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Research Article

Design of Enterprise Economic Management Intelligent Terminal for Big Data Application

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With the rapid development of world economic informatization, the research and application of intelligent terminals are more and more extensive. Through the comprehensive application of big data in modern enterprise economic management, enterprises can more accurately grasp all kinds of information and mine the deep value of data information. In the era of big data, to realize the stable growth of the enterprise economy, relevant personnel need to gradually explore the enterprise economic management mode, take the enterprise financial management as the core development project, speed up the exchange of internal and external data, improve the brand awareness of the enterprise, and let the enterprise occupy a leading position in the market. Traditional enterprise economic management methods cannot run through big data combined with intelligent terminals. Therefore, this article solves the problem of enterprise economic management under the background of big data through the design of intelligent terminals. The design of an intelligent terminal for enterprise economic management under the background of big data can provide complete information for management positions. It is not only a new attempt for enterprises to explore economic management mode but also a major innovation based on an enterprise scale.

1. Introduction

Big data is one of the important technological innovations of the 21st century. It not only closely connects computers with the Internet but also infiltrates digital thinking into people's lives. In recent years, many enterprises choose to invest more money in big data technology to obtain more data support and generate more products. With the development of the market economy, all walks of life have a sense of big data competition and make continuous progress in innovating enterprise economic management mode [1]. This is an important measure for enterprises to cope with the changes of the times and represent the trust and hope of enterprises for big data. The basic meaning of big data technology is the process of using computer technology to sort and analyze big data and finally form systematic information in the case of a surge of data and information. Compared with the sorting process of traditional data, big data technology selects high-quality information from a large amount of basic information, which has the characteristics of a large base, clear organization, and strong practicability [2]. In terms of database, the development of the big data era depends on information sharing, and the information sharing of network platform makes data collection easier. With the popularity of smartphones, big data information is growing explosively, which provides development space for information technology and makes big data occupy a higher position in enterprise production. The transmission of big data technology also depends on network innovation. On the premise of the continuous improvement of the timeliness of information transmission technology, the analysis and sorting of big data are clearer, which provides more application directions for enterprises. In the era of big data, starting with the economic management mode, enterprises can more comprehensively control the market information and grasp the capital flow and investment dynamics, which is a new trend in enterprise economic management [3, 4].

The emergence and use of intelligent terminal equipment have promoted the development of human society. Intelligent terminals, small, computer-based equipment, which will provide information query, entertainment, and other services for human beings with the help of various storage and control technologies. Smartphones, tablets, cameras, and other intelligent terminals are gradually widely used in people's lives, which further promotes the development of information technology in human society and makes people's life more convenient. People's lifestyle is gradually developing in the direction of convenience and informatization [5, 6]. Intelligent terminals have also been widely used and promoted, mainly including tablet computers and smartphones. The continuous development and application of the above-advanced technologies have further promoted the mobile development of human society. Among them, intelligent mobile mainly refers to the small equipment with computer function, which can use memory and other technologies to respond to computer technology. At the same time, with the continuous development of social informatization, the intelligent terminal is also constantly updating and developing. At present, the research shows that the application of terminal design in enterprise economic management is more and more widely and gradually developing toward modern intelligence [7–9].

2. Big Data and Enterprise Economic Management

In the era of big data, enterprise financial reports need to fully record the work content and detailed data. Therefore, big data has important value in economic management mode. However, due to the influence of traditional business management ideas, the financial departments of some enterprises do not fully apply big data to their daily work, and the enterprise managers do not fully understand the application of information technology, which leads to low overall work efficiency of the enterprise. The progress of big data technology has gradually improved the information management ability of the financial department, played the greatest role in big data, guaranteed the accuracy of data, and provided a reference direction for business decision-making [10, 11]. For enterprises, the work in economic management mode is complicated and trivial. Enterprise employees need to know every step of data sorting to minimize work errors. However, the advent of the era of big data has increased the cost of talent training, and enterprises have higher functional requirements for talents in management positions. Traditional data processing mode cannot adapt to the short-term talent training mode. But, advanced information technology provides new ideas for economic management. The integration, backup, and analysis of all data can be presented at the same time so that the data is no longer complicated and the economic management mode can be carried out in three dimensions [12, 13]. Therefore, big data is a bright light to liberate traditional trivial work and promote the all-around development of enterprises.

