Bigdata Analysis in Supply Chain Management and the Potential of Sustainable Development in the Future

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Abstract. As big data (BD) technology becomes more and more mature, its application in sustainable supply chain management (SSCM) is also more and more extensive. With the rapid growth of the global population and the globalization of the market, the applications based on big data techiniqes are also increasing rapidly and dynamically. Therefore, this article selects the manufacturing and food supply two ways to make their comparative analysis to the status quo and future predictions suggest, hope to strengthen the management of talent and SC partners of cooperation and sustainable development. In the meantime, this research gives priority to study of the present higher yield of BDA application of supply chain management according to the truth. However, the whole industrial chain is still in a relatively primitive and fragmented state to be developed at present with insufficient documentary evidence to link theory to practice. Overall, these results shed light on guiding further exploration of SCM.

Keywords: Bigdata Analysis; Supply chain management; Sustainable.

1. Introduction

Contemporaily, on account of the spread of COVID-19 terror, which has brought great impact and economic recession globally, plenty of companies are facing the pressure of society, government and competition. Due to the growth of population, a large amount of business data is also pouring in. When talking about supply chain (SC), the first choice in mind is the big data. More and more supply chain systems are turning to BDA to handle complex and large data because of the increasing number of key elements of the supply chain. For many people, Big Data (BD) has enough potential to revolutionize many fields, such as business, research, academia, industry, politics [1].

At present, the main components of the supply chain are six categories: planning, purchasing, manufacturing/production, customer service, logistics, returns. No matter what enterprises as long as it is facing the open market, once the product out of stock or logistics slow sale will bring huge losses. In this case, more purchasing raw materials need to forecast the market demand. Hence, planning to prediction is the source of the whole supply chain, and the introduction of the concept of big data to establish a good supply relationship, including demand forecasting, inventory planning, information Source allocation [2]. These data generation in SCM are attributed to the state-of-art network techniques, which are some of the applications of big data in supply chains [3].

This paper mainly adopts literature research and comparison method, the existing data in manufacturing and supply chain of the two kinds of food supply woule be analyzed. In addition, combining with theory and case, this study will sum up the suggestions and prospects for future sustainable development direction, compared with the traditional commercial advantage of sustainable supply chain management. The rest part is organized as follows. The Sec. 2 will talk about the current situation in SCM. The Sec. 3 will compared with the FSCM and MSCM. The final will make a conclusion.

2. Prominence of Big Data and Changes in Various Fields

Supply chain management is a comprehensive planning and operation management mode for upstream and downstream of the supply chain [4]. In general, the supply chain is centered on the core enterprise and aims to achieve the maximum benefit of the supply chain at the lowest cost through the control of information flow, logistics and capital flow. With the development of mobile Internet,

5G technology, cloud computing, sensors and other information technologies, these technologies have pushed the society into an information-intensive era [5]. The data from various business departments has been growing rapidly, so in this case, big data is gradually linked with supply chain management. Big data has evolved from simple and unique initial data collection to more complex data science analysis and efficient management systems [1]. In other words, big data is not only a reference for data information analysis and comparison, but also an important means to improve the competitiveness of supply chain in the field of e-commerce, constantly bringing benefits to people. According to online collection and log browsing, data models can be established to make predictions while understanding information, improve daily life as well as the quality of medical research and development, optimize transportation routes, etc. However, managing this vast amount of data is also the biggest professional crisis of our time.

As a matter of fact, the perspective of big data is essential. The subsequent application of BDA, through accurate in SC, quickly make decisions to improve the operating performance (e.g., in the biomedical field) [2], and through the electronic equipment, Monitor blood pressure, heart rate and other vital signs. In finance, big data analytics are used to distinguish fraudulent activities from legitimate business transactions, and in the food supply chain, to enhance traceability of food in the supply and demand process. The current SC has become the hottest factor in the industry. As the company pursues the reliability, faster delivery, and traceability, their first goal should be to identify their impact on sustainability of BDA can improve demand management [6], to accelerate the development of new products, thus supporting the sustainable development agenda. Owing to the global climate change, sustainable supply chain management in the past two decades has been important research. Under the background, United Nations also puts forward the sustainable development goal early and many studies involving sustainable supply chain management (SSCM), this study will introduce a concrete analysis on the food supply chain and manufacturing supply chain.

