Research on Power Enterprise Data Model Online Management Decision System Based on Big Data

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Abstract. At present, with the development of cloud computing and data analysis technology, big data technology based on cloud computing is also making continuous progress. As a cutting-edge technology based on cloud computing processing technology, big data technology is widely used in our daily production and life, bringing great convenience to our work, study and life. Under the background of today's big data era, the new era has brought great impact on all walks of life. If everything wants to keep pace with the development pace of the times, it is necessary to carry out reform, innovation and development. In order to deal with the challenge brought by this impact, this paper proposes a research method of online management decision system of power enterprise data model based on big data background. Through big data technology, the current research status of online management decision system of power enterprise data model is analyzed. Combined with the new requirements of big data era, a set of electric power suitable for the new era is formulated Development plan of enterprise data model online management decision system. Through long-term research and observation, it can be found that the method proposed in this paper is of great significance to the research of power enterprise level data model online management decision-making system based on big data background.

1. Introduction
Big data [1-3] refers to a large amount of information that cannot be applied, analyzed, screened and collected in a short period of time, providing a basis for enterprise decision-making and management. Big data has the characteristics of accuracy, diversity, fast speed and large quantity. Using these characteristics, enterprise managers can build big data model and analyze comprehensive big data in the process of enterprise operation, and excavate the most favorable industry information for the development of the enterprise, so that the enterprise managers can put forward the most scientific planning and decision-making scheme for the enterprise in the operation, and realize the healthy and sustainable development of the enterprise.

On the one hand, informatization and big data based on Internet and cloud computing provide a broader development space for the informatization decision management and informatization of the new generation of power enterprises [4], and provide more enterprise decision-making management
information sources in the process of promoting the informatization and decision-making management of power enterprises; on the other hand, The information and decision-making management environment that power enterprises need to face is changing more and more rapidly, and various data and decision-making information are directly related to the decision-making of power enterprises, especially accidents, which lead to continuous generation, dissemination and storage of data. Objectively speaking, enterprises need to realize the centralized integration of data through cloud computing platform, As soon as possible, a highly integrated decision-making big data management information system of power enterprises should be established to fully collect, analyze and manage the massive decision-making big data information assets in the power enterprise system. Therefore, in the context of complex big data decision-making environment, the complex decision-making environmental factors [5-7] directly affect all power enterprises' timely collection and comprehensive analysis of decision-making big data information, correct decision-making and decision-making selection, and thus directly affect the unified management of decision-making big data collection by all power enterprises, Objectively, it greatly increases the complexity and difficulty of decision-makers in power enterprise decision-making information management.

This paper studies the research method of power enterprise data model online management decision system [8-10] Based on the background of big data. With the rapid development of the new era, it has brought great impact to all walks of life. In order to meet the challenges brought by this impact, this paper puts forward the research method of online management decision system of power enterprise data model based on big data background Based on the analysis of the current research status of power enterprise data model online management decision system based on big data technology, a set of development scheme of power enterprise level data model online management decision-making system adapting to the new era is formulated based on the new requirements of big data era.

2. Research Method of Power Enterprise Data Model Online Management Decision System Based on Big Data

2.1. Big Data Technology

In the context of big data, enterprises can implement data-driven decision-making with the help of big data technology. By collecting comprehensive data related to enterprise operation and using digital methods to analyze and model them, a large number of factors and relationships hidden behind the enterprise data can be mined out, and valuable information can be obtained and mined to the maximum extent. Furthermore, it can accurately predict the time and probability of the event, and provide more reasonable enterprise decision-making scheme for professional decision-makers and enterprises, so as to further improve the predictability, pertinence and scientific degree of decision-making of the government and enterprises.

2.2. Research on Online Management Decision System of Data Model in Electric Power Enterprise

Power market demand analysis mainly aims at the social power consumption, power demand, load analysis and other information obtained in the process of power grid marketing. The analysis of social electricity consumption mainly analyzes and compares the power consumption situation and change rate of various industries, industries and high-energy consumption industries in China. Power demand and load characteristics analysis mainly analyzes the power gap of power grid and power load in large period, comprehensively analyzes social power consumption and power demand, and timely adjusts the balance of supply and demand. This is of great significance for maintaining the image of power enterprises and improving the service level.

