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The Impact of Using AI in Supply Chain on Corporate Management

Yunna Zhao[1,a,*]

[1]*Economics Department, University of California, Los Angeles, Los Angeles, 90095, The United States*
a. lydiazhaoyn@g.ucla.edu
**corresponding author*

Abstract: As the current market becomes increasingly competitive and labor costs continue to rise, enterprises must explore alternative strategies to enhance their supply chain management for better development and innovation. The main study in this research paper is the potential impact of AI on improving supply chain efficiency. Key components of the supply chain include information processing, inventory management, logistics management and customer feedback. This study focuses on the practical applications of existing AI technologies in supply chain management. The main features are to fasten and animate order data processing, improve order accuracy, simplify and accelerate inventory processes, optimize express delivery routes, and improve customer satisfaction. In addition, AI applications in supply chain management can significantly reduce work time costs and reduce labor costs, enabling companies to develop rapidly and gain a competitive edge in the market.

Keywords: Artificial Intelligence, Supply Chain Management, Efficiency, Low-cost.

1. Introduction

As technology continues to develop, labor costs and time costs are becoming higher and higher. Not only that, competition among all walks of life is becoming more and more fierce. In such an environment, if companies want to succeed in the competition, then improving their supply chain management will be a very good choice. In this article, This paper intends to study from the perspective of AI to understand whether the application of AI in supply chain management can have a positive impact on the company. This paper is to summarize the AI technology that can be applied in supply chain management in research papers and screen resources through traditional research methods. Due to the current development of technology, AI can be used in many aspects of supply chain management and its efficiency may be far higher than that of manual labor. Through this research, this paper hope to understand whether the application of AI in four aspects of supply chain management can improve the efficiency of the company and win in the competition. The research significance of this article is to help the audience better understand what impact AI can bring to the company in the field of supply chain and let readers know whether new AI technology should be adopted in the company to help the company develop or change.

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2. Supply Chain Management

From the perspective of supply chain management, information processing and information classification are very important for enterprises. The efficiency of a company in processing its own orders will directly affect the company's overall operation process in subsequent warehouse classification and inventory management. If overall efficiency is not improved at this stage, the company may be at a competitive disadvantage. So far, many companies are still using manual methods to process existing orders and data classification. However, these manual methods often result in slower efficiency and potential errors in data comparison, leading to deviations in the overall data that significantly affect supply chain management and overall operational efficiency. On the contrary, the reasonable application of AI in supply chain management will have a greater improvement on the supply chain efficiency of enterprises, because AI can analyze and process existing data more accurately. “The digital supply chain (DSC) is an intelligent, data-driven technology network that is based on massive real-time data processing, excellent collaboration, and communication capabilities to achieve information transparency, advanced planning, demand patterns prediction as well as maximizing the availability of assets”[1]. For Amazon, as the largest online retailer in the United States, the amount of order information they need to process is very large. Relying on manual methods would lead to substantial time costs and consuming resources that could impact overall efficiency and jeopardize its competitive position. Moreover, since orders are constantly generated every day, long-term manual processing of a large number of orders is likely to result in errors. The rational use of AI in the information processing link of supply chain management will greatly improve work efficiency and reduce errors in data processing or order classification.

3. The Inventory Aspect of Supply Chain Management

In the inventory aspect of supply chain management, AI can also have a very impressive performance. For supply chain management, the most important considerations for corporate management to make greater progress are time cost and labor allocation. In logistics, AI’s involvement can lead to a qualitative leap in supply chain efficiency. Amazon, as the largest retailer, not only benefits from a vast customer base but also operates its own logistics system, including warehouses and transportation. For UPS, their biggest competitive advantage is to shorten the time of product transportation as much as possible, which can not only make customers more satisfied but also reduce their own time cost in the supply chain process. For the transportation and sorting process in the inventory, the addition of AI can achieve higher efficiency in classifying products. In the past, express delivery required manual sorting, but now the surge in online shopping necessitates a larger workforce for sorting goods. However, AI addresses this challenge effectively by quickly scanning basic information and directing goods to the appropriate areas via conveyor belts. This can not only save a lot of human resources for UPS, but also save time as much as possible. In terms of inventory and sorting, AI can save manpower and control time costs for the company, which has a positive impact on corporate management. As noted, “the firm's success in a competitive market often hinges on its ability to control and plan inventory at minimum cost, while making inventory constantly available for customers when needed. Such an ability can be enhanced by the presence of accurate, real-time information about expected customer demands, the size and type of inventory at hand and the amount of order cycle time to fulfill the customer order [2].” This underscores the importance of effective inventory management for enterprises aiming to reduce costs. Inventory represents a significant expense for companies; excess stock can occupy warehouse space and incur additional management costs, while insufficient inventory may lead to supply shortages. For a leading retailer like Amazon, such shortages could drive customers to competitors, diminishing its competitive edge. Therefore, if supply and demand can be balanced based on customer purchasing power and other data, it can also

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avoid shortages and minimize the remaining goods in the warehouse. “Supply chain planners, for instance, use software tools that process historical data to forecast demand; many enterprises resource planning (ERP) systems automate the decision of when and how much to order; and warehouse and transportation management systems optimize storage and transportation operations [3].” Relying solely on manual analysis and calculation for these tasks is time-consuming and labor-intensive, particularly with large inventories. For workers, it takes a lot of time to scan and add goods to the warehouse one by one, and there is a high probability that omissions will occur. When this problem is discovered, it takes more time to improve the data. Not only that, manually predicting inventory levels involves considerable workload due to the variety of products in stock, making data comprehension and calculations cumbersome. On the contrary, AI can leverage available data to swiftly analyze historical customer purchase trends and adapt to various influencing factors. To a certain extent, it can classify and integrate all products and scan them quickly. After knowing the number of goods, AI can directly connect with the data of the website, and make estimates through real sales volume and sales and sales line charts in recent months or even a year, allowing for accurate predictions of future market demand and potential customer needs. This can also allow companies to optimize warehouse management while reducing time and cost.

