

Research on the Application of Big Data Technology in Enterprise Business Decision Management

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Abstract: With the rapid development of the digital economy, big data technology has become a key support for enterprises to improve their management and operation levels. Enterprises continuously accumulate massive data in various aspects such as production, marketing, supply chain management, customer service, and strategic planning, providing rich information sources for scientific decision-making. By collecting, storing, analyzing, and mining data, managers can have a clearer understanding of market dynamics, make correct judgments on business risks, and predict future trends, thereby improving the efficiency of resource allocation and the level of business management. Currently, the application of big data technology in enterprise business decision-making is becoming increasingly deep, but there are still problems such as an incomplete data governance system, inconsistent data quality, a lack of professional talents, and data security risks, which restrict the maximization of the value of the technology. This article, based on the development background of enterprise digital transformation, analyzes the application value of big data technology in business decision management, discusses the current application status and existing problems, and proposes practical paths such as improving data governance, optimizing decision-making mechanisms, strengthening talent cultivation, and promoting digital integration, in order to provide references for enterprises to enhance their scientific decision-making capabilities and achieve high-quality development.

Keywords: Big data technology; Enterprise management; Business decision-making; Digital transformation; Data governance

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1. Introduction

In the era of the digital economy, data has become the main production factor for enterprises' development, and big data technology is bringing about comprehensive changes to business operation methods. The competitive market environment is constantly changing, consumer demands are increasingly diverse, and the amount and complexity of information that enterprises face are also increasing. Relying on traditional

experience for business decision-making can no longer meet the needs of modern enterprise development. In recent years, technologies such as cloud computing, artificial intelligence, the Internet of Things, and mobile internet have developed rapidly, laying a good foundation for enterprise data collection, data analysis, and intelligent decision-making. Big data technology has begun to penetrate into all aspects of enterprise management and operation, becoming an effective means to improve enterprise operational efficiency and enhance its market competitiveness. Some enterprises have established digital management platforms, analyzing operating data, customer data, supply chain data, and market data to achieve precise marketing, intelligent procurement, risk warning, and scientific decision-making. However, many enterprises still lack data sharing, data integration, the creation of analysis models, and the value development of data, preventing the full utilization of many data resources. Systematically exploring the application approaches of big data technology in enterprise operation decision-making management has significant theoretical and practical significance for promoting enterprise digital transformation, strengthening the scientific nature of business decision-making, and enhancing the core competitiveness of enterprises.

2. Theoretical basis of big data technology in enterprise operation decision-making management

2.1. The connotation and main characteristics of big data technology

Big data technology refers to a series of technical systems using modern information technology to collect, store, process, analyze, and apply massive, multi-source, and rapidly changing data. Its main purpose is to extract valuable information from a large amount of data to provide support for management decisions. Compared with traditional data processing methods, big data technology has the characteristics of large data volume, diverse types, fast processing speed, and low value density. It relies on distributed computing, cloud storage, machine learning, and intelligent analysis to complete data processing tasks. With the continuous deepening of enterprise digitalization construction, various business systems generate a large amount of structured data, semi-structured data, and unstructured data every day, including production data, sales data, customer behavior data, supply chain data, and online public opinion data. These data together constitute the important data resources of enterprises ^[1].

2.2. Main contents of enterprise operation decision-making management

Enterprise operation decision-making management is an important management process for enterprises to plan, organize, coordinate, and control their production and business activities, involving strategic planning, marketing, product development, production organization, supply chain management, human resource management, financial management, and risk control, among others. Scientific operation decisions are closely related to the efficiency of resource allocation of enterprises and will also affect their market competitiveness and sustainable development level. Traditional operation decisions mostly rely on managers' experience, historical data, and market surveys. Although they can meet the needs of development for a certain period, due to the increasingly complex market environment and the rapid update of information, relying only on experience to judge is prone to cause information lag, one-sided analysis, and decision-making errors.

2.3. The mechanism of big data technology enabling enterprise operation decision-making

Big data technology has three auxiliary roles in enterprise operation decision-making, namely data support, intelligent analysis, and decision improvement. By establishing a data collection system, enterprises can implement real-time collection of data throughout the production and business process and achieve unified management through data warehouses and cloud platforms, thereby providing a foundation for subsequent analysis work ^[2]. By applying data mining, machine learning, and intelligent analysis models to analyze customers' consumption behaviors, changes in market demand, product sales trends, and the operational status of enterprises, managers can promptly understand the business situation of the enterprise and enhance the speed of its market response. Big data analysis can identify the main factors driving the development of the enterprise. In business decision-making, it can conduct simulation analysis and effect prediction for different decision options, thereby reducing decision risks and improving the efficiency of resource allocation.