3. Food Supply Chain Management in Sustainable Development

According to the analysis, the application of BD in the FSCM field is seriously fragmented and relatively “primitive”. Therefore, this paper decided to adopt a systematic literature review (SLR) approach, which first identifies the major categories and themes in the field and then identifies and comprehensively analyzes BD applications in different FSC market segments, to come up with a conceptual frameworkto categorize the most advanced research trends and propose relevant future research agendas [7]. The research is also based on the intersection of food supply chain management and big data. Fig. 1 vividly describes the relationship between BD and FSCM. It positively presents all processes related to cost effectiveness, foodproduct quality and safety, and environmental sustainability through the mutual connection between the two performance.

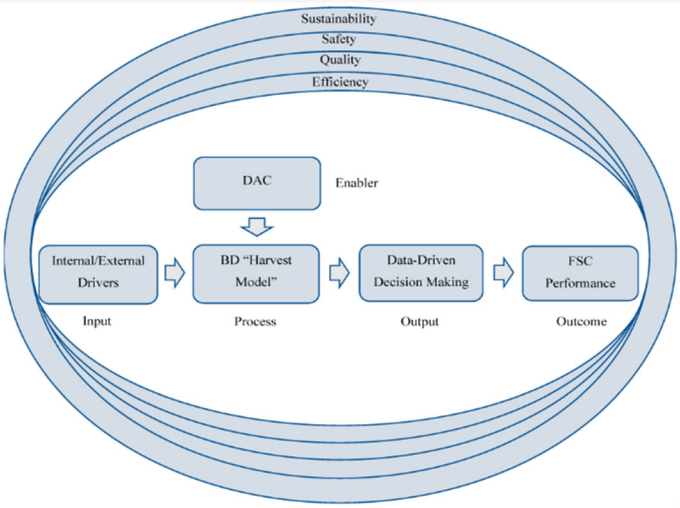


Fig. 1 A model of FSCM framework.

Ascribed to the epidemic, the world economy began to slow down. Nowadays, China Logistics Information Center, together with local logistics departments and industry associations, conducted a survey on the resumption of work and production of logistics enterprises in China. According to the results, 91.6% of mechanical electronic logistics enterprises think there's a major negative impact, 58.3% of companies that quarter's earnings will decline by more than 50%. Under the background of FSCM, applications of BD and BDA also gradually increase, people can describe accurately and real-time changing market trends, and to the inventory level and an appropriate adjustment of the distribution network. Fig. 1 is a framework of an integrated FSCM based on a BD point of view.

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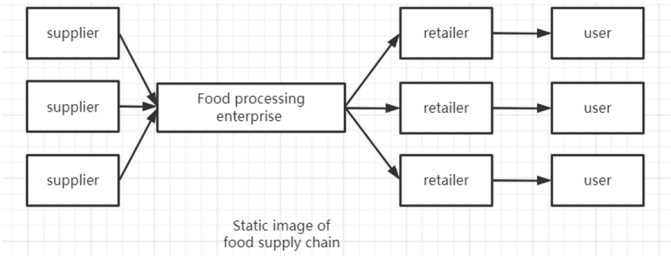


Fig. 2 Static image of food supply chain.

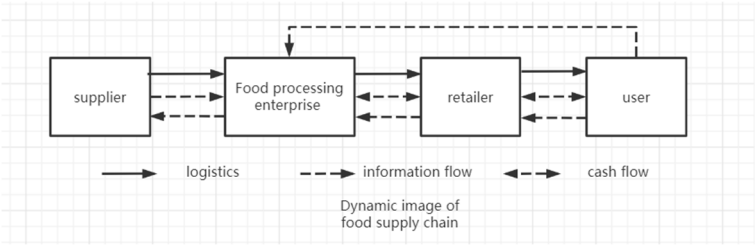


Fig. 3 Dynamic image of food supply chain.

