Application of Big Data Technology in Innovation Management System

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**Abstract:** In today’s era, the rapid popularization of computer network provides the basis for the development of many high-tech. Big data technology is a cutting-edge technology based on cloud computing processing technology, which is widely used in all aspects of our daily life. With the rapid development of information technology, many new technologies and new ideas are constantly being developed. If we want to continue to advance in this era of big data, we must carry out reform and innovation to adapt to the pace of the development of the times. In order to meet the new requirements of innovation management system in the new era, this paper puts forward the development method of applying big data technology in innovation management system. Firstly, the paper analyzes the development status of innovation management system in enterprises, compares the development status of innovation management system with the requirements of the times through big data technology, so as to formulate a new scheme suitable for the development of enterprise innovation management system. Through long-term research and observation, we can find that the research method of applying big data technology in innovation management system is of great significance to the development of enterprise innovation management system.

**Keywords:** Computer Network, Information Technology, Big Data Technology, Innovation Management System

1. Introduction

In recent years, driven by big data [1-3], macroeconomic growth has undergone disruptive changes. The Internet age intensifies the complexity of industrial innovation, and the traditional innovation
mode faces the risk of subversion. Based on the strategic application of big data, customer participation in innovation has become an innovation trend. Big data has become an important driving force of scientific and technological innovation and an important source of enterprise innovation. Big data strategy is related to national economic security and national competitiveness. China's real economy and enterprises are facing the challenges and needs of further transformation of industrial development mode and structural adjustment. If we want to promote the development of big data related industries to the height of the new national development strategy, we must accelerate the industrial strategic positioning of big data, data collection and analysis and the application of related industrial technologies from the new national strategic level. Through the collection and analysis of China's massive enterprise big data and related data mining, improve the ability of accurate grasp and analysis and prediction of China's massive data.

Enterprise innovation activity [4-5] is an important way to improve organizational efficiency, and the effective management of innovation activity is an important aspect of whether enterprise innovation activity can play its due role. In view of the shortcomings of the current innovation management research, only focus on the discussion of single innovation activities, lack of systematic thinking, this paper puts forward the problem of establishing enterprise innovation management system. On the basis of foreign research results, this paper studies the concept, input and output of innovation management system from the perspective of demand-oriented innovation architecture. On this basis, through the abstract description of the system conceptual model, the interactive learning mechanism of innovation management system [6-8] is preliminarily described.

This paper studies the application method of big data technology in innovation management system. In order to cope with the impact of the rapid development of information technology [9-10] on all walks of life, many industries are undergoing transformation and development, changing their traditional development and business model to meet the new requirements of the big data era. Today's enterprises want to reform and develop their innovation management system; they must combine the data analysis of big data technology to provide direction for their innovation and development path. Through long-term research and observation, we can find that the research method of applying big data technology in innovation management system is of great significance to the development of enterprise innovation management system.

2. Application of Big Data Technology in Innovation Management System

2.1 Big Data Technology

Big data refers to the amount of data involved exceeds the processing capacity of traditional database system, which requires high data scale and transmission speed. The new processing mode is required to be transformed into massive, high growth and diversified information assets, with stronger decision-making power, insight and process optimization ability. Big data has the characteristics of large amount, multiple types, low value density and fast processing speed. The core of solving big data problem is big data technology. Big data technology mainly includes: data collection, data access, infrastructure, data processing, statistical analysis, data mining, model prediction, result display, etc. Its main function is to quickly analyze and extract valuable information for the application subject through the data processing of complex and massive data.
2.2 Innovation Management System Development Method

Through the innovation management system, enterprises, consumers and technology owners form the relationship of interest, and interact with the innovation management system and depend on each other. Technology owners include innovative technology providers (such as scientific research institutions, universities, etc.) from inside and outside the enterprise; consumers constantly create innovation opportunities for the innovation of management system through the change of their own needs; enterprises formulate corresponding strategies according to the needs and existing technology resources, and become the leaders of innovation management system. Enterprises, consumers and technology providers. Through the output of innovation management system, the stakeholders are formed. From the perspective of control theory, we know that in order to ensure the stable operation of the system, we must form an effective feedback adjustment mechanism in the system, whether it is the conventional management of enterprises or the management mechanism of technological innovation.