3. The application status of big data technology in enterprise business decision management

3.1. The ability to integrate business data has been continuously enhanced, and the data-driven decision-making model has gradually taken shape

In recent years, digital transformation has become increasingly profound, and big data technology has gradually become the fundamental tool for enterprise operations. More and more enterprises have begun to build digital management platforms, integrating financial systems, production systems, procurement systems, sales systems, customer relationship management systems, and supply chain management systems to achieve centralized management of business data. In the past, there were information islands among various business departments, with data scattered and stored separately, and managers needed to go through multiple steps to obtain business information, which not only consumed a lot of time but also easily led to information distortion ^[3]. After the establishment of the big data platform, enterprises can uniformly collect, classify, and analyze data from various business modules, forming a complete data resource system, providing more comprehensive information support for business decision-making. Managers can use data dashboards to understand production progress, inventory changes, sales status, capital flow, and changes in customer needs in real time, and promptly identify and improve various problems in the business process.

3.2. There are still many constraints in the application of big data technology

Although more and more enterprises have begun to attach importance to the application of big data technology, the overall application level still has a large difference, and many enterprises have encountered many difficulties in the actual implementation process. Some enterprises have built information platforms, but there are no unified data standards among various business systems, and data interfaces cannot be intercommunicated, resulting in low data sharing and affecting the effect of data analysis. Historical data has missing, duplicate, and incorrect parts, causing poor data quality and inability to conduct precise analysis, thereby leading to errors in business decision-making. Some enterprise managers have a decision-making thought based on experience, and do not attach sufficient importance to the results of data analysis. When formulating business strategies, they rely more on their own experience rather than using data for decision-

making. The lack of data analysis talents has also become a prominent problem. Big data analysis requires a compound talent with both management knowledge and data analysis technology, but many enterprises have relatively weak professional technical strength and poor data value mining ability, resulting in a large amount of data resources not being fully utilized.

4. Practical application of big data technology in enterprise business decision management

4.1. Application of big data technology in marketing decision-making

Marketing is an important part of enterprise business activities and also the field where big data technology is most widely applied. Traditional marketing relied on market research, sales experience, and customer feedback to formulate marketing strategies, with long information acquisition time and slow response to market changes, and the accuracy of marketing activities was limited. With the development of Internet platforms, e-commerce, and mobile terminals, consumers leave a large amount of browsing records, purchase records, evaluation information, search keywords, and social media interaction data every day, providing many information sources for enterprises to understand market demand ^[4]. Enterprises can deeply mine consumer behavior using big data analysis technology, accurately identify the interests, consumption capacity, purchase preferences, and consumption cycles of different consumer groups, establish more complete customer profiles, and formulate differentiated marketing plans based on different customer needs, improving market development efficiency. Enterprises can also analyze the product life cycle based on sales data changes, make dynamic adjustments for best-selling and slow-selling products, scientifically formulate product combination strategies, prevent inventory accumulation, and improve the speed of capital turnover.

4.2. Application of big data technology in production operation management

Production operation management is directly related to enterprise cost control, resource utilization efficiency, and product quality. The wide application of big data technology has led enterprises' production management to move towards digitization, intelligence, and refinement. By relying on intelligent manufacturing platforms, industrial internet, and Internet of Things technologies, enterprises can collect real-time data on equipment operation status, raw material consumption, product quality inspection data, and production progress. Through data analysis, they can promptly understand the operation status of the entire production process and thereby improve production organization efficiency. When equipment operation parameters deviate from normal, the system will issue an alert, enabling enterprises to arrange equipment maintenance in advance, thus avoiding production losses caused by equipment failures and improving equipment utilization rates. Enterprises can formulate reasonable production plans based on order data, inventory data, supply chain data, and achieve the goal of reducing resource waste and improving production flexibility by implementing just-in-time production.