With the advent of the information age, information technology is widely used in various fields. Relying on information technology, the big data statistical analysis method plays a certain guiding role in enterprise economic management [14]. Based on promoting the stable development of the enterprise, it effectively improves work efficiency and realizes the effect of economic management. Its market scale is increasing year by year as shown in Figure 1. E in the abscissa represents the estimated growth rate and the ordinate on the right represents the growth rate. Firstly, in the process of production and operation, the enterprise should make appropriate adjustments to its own products and businesses in full accordance with relevant policies and regulations. It requires good communication and coordination ability among various departments within the enterprise to achieve the goal. Under the background of big data, the application of statistical analysis technology can realize the effective integration of information data and realize the scientific sorting, analysis, and utilization of information [15, 16]. Then it provides a scientific theoretical basis for enterprises to make correct decisions, and greatly improves the work efficiency of enterprises. In the context of global economic integration, the competition between enterprises is becoming more and more intense. At the same time, foreign-funded enterprises also have a more urgent competitive relationship with local enterprises [17, 18]. Therefore, enterprises are required to keep pace with the times and adopt advanced technology to formulate a scientific and rigorous long-term development strategy, while big data statistical analysis can realize the all-around sorting and analysis of market information and data.

3. Intelligent Terminal and Its Design

With the rapid development and wide application of modern industrial informatization and electronic technology, the human mobile economy and society had officially entered a new era facing mobility and the Internet, which directly makes people's various ways of daily life and work more convenient. The wide application of various mobile-based intelligent terminal connection devices and products, such as mobile-based smartphones, tablets, and home computers, has promoted the rapid commercialization and informatization of human society [19, 20]. Some intelligent monitoring terminal users hope to realize voice network video communication, which is also the most basic monitoring function of the mobile intelligent terminal at present. However, as a new type of mobile intelligent terminal monitoring equipment, the comprehensive application development of various video network monitoring, social video, and communication monitoring software in the intelligent terminal also allows people to freely and directly choose video network or video remote call.

In the development and design process of intelligent terminals, many electronic technologies, especially digital circuits and sensors, are used. Using a digital circuit, the main control system of an intelligent terminal can be developed, such as environmental monitoring and analysis system and charging control system. Using sensor, camera etc., code and other functions can be developed, which plays an important role [21, 22]. Specifically, the key technologies

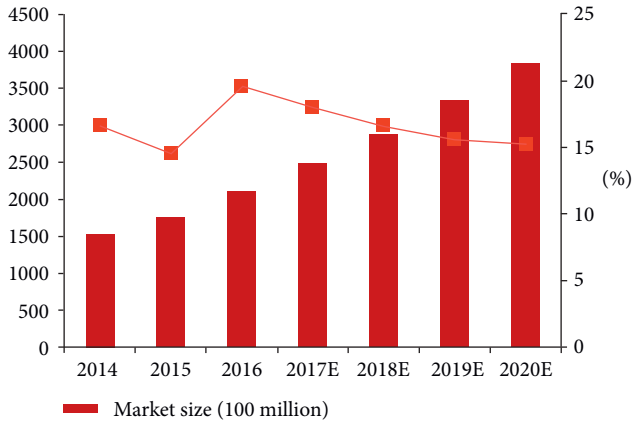

Figure 1: Growth trend of big data market scale.

of intelligent terminal application electronics, sensor technology, are described in detail. At present, the sensor mainly realizes the functions of data acquisition, data transmission and forwarding, data receiving, and so on in the development of the intelligent terminal. Specifically, the sensor can use ZigBee, WIFI, TD-LTE, and other networks to build a communication transmission network. Using the sensing function, sensors can collect the machine operation and environmental information, and then use the sensor network to send information to the aggregation node, which forwards it to the server and saves it to the database, so that people can mine and analyze these data. It can better discover the hidden knowledge in the data and control the operation of the intelligent terminal. There are two types of terminals, the data acquisition terminal and the data transmission terminal. The data acquisition terminal can complete the functions of information acquisition, transmission, storage, and forwarding. The main modules of the terminal node include the power management module, clock module, LED display module, video antenna module, signal modulation and demodulation module, and sensor module. Power management can be responsible for the power and energy regulation of IoT nodes [23]. If the amount of power supply is small, users can be notified to replace the power supply in time. The clock module can realize the clock frequency synchronization in the Internet of Things, ensure that the information of each terminal node and gateway node is sent and received at the same time, and improve the efficiency of data transmission. The LED display module can display the operation and operation steps of the terminal node, to know the operation of the terminal node at a glance. The RF antenna module can realize the data transmission and reception of the terminal node. Signal modulation and demodulation can realize the conversion between the digital signal and analog signal, and complete the compression and restoration of video data, image data, and text data [24, 25]. The sensor can perceive and acquire the most basic data. Use t_n to denote the set of times when a sale occurs. Let ε_t^c be a continuous, piecewise differentiable process suitable for F_t, and Δt be a bounded left continuous process suitable for F_t. ε_t is decomposed as follows:

$$\varepsilon_t = \varepsilon_t^c + \sum_{t_n<t} \Delta t_n. \tag{1}$$

Here, ε_t represents the collected data and ε_t^c represents forecast data. The constraints of dynamic pricing strategy are as follows:

$$E\left[\left(\varepsilon_t - \varepsilon_{t'}\right)^+ g\right] \le \theta\left(t' - t\right). \tag{2}$$

E represents expectation and θ represents the time difference function. Discrete approximation of data sets:

$$pN(x) = \sum_{i=1}^{N} \omega(x)\delta_{x^{(i)}}(x). \tag{3}$$

$\omega(x)$ represents the data set and $pN(x)$ represents the function after data discretization Selecting $q(x)$ to minimize the variance of $f(x)w(x)$ can obtain the optimal reference distribution:

$$q(x) \propto |f(x)|p(x). \tag{4}$$

The decentralized gradient descent method is as follows:

$$x_{k+1}^i = \sum_{j=1}^{m} w_{i,j} x_k^j - \alpha_k \nabla f_i\left(x_k^i\right), \tag{5}$$

where $\alpha_k > 0$ is a constant step size and w is a double random weight matrix.

The sensor gateway node is also known as the router node. The data collected by the terminal node can be uniformly transmitted to the gateway node so that it can exchange with the external Internet. At the same time, the gateway node can also accept the response instructions to realize the routing and forwarding function of data [26, 27]. When the Internet of Things is established, the gateway node can be placed flexibly according to the needs. The gateway node is similar to the terminal node. It also has a power management module, clock module, video filling unit, LED display module, etc., and the gateway node does not need to collect environmental data. The clock processing frequency of these processors is faster and higher, so they can better carry various types of application software [28].

EVS is explained variance and refers to the sample variance of the evaluation terminal. R^2 is the determination coefficient or goodness of fit. The closer R^2 is to 1, the better the design result. MSE is the mean square error and represents the expected value of error variance. The calculation formula is as follows:

$$\begin{aligned} \text{EVS} &= 1 - \frac{\text{Var}\left(X_i - \overline{X}_i\right)}{\text{Var}\left(X_i\right)}, \\ R^2 &= 1 - \frac{\sum\left(X - \widehat{X}\right)}{\sum\left(X - \overline{X}\right)}, \\ \text{MSE} &= \frac{1}{n}\sum_{i=1}^{n}\left(X - \widehat{X}\right)^2, \end{aligned} \tag{6}$$

where Var is the variance, X_i is the actual value, and $\overline{X}_i$ is the representative mean. X is the actual value, and $\widehat{X}$ is the predicted value.

MAE is the mean absolute error as follows:

$$\mathrm{MAE} = \frac{1}{n}\sum_{i=1}^{n}|\widehat{Y} - Y|. \tag{7}$$

Using the instantaneous function gradient randomly calculated at time k to approximate the gradient $\nabla f_i(x_k^i)$, the update rule of $v_{k+2}^{i,j}$ is as follows:

$$\begin{aligned} v_{k+2}^{i,j} &= x_{k+1}^{i},\ j = t_{k+1}^{i}, \\ v_{k+2}^{i,j} &= v_{k+1}^{i},\ j \neq t_{k+1}^{i}. \end{aligned} \tag{8}$$

Here, k iterations can be obtained, the remaining gradients remain unchanged, and the following update formula is obtained:

$$\sum_{j=1}^{p_i}\nabla f_i^j\left(v_{k+1}^{i,j}\right) = \sum_{j=1}^{p_i}\nabla f_i^j\left(v_{k+1}^{i,j}\right) + \nabla f_i^{t_{k+1}^i}\left(x_k^i\right) - \nabla f_i^{t_{k+1}^i}\left(v_k^{i,t_k^i}\right). \tag{9}$$

The formula above can obtain the full gradient that only needs to be calculated in the first iteration so that large-scale optimization problems can save a lot of resources and costs.