3. Experimental Correlation Analysis

3.1 Experimental Background

With the advent of knowledge economy, innovation is breaking through the traditional, single, static and closed innovation concept, showing more and more multi-dimensional, dynamic, open and systematic. Institutional innovation is the result of innovation development to a certain historical stage, in line with the development trend of innovation integration and systematization. The main learning methods are exploratory learning and developmental learning. Under the influence of many innovation elements, these two learning methods advance along the direction of organizational innovation objectives through the regulation and influence of external environment and internal resources.

3.2 Experimental Design

Exploratory innovation and exploitative innovation are two different types of innovation. They have obvious characteristics and differences in objectives, results, knowledge base, innovation sources, organizational structure, culture, performance impact and many other aspects. The survey results are shown in Table 1.

| project          | Exploratory innovation                          | Development innovation                          |
|------------------|------------------------------------------------|------------------------------------------------|
| Innovation goal  | Meet new customer or market demand              | Meet existing customer or market demand         |
| Innovative results| Radical innovation; acquisition of new design and new market | Gradual innovation; improvement of existing design, channel, etc |
4. Discussion

4.1 Analysis on the Application of Big Data Technology in Innovation Management System

Technological innovation is the core concept of enterprise production development. Information is the information resource guarantee of enterprise technology innovation process and innovation management. It penetrates into all aspects of enterprise technology innovation, and can optimize enterprise technology innovation decision-making and accelerate innovation process. Facing the large amount of information needed in the process of enterprise innovation and management, as well as the diversity and distribution of this information, the construction of enterprise technology innovation management platform is the inevitable requirement of the construction and development of new technology system. In this paper, the purpose of enterprise innovation management is investigated and discussed. The survey results are shown in Figure 1:
Figure 1. The purpose of enterprise innovation management

As shown in Figure 1, after investigating the purpose of innovation management in China's enterprises, it can be seen that 65% of enterprises carry out research on innovation management system to promote economic development, 20% of enterprises carry out research on innovation management system to break through the bottleneck of development, 10% of enterprises conduct research on innovation management system to cultivate scientific and technological talents, and 5% of enterprises carry out innovation management system. The purpose of unified research is to manage enterprises scientifically. This shows that, in the new era, most enterprises carry out the research of enterprise innovation management system mainly to promote economic development, economic development is the biggest goal of enterprise innovation. Facing the fierce competitive environment, enterprises must constantly carry out technological innovation, in order to maintain the advantage in the competition.

If enterprises want to maintain their advantages in competition, they must constantly carry out technological innovation. There are a lot of different processes involved in the production of information in enterprises. At the same time, enterprise technology innovation also uses and exchanges information from different angles or ways. Therefore, information construction is particularly important in the process of technological innovation. Basic information security plays an important role. It permeates every link of enterprise technology innovation. Therefore, it is necessary to optimize the technological innovation decision-making and speed up the innovation process with the support of modern scientific and technological information system and abundant information resources. As the management environment is complex and changeable, scientific management becomes more and more difficult. In the process of building technology innovation system, it is
necessary to use information technology to strengthen management means and improve management level. This paper investigates the growth rate of the average turnover of the enterprises that have carried out innovation management system research and those that have not carried out the research in recent years. The survey results are shown in Figure 2:

![Comparison of the growth rate of turnover between enterprises with innovation management system research and those without innovation management system research](image)

**Figure 2.** Comparison of the growth rate of turnover between enterprises with innovation management system research and those without innovation management system research

As shown in Figure 2, this chart is a comparison chart of the average turnover growth rate between the innovation management system reform and the non-innovation management system reform of enterprises in China in recent years. It can be seen from the figure that the average turnover of enterprises with innovation management system reform is significantly higher than that of enterprises without innovation management system reform. Moreover, with the development of time, its average turnover growth rate is getting higher and higher, from 36% in 2016 to 68% in 2019, which fully demonstrates the importance of innovation management system reform for an enterprise. Only by continuously carrying out innovation activities, recognizing its own problems and carrying out reform, can an enterprise continue to develop rapidly.