The satisfaction of system partition was characterized by modularity $Q$: 

2
\[
\sum_{ij} A_{ij} \sigma(c_i, c_j) = \frac{1}{2m} \sum_{ij} A_{ij} \sigma(c_i, c_j)
\]  

(1)

\[
Q = \frac{1}{2m} \sum_{ij} \left[A_{ij} - \frac{k_i k_j}{2m}\right] \sigma(c_i, c_j)
\]  

(2)

The transmission effect of trust chain:

\[
\omega^J_{x} = (\omega_{W_1}^J \otimes \omega_{x}^W) \oplus (\omega_{W_2}^J \otimes \omega_{W_3}^W) \oplus (\omega_{W_4}^J \otimes \omega_{W_5}^W)
\]  

(3)

3. Experimental Correlation Analysis

3.1. Experimental Background

Lean management is a self-improvement management process in order to improve the ability of enterprises, constantly adapt to the changes of internal and external environment, and improve the competitiveness and efficiency of enterprises. By optimizing the business process and resource allocation, improve the management efficiency to achieve. Under the background of group operation strategy, intensive development strategy, lean management strategy and standardization construction strategy, the implementation of enterprise lean management will greatly improve the management level of power supply enterprises.

3.2. Experimental Design

The construction of power big data system effectively uses modern information technology, integrates marketing information system and distribution network GIS information system into a complete and unified information platform, which can ensure the accuracy of line loss "four points" statistics, so as to consolidate the management process and establish a long-term mechanism of line loss management. The line loss rate of the front and back office areas of "four points" lean management is investigated and compared, and the survey results are shown in Table 1.

| Station area number | Line loss rate |
|---------------------|---------------|
|                     | June 2018     | June 2019     |
| UE01                | 2.67          | 2.86          |
| UE02                | 7.91          | 5.32          |
| UE03                | 6.9           | 4.25          |
| UE04                | 9.56          | 8.5           |
| UE05                | 4.62          | 4.01          |

Table 1. Comparison chart of line loss rate in front and back office areas of "four points" lean management

4. Discussion

4.1. Research Status Analysis of Power Enterprise Data Model Online Management Decision System Based on Big Data
With the rapid growth of power big data, power data integration management technology is particularly important. When collecting and sorting out various data and information, a large number of sensors are used for research, and the effective management of temperature and humidity and other relevant data can meet the needs of customers and ensure the quality of service provided to customers. The adaptive sensing system needs to be arranged and undertaken by the supplier. For the collected data, the analysis has strong pertinence. In the research and analysis of big data, it is relatively difficult. From the massive data information to find valuable information, determine its role, the implementation of effective management. In making major decisions, it should be taken as an important reference and basis. In this paper, the problems faced by the development of electric power enterprises are investigated, and the results are shown in Figure 1:

As shown in Figure 1, after investigating the problems faced by the development of China's electric power enterprises, it can be found that 55% of the problems in the development of China's electric power enterprises are due to the low efficiency of power generation, 25% of the problems in the development of China's power enterprises are due to the difficulty of power big data analysis, and 15% of the problems in the development of China's power enterprises are due to the weak marketing management 5% of the problems faced by China's electric power enterprises are due to fierce competition. From the proportion of data in the figure, it can be clearly found that the biggest development problem faced by China's power enterprises is low power generation efficiency. Therefore, in order to improve the development of China's power enterprises, it is necessary to strengthen the research and development of online management and decision-making system for data model of power enterprises in China.

