The Impact of Big Data on the Development of Sustainable Logistics Supply Chain Management

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Abstract: With the advancement of information technology in recent years, it has become the norm for businesses to employ big data for supply chain management. Using logistics firms as an example, this article describes the function of big data analytics in logistics supply chain management, uncovers the truth behind the data, and offers a foundation for enterprise management and decision-making. The big data supply chain management style of logistics companies is not yet completely developed, and there are several problems, such as the need to enhance product quality, perfect data administration, and increase industrial optimisation. Therefore, the integration of big data and the logistics supply chain should be increased to encourage the rapid development of both.

Keywords: Supply Chain; Big Data; Logistics

1. Introduction

Big Data, as the name suggests, is the use of certain software to process a huge variety of information, using certain algorithms to process and analyse new data as a reference. There are several examples of big data usage in our daily lives, for instance,Amazon, which is used by customers to analyse their likes and dislikes based on their browsing history, and after processing big data to analyse their future needs, then push similar products for them. So, the seemingly simple page recommendations in everyday shopping are actually thanks to the processing of big data. According to statistics, Amazon has hundreds of millions of users browsing every day, generating a huge amount of product transaction data that urgently needs intelligent algorithms. As well as powerful data processing technology to statistics and analysis of customer needs.

2. Literature review

Jha suggests that big data analytics (BDA) has become important in every aspect of business management, caused by the existence of big data and the purpose for which management is banking on it. From the studies that have been conducted, it has been shown that the supply chain is the biggest source of data for companies and their decision making process is mostly influenced by big data analytics. In this study, he sought to identify the purpose of helping companies to establish big data analytics and maximise their returns through BDA technology. The findings indicate that acquiring technical expertise is necessary for generating big data analytics; nevertheless, competing technologies also play a vital part in the process.

Linlin Chen participated in the investigation of the effects of artificial intelligence and large amounts of data on the logistics supply chain model. It has been suggested that the logistics service chain is a specialised service chain that is continuously updated and improved along with the development of the logistics industry. When there is a greater degree of specialisation in logistics, this particular chain of service will automatically come into being. Through the process of describing the algorithm for data mining, the concepts and algorithms that surround it may be developed further.

3. The role of big data for supply chain management in logistics enterprises

Big data The most essential role that supply chain management mode plays in the logistics industry is providing businesses with rich data. This data may include information about suppliers, market sales, quality data of items, enterprise development prospect data,

and so on. The operation of supply chain management can be made more convenient and efficient through the utilisation of big data analysis. Data analysed not only using big data but also in conjunction with other information. By analysing the information provided by cargo owners, for instance, logistics companies can increase the speed and accuracy with which they provide their services to cargo owners, as well as the efficiency with which they perform their own work.

The company is able to further improve its management mode with the assistance of the big data model's supply chain management mode, which also supplies the company with data and information that is both pertinent and useful in assisting the company in exploring potential avenues and approaches that are appropriate for its development in a timely manner. The majority of businesses currently engaged in supply chain management are making use of big data analysis, can timely find the disadvantages and advantages of the enterprise management mode, clear enterprise problems, timely improvement, and constantly optimize the enterprise management mode, comprehensive to improve the competitiveness of enterprises.

When integrated with the model for supply chain management, the data and analysis findings acquired from big data give the management of the organisation with a solid foundation upon which to base their judgments regarding a variety of issues. Big data processing of data on the supply, transport and management of goods allows for a more accurate, rapid and scientific grasp of the information behind the data and provides a basis for decision-making.

4. Big data applications in logistics and supply chain management

The use of big data in the management of logistics and supply chains is extremely beneficial for a number of reasons, including the enhancement of supply chain sensitivity, the reduction of enterprise risks, the correct decision-making regarding supply chains, and the reduction of costs. The use of big data in the management of supply chains and logistics has become increasingly sophisticated alongside the development of technology that facilitates data gathering, storage, and analysis.

