The Effective Application of Big Data Analysis in Supply Chain Management

Cenglin Yao1,2,*

1Wuhan University of Science and Technology, Hubei, China, 430056
2Wuhan Business University, Hubei, China, 430056

*Corresponding author e-mail: 3296447871@qq.com

Abstract. In today's world, the use of big data is almost everywhere. It has been widely used. Under the background of big data, how to carry out supply chain management based on big data technology and obtain scientific and effective valuable information has become an urgent problem for enterprises. This paper first analyzes the influencing factors of big data in the application of supply chain, and then studies the effective application of big data analysis in supply chain management.

Keywords: Effective Application, Big Data Analysis, Supply Chain Management

1. Introduction
As computer technology and network technology develop rapidly, all aspects of people's life have established a variety of organic and inorganic connections with various data, and various behaviours of people have produced a variety of data. At present, human beings have entered a new era with big data as it's Guide [1]. Generally speaking, big data usually has five characteristics as shown in Figure 1.

![Figure 1. Five characteristics of big data](image)

Using big data to analyze every link in the process of supply chain management, it provides a new help for the innovation of supply chain management mechanism and mode, and realizes the creation of
new value and the promotion of competitive advantage on another level. Supply chain management covers all aspects from purchasing, manufacturing, transportation and storage to sales [2]. In order to achieve sustainable and steady development, it is of great practical significance for enterprises to increase their strength and input technology in management, make use of big data to comprehensively analyze the manpower, material resources, wastage and idea in the process of supply chain management, and enhance the enterprises' control over the management situation.

2. Influencing factors of big data in supply chain application

2.1. **Big data analysis and optimization of supply chain decision system**

At present, many enterprises have already felt the pressure from the social and economic transformation, and have a certain understanding of the importance of big data to enterprises in computer technology, but in the actual management, whether it is management or executive, the actual application of big data in supply chain management is confused. Some enterprise personnel because of the lack of basic literacy of computer technology, how to use big data analysis cannot start, even some enterprises only realize that facing serious development problems, but do not know big data this kind of technical means [3]. In fact, the application of big data analysis can significantly enhance the advantages of enterprise supply chain decision-making system in several aspects as shown in Figure 2. Through big data analysis, enterprises are able to get information from various channels in the process of operation, and tap the effective value of these information, which can create more profits for enterprises.

![Figure 2. Advantages of big data application in supply chain system](image)

2.2. **The influence of big data's data type**

The data types of big data mainly include structural data and unstructured data, among which the proportion of structural data in the total data is very small, but it has an important impact on the development decision-making of enterprises [4]. For example, in supply chain data, ERP data is structural data, which can objectively reflect the operation problems and development trends of enterprises, so it is very important. As unstructured data, inventory data and customer service data are also of great significance to supply chain management decision-making, but few enterprises can realize the importance of unstructured data [5].

2.3. **Importance of big data quality**

Since the quality of data has an important impact on the analysis results, and poor quality and inaccurate data will cause the decision-making deviation of enterprises, so the premise of obtaining
accurate information is to ensure the quality of data. The evaluation of data quality should be carried out from multiple dimensions, and the accuracy, timeliness and other factors of data should be objectively evaluated. Secondly, the data scenario evaluation is carried out for the application scenarios of data, and the data is evaluated from the dimensions of relevance, value, credibility and so on [6].

3. Big data analysis in supply chain management

3.1. Statistical analysis
Statistical analysis includes qualitative analysis based on subjective judgment and quantitative analysis based on historical data. Statistical analysis is helpful to summarize and classify the historical data related to production and operation, and present them scientifically. The quantitative analysis of big data statistics in supply chain mainly includes time series analysis and regression analysis. The former is the prediction of opportunity historical data, and the latter is used to clarify the relationship between variables. In addition, because the big data statistics can provide detailed data for the enterprise for a long time, and can carry on the meticulous periodic analysis to the collected data, the management risk of the enterprise in the supply chain management is further reduced. On this point alone, the development and application of big data are extremely beneficial, not to mention that big data will play a greater role in the future.

3.2. Simulation and optimization
Big data application modeling and simulation can help the benefit of data analysis, in which simulation method is used to optimize cost-effectiveness, and simulation tools can predict the future demand of products based on historical data. Big data simulation provides an important support for the analysis of the relationship between operation and system integration of supply chain. Optimization helps supply chain management find opportunities in complex systems with multiple factors and constraints. More than this, the application of big data optimization technology can discover new data and analyze economic cost and social responsibility, and achieve the final business objectives through the supply chain visual optimization scenario management and performance monitoring.

3.3. Optimize human capital construction
The operation of human capital in the supply chain depends more and more on big data analysis in recent years. The optimization of human resources and the improvement of the quality of labor force are very dependent on the application of big data analysis technology. Big data analysis technology not only helps to save costs, improve the service level of human resources, but also helps to improve the ability of enterprises to demand employees, which plays a key role in those enterprises in the peak period of employment.

3.4. Strengthen supplier negotiation
With the help of the big data analysis of consumer preferences and consumer buying behavior, negotiation with suppliers can be greatly promoted. By obtaining the real data of consumers' preferences and purchase behaviours, enterprises can take more initiative in the negotiation with suppliers, and carry out scientific judgment and decision-making, promote the effective negotiation between the two sides, and win the final victory in the commercial negotiation. In addition, big data analysis helps supply chain track product expansion, so as to obtain the best input-output ratio and expand sales channels.

3.5. Combining enterprise resources
Since the consumption of production resources accounts for a large part of the enterprise's expenditure, so it is of great significance to expand the big data analysis application, so as to
significantly reduce the enterprise's procurement cost. After introducing big data analysis, enterprises are able to optimize the source channels of raw materials and integrate suppliers into operation. In addition, based on the concept of the balance between benefits and risk, companies need to make the right choices.

4. An example of supply chain management for big data analysis
Use big data analysis to carry out enterprise supply chain management for supervision and scientific configuration, conduct in-depth data mining, guide the operation of each stage of enterprise supply chain management based on valuable data, and improve the rapid response ability of enterprise supply chain management. Upgrade the supply chain management process of modern enterprises to ensure the maximum economic benefits of enterprises. The big data analysis technology is applied to supply chain risk management of enterprises to provide reliable information support for risk disposal decision-making, reduce the contingency of risk events and find the inevitability of risk events, so as to help enterprises grasp the initiative of events in the actual operation and development process and enhance the scientificity of risk disposal decision-making.

5. Conclusions
In order to fundamentally improve the quality and efficiency of supply chain management, modern enterprises need to actively apply big data analysis, master the main process of big data analysis in supply chain management, and strengthen the effective use of big data analysis and processing methods in supply chain operation management and risk management. Only in this way can enterprises fundamentally promote the supply chain management and realize the healthy and stable development.

References
[1] Guan Zhihua. Application of big data analysis in supply chain management [J]. Logistics technology, 2017,36 (9): 132-135.
[2] Guo Xibin. Research on the application of big data in communication supply chain management [J]. Mobile information, 2017 (7): 31-32.
[3] Zhang Zhihui. Research on supply chain financial financing mode and risk [J]. Knowledge economy, 2016, (1): 39-40.
[4] Lu Qihui, Yao Jiaxi, Zhou Weihua. Study on the selection of inventory pledge financing business model based on EOQ model [J]. China management science, 2016, (1): 56-66.
[5] Zhang Xiaofei. Analysis of school financial control strategy under the reform of new government accounting system [J]. Theoretical research, 2018 (5): 15-17.
[6] Song Hua. Supply chain finance [M]. Beijing: China Renmin University Press, 2015.