The core link of power marketing analysis and decision-making system is power marketing big data analysis. The power data analysis and decision-making system is integrated into the platform. Through the above different data source interfaces, the data extraction function will be executed, the connection and remote data access will be established, and the source data collation and target data construction will be pre-defined. According to the data retrieval conditions of the data interface, the data is obtained and entered the data analysis stage. This paper compares the turnover growth rate of electric power enterprises that have used the data model online management decision-making system and those that have not used the data model in recent years. The results are shown in Figure 2:
Figure 2. Comparison of the growth rate of turnover between enterprises with innovation management system research and those without innovation management system research.

The results of comparing the turnover growth rate of electric power enterprises that have used the data model online management decision-making system and those that have not used the data model in recent years are shown in Figure 2. It can be clearly seen from the figure that the growth rate of business turnover of electric power enterprises that have used the data model online management decision-making system is obviously higher than that of the power enterprises that have used the system. Business volume growth rate: the business turnover growth rate of electric power enterprises that have used the data model online management decision-making system has increased from 11% in 2015 to 69% in 2019. This data comparison fully illustrates the importance of using this data model for the development of China's electric power enterprises. This shows that the research on online management decision system of data model of electric power enterprises in China needs to be strengthened.

4.2. Suggestions for Research and Development of Power Enterprise Data Model Online Management Decision System Based on Big Data

With the development of information technology and the deepening of information construction of power enterprises, enterprises put forward higher requirements for their own informatization. Enterprises need standardized and flexible data integration and information sharing among business applications, so as to realize the integration of production information and management information. Enterprise data model plays an important role in information resource sharing and information fusion. Unified global data model is the product of enterprise information standard system, especially data architecture, which plays an important supporting role in resource integration and strategic decision-making of power enterprises.

The power industry is facing a new big data environment. The era of big data brings new challenges and opportunities to the development of power industry. At present, the information between the marketing system and the production system is relatively isolated, and the collaborative efficiency between the businesses is low. It is difficult to carry out the lean management of marketing, which affects the further improvement of the quality service and lean level of power enterprises. The establishment of a new power big data platform under the marketing mode and the integration of multi...
system data fusion can solve the problem of low efficiency of power fault repair, poor economic benefits of power grid operation and recovery of high-voltage power cost, and meet the people's demand for strong strength and high-quality services.

The global data model of power enterprises is a description of all business objects of power enterprises, which involves all business fields of power enterprises. It needs to understand the knowledge characteristics of various business areas and be able to make accurate description. In the design process of the model, although we refer to the power enterprise open information model, marketing system data model and other mature data models, but due to time and capacity constraints, many details have not been solved. The design of power enterprise global data model is an iterative process, which needs further research and design. There is still a lot of work to be done in the research and design of global data model for power enterprises. Unstructured data, spatial data and real-time data are rarely involved in the application of global data model in power enterprises. Therefore, it is necessary to strengthen the application of global data model in power enterprises.

Realize the lean management of power grid line loss. Power grid line loss has always been a major problem faced by power enterprises. It will not only affect the stability and sustainability of power supply, but also cause power loss, causing a lot of economic losses to power enterprises. Therefore, if we can correctly handle the lean management of power grid line loss, it will greatly improve the marketing management level of power enterprises.

With the construction of power grid, the informatization construction of power enterprises has made great progress. Due to the imbalance of information construction between different regions and departments, there are obstacles in information exchange between transaction management systems. It is difficult for power enterprises to obtain decision support information from a large number of technical and inter departmental joint operation information. The development of power enterprise data model online management decision system provides a good and effective means for power enterprises to obtain decision information.

5. Conclusions
This paper introduces the research method of power enterprise data model online management decision system based on the background of big data. With the development of the times, the society is constantly improving, and the level of human science and technology is also constantly improving. In order to meet the new requirements of the development of power enterprise data model online management decision-making system in the new era, this paper puts forward the research method of power enterprise data model online management decision-making system based on big data background. Through the big data technology, this paper analyzes the current research status of online management and decision-making system of power enterprise level data model, and combines with the new era of big data In order to develop a set of power enterprise level data model online management decision-making system to adapt to the new era. Through long-term research and observation, it can be found that the method proposed in this paper is of great significance to the research of power enterprise level data model online management decision-making system based on big data background.

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