Basole conducted research into the application of tracking technologies in the logistics of supply chains. They conducted an analysis of the elements affecting the absorption of monitoring technology using institutional theory and transaction costs as their two primary frameworks. The findings of this study could provide information to those in decision-making positions within supply chains who are responsible for adopting tracking technologies.

Yu created a structural equation modeling-based data analysis approach and evaluated the influence that data-driven supply chain capabilities have on the financial performance of Chinese manufacturing businesses. According to the findings of the study, an organization's level of financial performance was positively correlated with the degree to which its partners in the supply chain coordinated their efforts and the speed with which the supply chain responded to shifts in market demand.

Flaskou develop a method to process raw GPS data and specify freight performance metrics, proposing two algorithms for estimating two-way link speeds and analysing truck trips.

Arun investigate two aspects: first, the processing of truck GPS data; second, the development of a travel-based truck model, and also discuss the calibration and validation of these discrete selection models.

Based on previous studies on freight mobility and reliability, Chen-Fu Liao developed a method for analysing truck GPS data, deriving indicators such as mobility, delay and reliability of trucks based on travel routes, road sections and time, and performing statistical analysis on them.

5. Significance of Big Data Application in Logistics Supply Chain Management

To begin, the use of big data provides modern logistics supply chain management with help in the form of comprehensive data information. In point of fact, the technology behind big data may provide organisations with a great quantity of data with information for the management of logistics supply chains. By mining the value of data information and analysing large amounts of data from a variety of perspectives and levels, it is possible to acquire reliable knowledge regarding market circumstances as well as the logistics supply chain. Information, as well as relevant data and needs of different subjects such as consumers, manufacturers, and suppliers. With the help of massive data information, modern enterprises have data support in the process of analyzing the market, processing business, and making decisions, thus improving the effectiveness of logistics supply chain management.

Second, the logistics supply chain management decisions can be grounded on big data, which gives a basis for these judgments. Big data helps modern businesses manage the logistics supply chain and provides a foundation for businesses to make scientific

decisions during the process of gathering diverse and huge amounts of data. In a general sense, the important data that modern businesses employ for logistics supply chain management originates mostly from actual logistics activities. As a result, the degree to which data information is accurate, applicable, and rigorous is to a relatively high level. It is imperative that all of the links in the supply chain, both upstream and downstream, are able to function efficiently in order to ensure that the logistics supply chain as a whole is able to carry out its myriad of responsibilities without incident.

Thirdly, the implementation of big data technology in the management of supply chains for logistics helps to bring down the overall cost of logistics. The management of supply chains in the logistics industry has benefited greatly from the rapid advancement of science and technology, which has led to the widespread use of a variety of cutting-edge technical methods, such as big data technology. Big data technology has the potential to realise the entire process management of the logistics supply chain, bring the various subjects involved in the supply chain, such as consumers, production enterprises, sales enterprises, and logistics enterprises, closer together, and realise systematisation and integration, which will ultimately lead to the logistics industry becoming more efficient. Both the ever-present "information island" problem and the ever-present issue of rising logistics costs have been properly addressed and overcome, respectively. The technology of large amounts of data is beneficial to the development of information service channels.

6. Conclusion

Today is the era of big data, and it is becoming increasingly indispensable to a growing variety of industries. These businesses leverage big data to increase benefits for their clientele. Big data analysis's ability to accurately predict the market has helped the corporation save time and effort while also allowing it to craft a more robust strategy. In addition to understanding the need of a streamlined supply chain, business managers should be cognizant of the necessity to continuously enhance the efficacy of the traditional approach to big data analysis. As the sophistication of computing continues to rise, the logistics management process within firms has become increasingly important, and big data technology has played a role in this. By incorporating big data technologies into the design of data centres, logistics companies may unlock the hidden value in their data and better manage and grow their operations. Therefore, it is imperative that all firms view big data as a strategic resource during their development processes, use the advantages provided by big data technology, and enhance the strategic planning and business model planning processes inside their own organisations.

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