4.3. Application of big data technology in risk control and strategic decision-making

During the operation process of enterprises, they inevitably encounter various uncertain factors such as market risks, financial risks, supply chain risks, credit risks, and policy changes. Establishing a scientific and complete system has become the guarantee for the high-quality development of enterprises. Big data

technology can comprehensively analyze various information such as enterprise operation data, industry development data, macroeconomic data, and external market conditions, thereby enabling enterprises to detect potential risks and improve their risk warning level quickly. Enterprises can create risk monitoring models to continuously observe their fund flow, assets and liabilities, cash flow changes, customer credit, market demand, etc., so as to detect operational abnormalities in advance and reduce operational risks ^[5]. In supply chain management, the big data platform can observe the performance of suppliers, logistics transportation conditions, and changes in the international market dynamically. If there are abnormal phenomena in the supply chain, an alarm will be immediately issued, providing support for enterprises to implement procurement plans and production arrangements.

5. Implementation path for enhancing the management level of business decision-making through big data technology

5.1. Improve the enterprise data governance system and enhance data application quality

To leverage the role of big data technology in business decision-making management, it is necessary to establish a scientific and complete data governance structure, thereby providing reliable support for data analysis and business decision-making. Enterprises should formulate unified data management standards based on their own business characteristics and standardize the processes of data collection, storage, sharing, updating, and application, thereby enhancing the standardization level of data management. During business operations, each business department must adopt unified data entry standards and avoid situations where data is duplicated, blank, or inaccurate due to reasons such as repeated entries or data inaccuracy. Enterprises should establish a unified data center to integrate data from various business systems such as production, procurement, sales, finance, human resources, customer service, and supply chain, breaking down departmental barriers and enabling the interconnection of business data, thereby improving the efficiency of data sharing. For the continuous increase in data volume, the data classification management system should be continuously improved, with core business data, customer information, financial data, and business secrets classified and protected at different levels, and data access permissions strictly controlled, to enhance the level of data security protection. Enterprises should also establish a data quality evaluation mechanism, conduct regular data checks and data organization, immediately correct abnormal data, and continuously improve the reliability of data analysis results. With the continuous development of new technologies such as artificial intelligence and cloud computing, it is necessary to actively promote the upgrade of big data platforms, improve intelligent analysis models, and enhance the depth of data mining, so that data resources truly become the business advantages of the enterprise and provide continuous and stable data support for business decision-making.

5.2. Strengthen digital talent training and technological integration, and build an intelligent decision-making system

The application level of big data technology not only depends on platform construction, but also on the construction of the enterprise's digital talent team and the update of management concepts. Enterprises should continuously improve the digital talent training system, promote the collaboration between data analysis personnel, information technology personnel, and business management personnel, and enhance the overall data application level. For managers, digital management concepts should be strengthened in training,

enabling them to understand data analysis results correctly and gradually form the awareness of data-driven business decision-making, improving scientific decision-making capabilities. For professional personnel, training in data analysis, artificial intelligence, business intelligence, and algorithm models should continue to be strengthened, continuously improving data processing capabilities and data value mining capabilities, providing more professional technical support for enterprise business management and decision-making. Enterprises should also establish cross-departmental data analysis teams, including marketing, production management, financial management, supply chain management, and information technology departments, to include professional personnel from these departments in the data analysis system, achieving data resource sharing and business collaboration, thereby achieving the goal of improving management efficiency. During the digital transformation process, it is necessary to actively promote the integrated development of big data technology with advanced technologies such as artificial intelligence, cloud computing, blockchain, and the Internet of Things, gradually establishing intelligent business analysis platforms, intelligent risk warning platforms, and intelligent auxiliary decision-making platforms, enabling automatic collection, analysis, and intelligent prediction of business data, and improving the efficiency of enterprise decision-making.

6. Conclusion

In the era of the digital economy, big data technology has become the driving force for innovation in enterprise management and also the foundation for the high-quality development of enterprises. As market competition becomes increasingly fierce, the business environment of enterprises has become increasingly complex. Scientific decision-making has become more and more significant for the sustainable development of enterprises. Through real-time collection, intelligent analysis, and deep mining of massive business data, big data technology provides enterprises with a more comprehensive, objective, and accurate information basis for business decision-making. It not only improves market prediction capabilities, resource allocation capabilities, and risk prevention capabilities, but also promotes the transformation of enterprise management models from experience-based management to data-based management, and from loose management to meticulous management. From marketing, production operations, and supply chain management to strategic planning, big data technology has permeated every aspect of enterprise management, serving as a way to enhance the comprehensive competitiveness of enterprises. Enterprises should continuously improve their data governance systems, strengthen the cultivation of digital talents, improve the efficiency of data quality management, and promote the in-depth development of the integration of advanced technologies such as big data, artificial intelligence, and cloud computing with business operations, so as to continuously improve the level of intelligent decision-making.

Disclosure statement

The author declares no conflict of interest.

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