The local objective function containing i agents is given as follows:

$$f_i(x) = \frac{1}{q_i}\sum_{n=1}^{q_i}\left\|C_i^n x - d_i^n\right\|^2. \tag{10}$$

Here, C_i^n is the sensing matrix in the problem model and d_i^n is the measured value.

4. Design of the Intelligent Terminal for Enterprise Economic Management

In the era of big data, the enterprise economic management model is facing challenges, but it also provides opportunities for the expansion of enterprise scale. Enterprise management needs to upgrade big data information technology according to the actual operation of the enterprise, and use big data to integrate enterprise resources [29, 30]. At the same time, the renewal of mode and technical means help enterprises occupy a favorable position in the fierce market competition. In the new economic situation, the use of intelligent terminals can timely focus on the market development trends, formulate innovative economic management systems, timely make up for the shortcomings of management strategies, and help enterprises move forward toward a healthy development track. According to the operational strength and asset distribution of enterprises, the introduction of an advanced platform management system can promote the improvement of enterprise efficiency, realize multidimensional expansion, establish a good risk governance mechanism for enterprises to use Internet big data technology, and formulate emergency plans in time after discovering risk loopholes, to find risks in economic management and formulate effective measures to solve these risks. The establishment of the platform not only makes the departments in the enterprise form an organic whole but also the spatial carrier of their cooperation and coordination.

4.1. System Hardware Architecture. The hardware system is mainly composed of the following four core modules: sim800a communication module, gt-u7 positioning module, main control, and 3.2-inch LED display. One must connect sim800a module, gt-u7 module, 3.2-inch LED, and serial port of MCU. Each module checks all parameters on the circuit, such as voltage, current, short circuit, and open circuit, by connecting the power supply and using a multimeter, to ensure that the working circuit is normal. The hardware structure diagram of the intelligent terminal is shown in Figure 2.

Because the system needs to realize human-computer interface interaction, display real-time temperature, send text messages, receive and make calls, and other functions, it needs to have modules such as a controller, display, and voice call. As shown in Figure 2, it is mainly composed of a minimum system, external expansion, sensors, and so on. The lower computer core of the controller system is the STM32F103 controller. 64 KB SRAM has rich internal integration resources, can accommodate a large number of codes, can be equipped with an external bus, and can also be used to expand SRAM and connect led. Driving through a Flexible Static Memory Controller can significantly improve the screen brushing speed of LED and fully meet the functional requirements of the lower computer control of the system. Considering that the use of resistive display requires a medium-capacity single-chip microcomputer with more pins, and a large number of internal resources are needed to run the real-time operating system and interface program, stm32f103zet6 single-chip microcomputer is selected. The software design of this system includes the programming of lower computer and upper computer. The lower computer uses C language to write the control program of STM32 in the keil5 compiling environment. The code quantity of the tailorable real-time operating system is cut according to the actual situation, so the code quantity is not large and has strong flexibility. It can be transplanted to a variety of single-chip computers. The system is written in C language and assembly language. Most of them are written in C language, except that part of the contact with the bottom is written in assembly language. When transplanting the system, you only need to modify the assembly language part. STM32 is a 32-bit single-chip microcomputer. It is very difficult to transplant the system, but the single-chip microcomputer is open source. The early developers have transplanted the real-time operating system well, so they only need to consider how to use the system.

The operation system of MCU is shown in Figure 3. The transplantation of single-chip microcomputer system is very difficult, but the system code is open source. Early developers added a real-time operating system, so they only need to consider how to use the system for design.

4.2. Design of the Enterprise Economic Management Intelligent Terminal for Big Data. For the operation and development of modern enterprises, the comprehensive application of enterprise economic management in the terminal is a new technology formed after innovation and reform based on the

Figure 2: Hardware structure diagram of the intelligent terminal.