To better express the desired results, provide sustainable impact and added value for their operations, appropriate management within the FSC framework, develop and implement data analysis capabilities (DAC) in the food system through effective and sustainable transportation of resources and mutual collaboration among various functions in the industry chain, the quality and safety of food in different supply chain functions have been greatly improved [4]. The research proposed in this paper provides new insights related to the comprehensive description of BD application status in FSCM. However, after these evidences, the whole industry chain is still in a relatively primitive and fragmented state to be developed. It further shows that the development of supply chain needs to be carried out according to the actual situation. Data collection procedures in FSCM are still in an initial way when analyzing sustainability processes, especially when facing upstream operations of supply. Therefore, in the future agri-food supply chain people can turn tier-1 suppliers into central mainstream development of central FSC network participants. Alternatively, farmers can switch to direct distribution of their own products (i.e., the short grain supply chain model) without temporarily eliminating intermediate members. These two models have been satisfied in both developing and developed countries, and BD will act as a lubricant.

4. Manufacturing Supply Chain Management in Sustainable Development

Sustainable manufacturing in the supply chain can use automatic car chosen and goods storage. To be specific, one can use the tags to speed up the efficiency and pollution prevention, including strengthen the utilization rate of energy and raw materials, to filter the harmful waste water of waste water produced in the environment, improve the utilization rate of on the recyclable garbage, and reduce the influence its operations in social and economic problems, etc. Fig. 4 depicts a sustainable supply chain mode, it can be adopted in the supply chain where each member of the data is stored in the cloud, make its synchronous and can be shared. In this case, it is able to not only speed up the efficiency and the factory can be real-time and accurate control based on the cloud data including the shortage situation of supply chain retailers can speed up the manufacture to supplement. In the case of raw material shortage even change the manufacturing strategy, in the supply chain transport link error is even stop loss cancel raw material manufacturing.

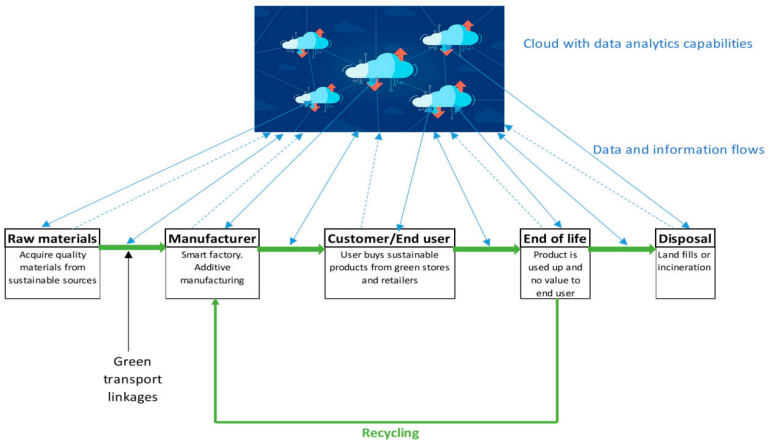


Fig. 4 Example of MSCM.

These applications direction have greatly helped us to create new insights Cyber attacks and information technology skills gaps are some ofthe challenges that hinder the implementation of BDA. Companies that implement SSCM may also reduce operating costs,improvetheir image and monitor their environmental actions in the manufacturing process by targeting sustainable development goals from the perspective of profitability [3]. In addition, data-driven decision makinghas the potential to improve not only the individual enterprise, but also the effectiveness of its supply chain in implementing and monitoring SSCM objectives. Since the element analysis in manufacturing supply chain managementis rather complex, this article uses Toulmin's argumentation model to elaborate it. On this basis, it show sthe various elements involved in the argumentation process under the complicated situation that the syllogism model cannot cope with in the argumentation field. The Toulmin model illsutrated in Fig. 5 is composed of six elements in the academic field, including claim,basis, justification,support, modal determiner and refutation.

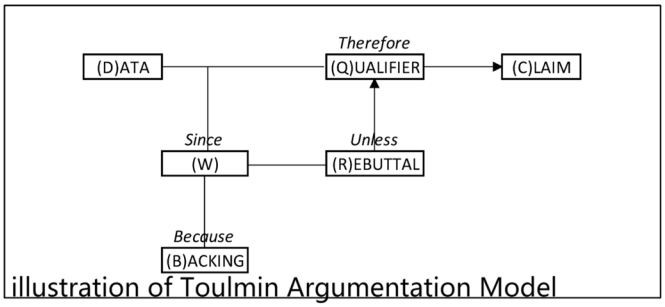


Fig. 5 Toulmin Argumentation model.