4. The Logistic Aspect of Supply Chain Management

Not only that, AI can also provide value to enterprises in logistics. As mentioned earlier, Amazon, currently the largest retailer, has established its own logistics company, allowing for faster delivery efficiency compared to competitors that may outsource their logistics needs. Amazon’s logistics can directly align with its platform, enabling prompt delivery of products to customers. However, delivery delays may occur due to road conditions or other reasons, where AI can play a vital role. “The latest breakthrough in the digitalization of logistics business comes from the real-time connection between assets and data platforms: machines, vehicles and equipment can now be monitored through sensor technology, which can capture various data in real time [4].” AI can analyze the address of the goods to be delivered through intelligent algorithms while calculating the weather interference that may be encountered on different routes and the traffic jams that may occur at different time periods. In other words, AI can reasonably analyze road conditions and provide the most reasonable and fastest delivery route for delivery personnel. This can greatly improve Amazon's delivery efficiency and improve customer satisfaction. On the other hand, AI can also help companies process data in real time during transportation based on the current location of the vehicle and the day's delivery plan. By clarifying daily tasks, delivery information can be intuitively uploaded to the website and shared with customers via message reminders, ensuring timely receipt and reducing the risk of loss. In this regard, customers can better understand the delivery information of their products and avoid the situation where customers sign for express delivery without knowing it. Moreover, in addition to helping logistics vehicles plan routes, AI also has a technology that is gradually being used but has not yet been popularized. This technology is to completely replace manual delivery with AI. At present, small autonomous vehicles can be seen delivering goods, primarily assisting restaurants with food delivery. These vehicles operate under a controlled system to plan routes. But at present, this technology is not perfect. The main reason is that express delivery needs to be signed in time, otherwise these AI cars need to wait for a long time in one place until someone comes to sign. In the future, AI delivery vehicles could effectively replace manual labor in logistics by establishing signing stations at delivery points, enabling automated signing upon arrival. This can not only transport goods faster but also can be completed without human intervention, thus greatly improving logistics efficiency and gradually reducing labor costs.

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5. The Risk Management of Supply Chain

In addition, AI has another crucial role in supply chain management, which is to manage the risks of the enterprise supply chain. "Generative AI's utility extends to the domain of risk management (e.g., political, economic, cultural, and partner), where it assists in scenario-based risk assessment by generating potential disruption models, including instances like supplier insolvency, strikes, natural calamities, pandemics, and more. [5]" In the supply chain, enterprises may face financial risks due to various factors that hinder timely sales of goods. For enterprises, the emergence of these problems is likely to greatly affect the overall operation of the enterprise. However, some problems may not be obvious, and it may be difficult to accurately predict possible problems through manual calculation or detection. On the contrary, AI can be well evaluated based on various scenarios. For example, from the perspective of financial conditions, if AI technology can be used in risk management for early prediction, AI can predict and understand the overall operation of the enterprise in advance through the enterprise's operating data and the inventory and sales speed in the warehouse. Most importantly, AI can continuously analyze the financial data of suppliers and issue early warning signals due to financial instability or abnormal quantity of goods in the warehouse during the detection period. This proactive approach helps companies mitigate potential financial problems and enhances overall supply chain resilience.

6. The Customer Feedback of Supply Chain Management

Finally, the last and most important part of supply chain management is customer feedback. When dealing with customer opinions, feedback or complaints, it may be difficult for manual customer service to respond quickly and provide the best solution. According to *Application of Artificial Intelligence in Supply Chain: Revolutionizing Efficiency and Optimization 2024*, it mentions that "Customer service: AI can be used to provide real-time customer support. This can improve customer satisfaction and loyalty [5]." AI can reply to customer messages and handle them in a timely manner at any time of the day. In contrast, manual customer service requires more human resources to ensure timely responses, which can increase operational costs. For example, in the middle of the night, it is very difficult to reply very quickly. However, AI can quickly find the information that customers want to know from the database and respond accurately. Even outside of normal working hours, it can act as a reply machine to help companies stabilize customer satisfaction and meet customer needs as quickly as possible. It is important to note that timely and appropriate handling of product usage feedback is crucial; failure to do so may negatively impact corporate management and reputation. AI can quickly process and classify customer feedback or complaints, and can classify and summarize a large number of customer questions, identify the most frequently asked questions by customers and prioritize them, so as to avoid letting humans spend a lot of time answering the same question repeatedly. In this way, companies can greatly reduce the frequency of manual labor, and AI can also speed up feedback processing, allowing companies to reduce labor costs while solving most customers' problems more quickly.

7. Conclusion

To sum up, the company's application of artificial intelligence in supply chain management offers significant benefits across various aspects, such as information processing, inventory management, logistics management and customer feedback. In terms of information processing, AI can automate information and tasks and improve efficiency while reducing the risk of errors, providing substantial advantages to companies. In inventory management and logistics management, AI simplifies workflows and processes large volumes of data and orders simultaneously, enabling companies to lower time costs and minimize errors. In addition, AI applications can process customer feedback

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more quickly and resolve it quickly, which can improve customer satisfaction and loyalty to the company and its products. The effective use of AI in supply chain management helps companies maintain competitiveness and supports sustainable development in future endeavors. For this research paper, the current shortcoming is that some inspirations from life may not be confirmed by the research. Future research will focus on gathering more materials to validate these insights. For example, the research can study how AI can help companies in risk management and logistics, as these two aspects can further speed up the company's supply chain process and provide further guarantees for the company's development.

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