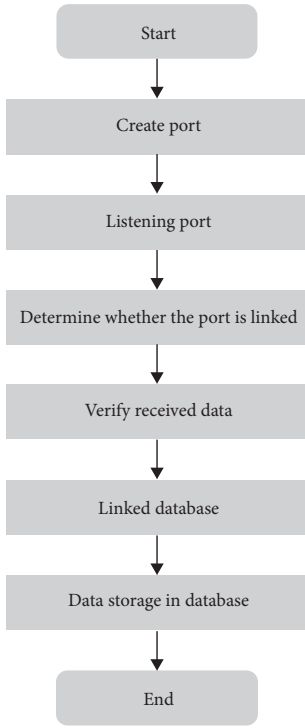

Figure 3: System operation flow chart.

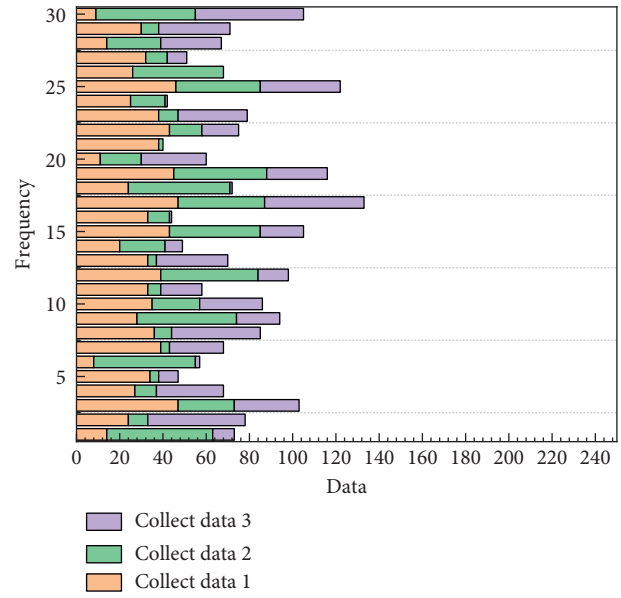

Figure 4: Data collection diagram of enterprise economic management.

traditional economic management mode, which is very suitable for the operation and management needs of modern enterprises under the condition of the market economy. From a practical point of view, the active application of intelligent terminals in enterprise economic management makes the management process more refined, and the ability to deal with the complex impact of the economic market becomes stronger. It also makes the economic management activities pace with the development of the economic market at any time, and maximizes the economic benefits of the enterprise while improving the utilization rate of enterprise economic resources.

On the whole, modern enterprise economic management mainly has the following characteristics in the actual application of intelligent terminals. First, there are obvious strategic characteristics. Modern enterprise economic management pays more attention to the information collection and maintains high consistency and coordination with the enterprise's strategic development plan, which enables enterprise economic management to bring a higher guiding ideology to enterprise operation and development. As shown in Figure 4, the abscissa represents the data and the ordinate represents the frequency. In the figure, the data collected by the intelligent terminal is more comprehensive and the comprehensive features are obvious. The use of intelligent terminals in economic management does not play a role from a certain angle, but from the development level of the entire enterprise, making enterprise operation and management more scientific and feasible. In particular, it will reasonably allocate the enterprise economy and supervise all economic activities of the enterprise, such as enterprise operation cost, enterprise production and sales, enterprise core technology innovation, and human resource management. This makes the enterprise management more comprehensive and specific, as shown in Figure 5, the ordinate represents the optimization effect, and the information obtained when the fifth layer is reached by continuously optimizing the information value. Either from the economic and market development situation or the actual situation of the operation and development of modern enterprises, promoting the comprehensive integration of big data and economic management can greatly promote the ability of enterprises to deeply mine and utilize data information, especially comprehensively sort out and analyze the external and internal information of enterprises, and input the analysis results into the pre-established operation model, and finally get the feasibility analysis of the data and information results, to improve the accuracy of

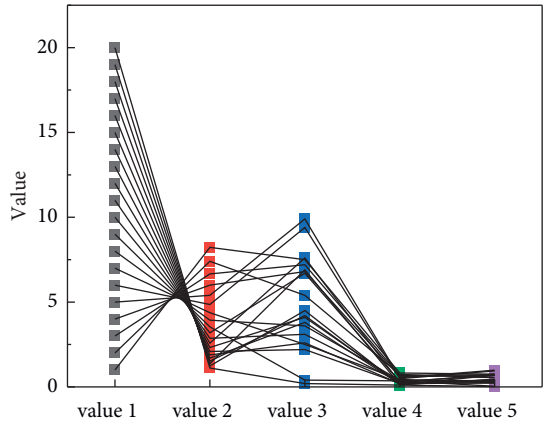

Figure 5: Multimedium economic activity optimization process chart.

