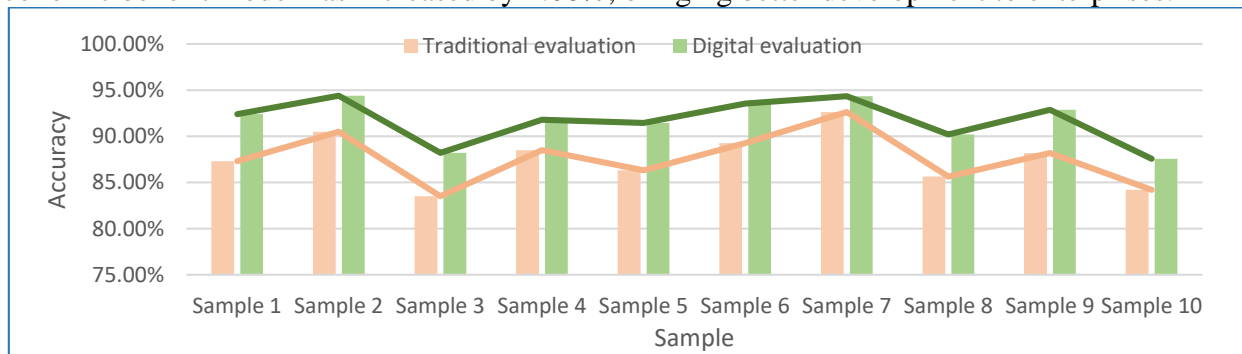


Figure 8: Comparison between traditional economic benefit evaluation model and digital economic benefit evaluation model

## 6. Conclusions

With the development of economy, sustainable development has become an important strategic task. In today's economic globalization, economic globalization would have a huge impact on the economy. Digital technology is an important part of the close combination of digital technology and real economy. It is based on digital technology and centered on digital technology to achieve digital transformation. As people all know, as a new economic form, it would have a great impact on the development and reform of the company. With digital technology as the medium, digital economy is deeply integrated with traditional production factors, thus promoting the innovation of enterprise management mode. For the company, based on digital technology, it optimizes the existing business to realize the digitalization of products and businesses, so as to build a digital business environment.

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