In terms of management, it also involves supply chain merchants, technical means providers, logistics service providers, and all activities related to customers [1]. It not only becomes the bridge

connecting the whole supply chain, but also the upstream and downstream connection. The upstream link is characterized by the procurement of raw materials, including product development, engineering and production [7]. The BDA provides MSC with the dimensions to achieve the three goals of the SSCM, including the environment, economic development and social humanity. Big data analytics also provides two new concepts for the manufacturing supply chain, smart factory and smart logistics, which is the collection of smart data. Apparently, data analytics can also be used to help map new insights to help achieve supply chain integration. The most common and appropriate way to perform BDA analysis is to use machine learning scenarios, which are analyzed on top of advanced software and algorithms to study how they can be used to model structured and unstructured data sets to make better business decisions across the three sustainability dimensions.

5. Lite

Applications in manufacturing (e.g., transportation tracking and traceability, and BDA), reduce emissions and in this respect facilitate SSCM of MSCS [7]. IoT, 5G technology development is very important for the large data development belt, especially the enterprise to strengthen the emphasis on big data technology. Besides, it also lead to the big gap of implementation of BD, which can direct mount guard technology talent scarcity, the talent of the imbalance between supply and demand.

In terms of food supply chain, although the country is also strongly supporting, there are also problems, e.g., the manufacturing industry that need to strengthen the ability of the management team and the management of scarce talents, and the knowledge of BDA including the transition of FSC to CE is needed. All companies need qualified team management and workers with a strong knowledge of the supply chain in data science before talent can use BDA in their operations. This is a prerequisite to ensure more efficient operation in their SC management [8]. As a result, the paper think can be according to company annual report or share data to plan training activities through the clouds, the second method is to collect more data which increase the ability of BDA, by collecting data of packaging (e.g., QR codes), to provide more data for denominators makes more and more data in the database and will not be lost. The third method is to further study the solutions to improve sustainable development in the future, strengthen the establishment of two kinds of circular supply chains: agricultural supply chain and urban food supply chain, and improve the efficiency and quality management of food supply chain.

Meanwhile, as COVID- 9 pandemic worldwide undoubtedly brought great influence to people, in order to reduce the number of personnel flows, avoid contact, many countries close reduces food production/distribution facilities, the factory also slow down the operation and production of manufacturing. It also caused a huge demand fluctuations, financial constraints and obstacles related to logistics, which severely hindered the operation of both industries. While both tested the resilience and responsiveness of the FSC and MSC, it is clear that the comparison of the two points to greater weaknesses in the food system due to greater food demands during the pandemic. Although there is still insufficient evidence to prove that the short-term digital FSCM is more resilient and responsive in similar situations. Therefore, scholars need to further study and analyze the development of BD applications in various industries. Hence, a more flexible and responsive SC model can play a role in the society and the overall environment. Nevertheless, for the direction of development, the people should focus on the current news and national development points.

6. Conclusion

In summary, the application of BDA and other digital technologies in SCRM has made great progress. In addition, the destructive and increasingly serious emergencies remind the world that people live in an unpredictable, need through the supply chain to integrate sustainable development goals and activities. Hence, it not only to pursue the economic level, but also the pursuit of social and environmental goals. The COVID-19 epidemic is sweeping the world. The impact of these events not

only caused numerous casualties in daily life, but also seriously affected the development of businesses in all walks of life. This paper concludes that the main drivers in the development of supply chains are information management and environmental impact, government incentives and the ability to organize management teams. The most basic driving factor for the realization of BDA in FSC is the government incentive measures, and the social demand leads the government to need targeted measures to encourage the implementation. To strengthen the operational efficiency and leadership organizational capabilities of the independent enterprise private sector, enterprises can also use BDA to collect data, strengthen the application of artificial intelligence, decision support systems, and predictive preparedness for disaster recovery. With data-driven innovation, many managed services and steps in the production chain also require talent technology support, so the collaborative content outline in talent management and SCM can be categorized as a linking factor by providing data for high-quality data collaboration and better recovery strategies. In addition, improved policies in SCM visibility can provide effective management services and production chain talent planning. Management team capability is an important driving force for the development of data-driven innovation. Finally, information management and environmental impact, collaboration, and facilitation among SCM partners were identified as key BDA drivers for the transition of FSC to CE and SOM, the interplay between these drivers will be food, industry, academia, and business. Overall, these results offer a guideline for the future of supply chain management.

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