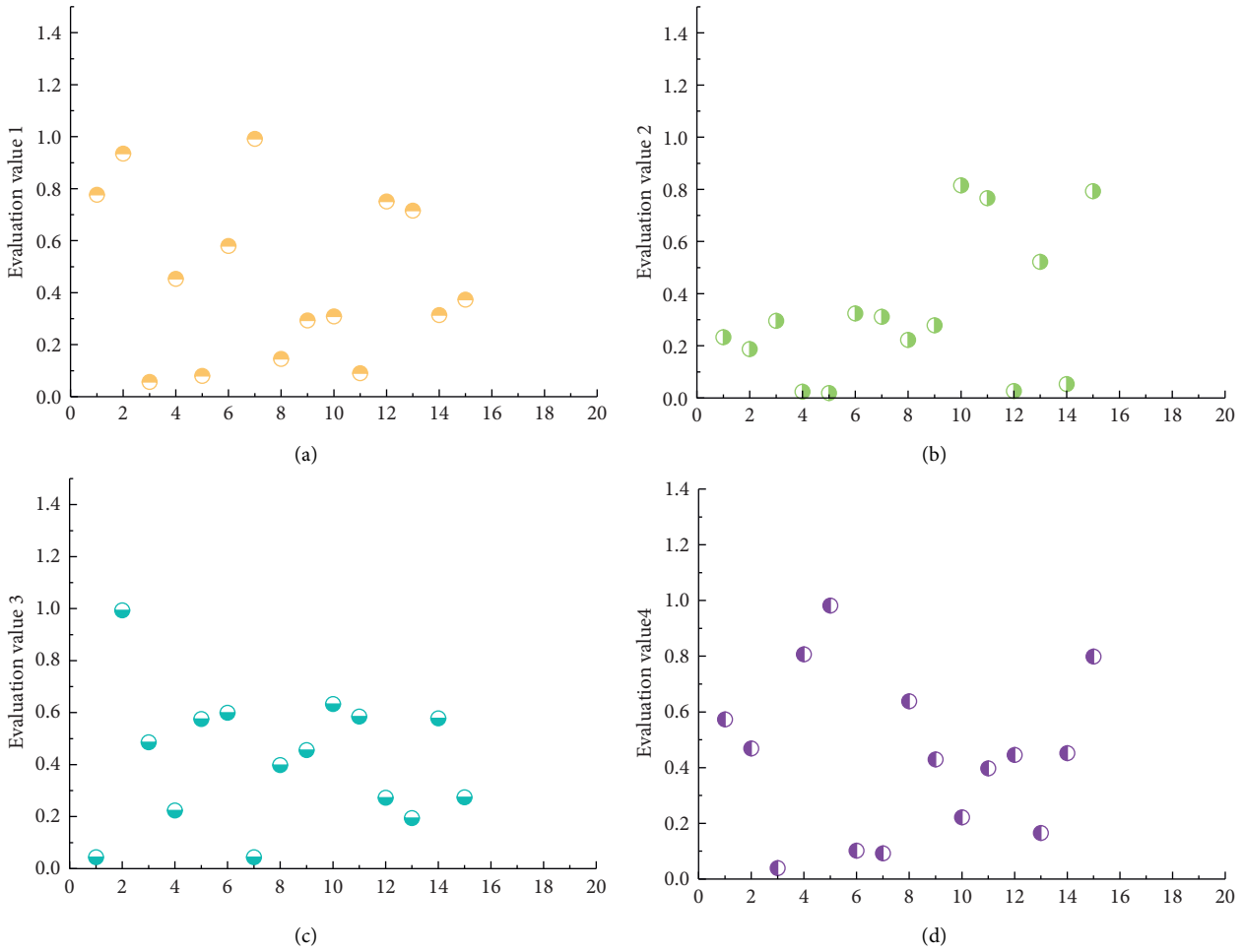

Figure 6: Interactive data collection diagram.