4.2 *Suggestions on the Application and Development of Big Data Technology in Innovation Management System*

The application of big data technology in enterprises can improve the ability of enterprises to deal with crisis events. Enterprises can use advanced cloud computing and big data related technologies to build their big data platform for crisis decision-making and management, and collect relevant information
and data related to crisis management emergencies in real time through Internet and other modern information media tools, And in the enterprise with the help of mathematical statistics and related technology to quickly and effectively screen, analyze and track the information related to sudden data. Through the technology of data visualization, the complex and abstract statistical information of emergency data is transformed into the real and available crisis management decision information. Enterprises can collect the relevant data of crisis events in the fastest time to form a unified crisis decision-making plan. At the same time, enterprises use the information feedback mechanism of big data platform to timely follow up the crisis events, and through real-time tracking and timely adjusting the implementation effect and role of crisis decision-making, in order to improve the efficiency of enterprise crisis management.

To improve the decision-making level and efficiency of enterprises, enterprises must establish a scientific decision-making mechanism. We should implement the power supervision and restriction mechanism, straighten out the power and responsibility relationship among the decision-making level, the management level and the production executive level, and establish a decision-making mechanism that truly meets the requirements of the market economy system.

According to the development goals set by the decision-making level, create, improve, introduce or plan the prospect of new projects, investigate and analyze the projects with market development prospects, provide technical support for product innovation and improve enterprise benefits. Make full use of domestic and foreign technical resources and carry out various forms of technical exchanges and cooperation. The research achievements at home and abroad should be integrated for reuse. Establish a new mode of school enterprise cooperation and enterprise bank cooperation. Pay close attention to the dynamic information of resources, market and technology of nonferrous metals industry, so as to provide strong information support for the development of the project. Implement effective incentive mechanism for talent R & D. Develop a variety of models to attract domestic and foreign elites to serve the development of enterprises. We should strengthen the quality training of personnel in the unit and improve the quality and innovation ability of the staff and workers. Actively apply for patents and shorten the test and production cycle of new products. Provide on-site guidance and help for production line.

Innovation is the eternal theme of enterprises, and management innovation is also the eternal theme of enterprises. Under the background of global economic integration and knowledge economy era, innovation is becoming more and more important. China attaches great importance to innovation and puts forward the specific goal of "squeezing into innovative countries". This requires changing the growth mode, from mainly relying on factor input and scale expansion, relying on scientific and technological progress to improve the quality of workers and management innovation. The State Council has issued "management promotion activities" in central enterprises, which requires further improvement of the management innovation work system, forming a culture and atmosphere to encourage all employees to participate in management innovation. At the same time, it is necessary to pay attention to the effective transformation of management innovation achievements and improve the ability of internal resource allocation, further improve the long-term mechanism to promote the continuous improvement of enterprise management level by relying on management innovation.

Over the years, people have done a lot of theoretical and empirical research on the process, type, mechanism and strategy of technological innovation from different angles, and have achieved many
results. Research shows that the process of technological innovation is not random, but can be managed. Through effective management, the efficiency and success rate of technological innovation can be greatly improved. At the same time, it shows that the process of technological innovation is a complex nonlinear process, which requires a lot of interaction, often complex technology and market factors. Only when technological innovation is rooted in the enterprise environment and the key factors of related technological innovation, can the effective management of technological innovation be realized, and the knowledge generated in the process of technological innovation can be internalized into the core competitiveness of enterprises.

5. Conclusions

This paper introduces the application method of big data technology in innovation management system. In today's big data background, the development of all walks of life cannot do without the help of science and technology in the new era. In order to meet the new requirements of the new era for innovation management system, this paper puts forward the development method of applying big data technology in innovation management system This paper analyzes the development status of the enterprise, compares the development status of the innovation management system with the requirements of the times through big data technology, so as to formulate a new scheme suitable for the development of enterprise innovation management system. Through long-term research and observation, we can find that the research method of applying big data technology in innovation management system is of great significance to the development of enterprise innovation management system.

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