decision-making in all links of enterprise operation and development. Through big data, we can summarize and sort out a series of data information, analyze it through big data and cloud computing, and finally present the data in the form of charts and interactive simulation. The collected data is shown in Figure 6, the abscissa represents the collection frequency and the ordinate represents the estimated value. In the integration of big data and modern enterprise economic management, accurate analysis can be carried out with the help of a variety of economic management analysis tools, which can maximize the accuracy and transparency of data information analysis results, and ensure the real-time

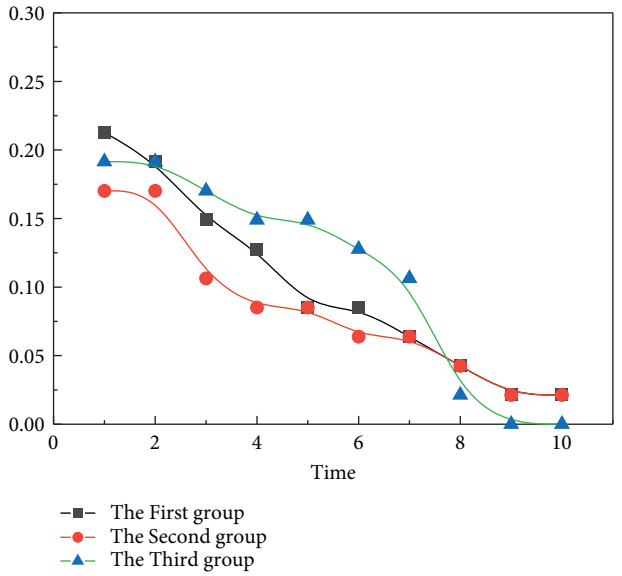

Figure 7: Real-time data processing results.

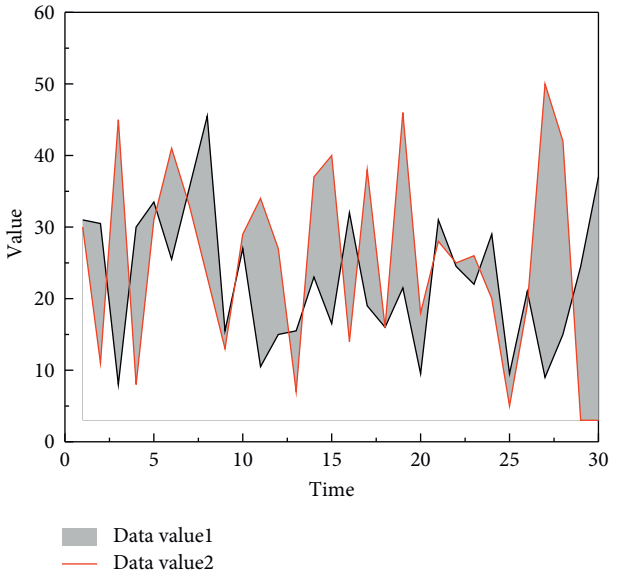

Figure 8: Comparison of capital investment and return.

collection and real-time release of data information. As shown in Figure 7, autocorrelation processing is performed on the data. The abscissa represents the number and the ordinate represents the result value, when the number is large, the third group performs better.

To really make good use of big data technology, improve the modernization level of enterprise economic management, and make this management work take the road of information and intelligent development, we need to actively build a modern enterprise economic management platform according to the actual situation of the enterprise and the development trend of big data technology, give enough space for big data technology, and improve the

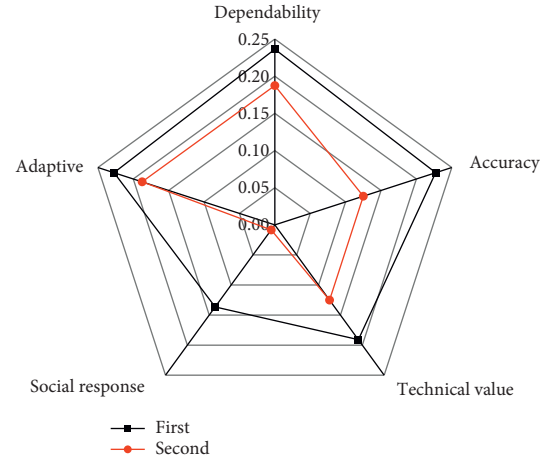

Figure 9: Multitask evaluation diagram.

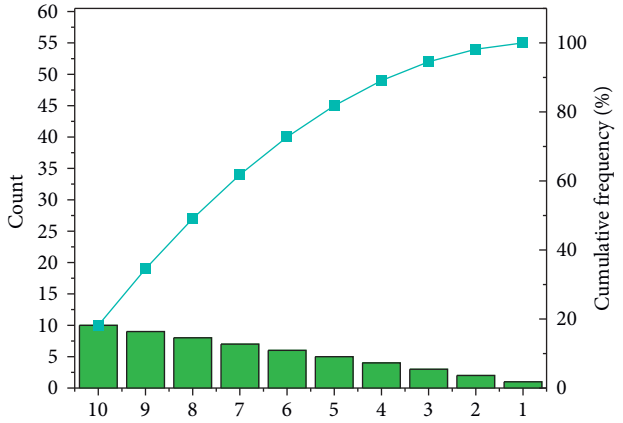

Figure 10: Statistical analysis of data.

comprehensive level of enterprise economic management on this basis. Enterprises need to invest special funds for the purchase and development of infrastructure hardware facilities and software systems. Through the big data economic management platform, comprehensive and detailed management of enterprise economic management is carried out.

Establish a status monitoring system to monitor the operation status of enterprise economic management mode and various economic data information resources, monitor the use of economic funds in the production of enterprise products in real-time, and compare the investment and return of enterprise product or technology R&D, as shown in Figure 8. Data value 1 represents the investment in technology R&D and data value 2 represents the return or income. According to the establishment of a task management system, manage the short-term and long-term economic management tasks of the enterprise, check the progress of each economic management task at any time, and evaluate the task, as shown in Figure 9. Build a cluster management system, realize the detailed display of economic management tasks in each stage, and automatically find the nodes that

need to be actively managed. Construct a service management system, aim at economic management service content, reflect the function of adding and deleting service content, and display the current status of service objects in real time. For example, establish a user management system, in which there will be different economic management personnel permissions. The statistical results of the data are shown in Figure 10 that there are different statistics in different groups of information. The management personnel has the right to view the current situation of enterprise economic management and grassroots employees have the right to put forward opinions on decision-making decisions or provide key information through the system platform.

5. Conclusions

In the information age, information network technology has become an effective tool for enterprise economic management, which can greatly promote the transformation of productivity and the optimization of enterprise economic management means. In the context of the new era, many enterprises still insist on using traditional economic management tools and means to carry out economic management activities and do not update economic management tools with the development of information and data technology, which makes it difficult to improve the economic management efficiency of enterprises. Through intelligent terminal design, enterprises can use information technology to show the advantages of big data through the platform image and introduce big data technology, cloud computing, cloud storage, and other technologies to improve the efficiency and level of economic management, which is more in line with the market environment of the new era. The construction of the design and service management system of intelligent terminals greatly enhances the core competitiveness of the company. By understanding and comprehensive use of intelligent terminals, companies can adapt to adjusting economic management tools to make them more suitable for corporate economic management behaviors and activities.

The advanced and scientific nature of the technology of enterprise economic management will have an important impact on the implementation effect of follow-up management. Before implementing this work, managers should first ensure that management concepts have certain advanced nature, and then combine with the actual management at this stage, eliminate some old management modes that do not conform to their own development, and better adapt to the market environment. In the new situation, the business philosophy of small- and medium-sized enterprises should have corresponding foresight and strategy. By exploring the management mode of some excellent enterprises at home and abroad, constantly updating the management concept, establishing intelligent terminals, and comprehensively expanding the business scope, it has promoted the progress of enterprise management to a great extent. In terms of marketing, enterprises can promote the digitization of marketing methods through intelligent terminals, establish and improve online and offline dual marketing channels, and enhance the influence of enterprise products. Enterprises can introduce big data technology, fully analyze consumer preferences and market trends, accurately locate and launch products, and improve the market competitiveness of products. In addition, using big data technology, enterprises can accurately locate consumers through intelligent terminals and establish one-to-one online communication with consumers, to improve consumers' consumption satisfaction, enhance the image of enterprises in consumers' hearts and establish popular brands. In addition, in terms of personnel management, Internet information technology can also produce a multiplier effect. Enterprises can use network information technology to establish intelligent and information-based management systems. In short, enterprises should make full use of the existing network information technology, improve the enterprise's economic management system, improve the enterprise's economic management technology and improve the intelligent level of enterprise management.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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