Role of AI in Supply Chain Management

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ABSTRACT

Supply networks in all sectors have been severely disrupted and made more volatile by the COVID-19 epidemic, making them difficult to manage. Therefore, businesses need adaptable supply chain operations and infrastructures to deal with ever-changing market conditions and the environmental impact of the supply chain as it currently stands. Their problems will be solved, their operations will be improved, and their decision-making across sales, manufacturing, procurement, and logistics will be aided by supply chain management (SCM) and artificial intelligence (AI). Supply chain management (SCM) AI engineers play a crucial role in assisting businesses in improving their SCM operations and procedures via the use of AI. Artificial intelligence (AI) supply chain operations are the future of supply chains

because they provide visibility and transparency throughout the whole marketing, planning, and distribution spectrum. For this study 100 people were taken who are working in different firm in supply chain. The results suggest that Businesses who perceive it to be easy to integrate AI into their supply chain management system will be more likely to believe in AI's ability to improve supply chain management and Businesses who believe that AI can contribute significantly or completely to reducing supply chain costs will be more willing to invest in AI technology for supply chain management.

Keywords: AI, supply chain, supply chain management, logistics, TAM, transportation costs etc.

INTRODUCTION

The application of AI in supply chains has the potential to improve capacity planning, demand

forecasting, productivity, supply chain expenditures, and output, all while fostering a safer working environment. The devastating effects of uncertainty on supply chains were made abundantly clear by the epidemic and its aftereffects, underscoring the need of well-thought-out contingency plans for guiding businesses through such situations.

BUSINESS ADVANTAGE OF AI IN SUPPLY CHAIN

Accurate inventory management

Accurate inventory management is crucial to the smooth flow of items entering and leaving a warehouse. With its help, you can prevent overstocking, understocking, and unexpected shortages. However, due to the many moving parts (order processing, picking, and packing), inventory management can be a tedious and error-prone process. Supply chain planning systems powered by artificial intelligence may be effective due to their ability to analyze massive volumes of data. These intelligent systems can rapidly assess and comprehend large volumes of data, which allows for precise supply and demand forecasting into the future. Some of the more sophisticated AI systems may even foresee the emergence of new consumer behaviors and project yearly fluctuations in demand. With this degree of artificial intelligence application, businesses may save money by not having to overstock on items they know their customers won't desire.

BENEFITS OF AI-POWERED SUPPLY CHAINS

There is evidence to show that the integration of AI and ML technologies may have a significant impact on logistics and supply chain operations. The use of artificial intelligence (AI) in supply chains is becoming increasingly popular among some of the world's most successful businesses for a number of reasons. These include: cost savings, risk mitigation, improved supply chain forecasting, reduced operational redundancies, accelerated deliveries, more optimized routes, and better customer service.

McKinsey found that 61 percent of manufacturing executives who used AI in their supply chains saw a reduction in costs and 53 percent saw an increase in revenues. Additionally, over a third predicted an increase in total revenues of more than 5%.

CHALLENGES OF AI IN SUPPLY CHAIN

If you want to create effective AI-powered supply chains, you need also be prepared for potential obstacles.

System complexities

Most AI systems nowadays are hosted on the cloud, which means they consume a lot of data. It's possible that many partners in the supply chain won't be able to afford the AI-specific hardware that operators would need in order to use these functionalities.

LITERATURE REVIEW

Singh, (2021) This study sums up what is known about using blockchain technology for SCM and presents its implications. This research finds and

evaluates articles written on the pros and cons of utilizing blockchain technology for supply chain management that were published between 2016 and 2020. The results show that blockchain has the potential to improve supply chain transparency, traceability, and safety. Technical complexity, interoperability, and regulatory issues are just a few of the hurdles brought to light by the research. The report finishes with a discussion of possible next steps for blockchain research and supply chain management applications.

Böhme, (2022) This research synthesis looks at how digital innovations have altered the field of supply chain management. This research finds and evaluates works published between 2015 and 2020 that examine how digital technologies have altered supply chain efficiency, adaptability, and longevity. The results show that digital technologies have the potential to boost supply chain performance by facilitating better communication, coordination, and finalization of tasks. The research also shows that supply chains may benefit from digital technology by being more flexible and adaptable to ever-evolving market circumstances. Finally, the study demonstrates how digital technologies can facilitate circular economy practices, lessen waste along the supply chain, and increase sustainability overall.

Arndt, (2020) The effects of Industry 4.0 on logistics are the focus of this overview of the relevant research. This research finds and evaluates articles written on the influence of Industry 4.0 on supply chain strategy, operations, and performance that were published between 2015 and 2019. The results indicate that supply chain agility, visibility, and cooperation may all be enhanced by implementing Industry 4.0. The research also emphasizes how Industry 4.0 has the ability to revolutionize supply chain strategy by opening the door to new revenue streams and operational paradigms. The study wraps up by discussing potential follow-up studies and providing real-world implications for implementing Industry 4.0 in SCM.

Rahman, (2022) The effects of COVID-19 on international supply chains are examined in this research. The research finds and evaluates articles written in 2020 and 2021 on supply chain disruptions and difficulties during the epidemic. The results indicate that COVID-19 has had a major effect on supply chain operations, causing problems with logistics, purchasing, and production. The report also emphasizes the importance of digital technology, cooperation, and resilience in reducing the effects of COVID-19 on international supply chains. The study concludes with a discussion of the study's findings and their implications for supply chain management in the wake of a pandemic.

Jabbour, (2021) This study uses a systematic literature evaluation and bibliometric analysis to deepen our familiarity with sustainable supply chain management. Findings from this study identify major issues, trends, and knowledge gaps in the sustainable supply chain management literature from 2010 to 2020. Based on the findings, sustainable supply chain management is an evolving profession that places a greater emphasis on economic performance, social responsibility, and environmental impact. Additional research into the challenges of incorporating sustainability into supply chain strategy and implementing sustainable supply chain management is called for in the report as well.

Shahriari, (2022) This report provides a synopsis of current literature on agile and lean supply chain management. This study identifies and assesses literature on lean and agile supply chain management published between 2016 and 2020. The findings suggest that implementing lean and agile practices across the supply chain might improve performance in these areas. This research highlights the need for more investigation into the challenges associated with integrating lean and agile supply chain management techniques, as well as the development of hybrid lean-agile supply chain management systems. Finally, the report concludes with recommendations for moving forward with lean and agile supply chain management.

Ghiani, (2020) The purpose of this research was to investigate how artificial intelligence (AI) can improve SCM. This research aims to fill in the gaps in our knowledge of how AI can improve SCM processes and add value for businesses. A systematic literature review was used as the research strategy for this investigation. Findings suggest that AI may aid in numerous areas of supply chain management, including forecasting, inventory control, logistics optimization, and vendor choice. This research also suggests that firms may improve their sustainability efforts and consumer happiness with the aid of AI. However, there are obstacles to implementing AI in SCM, such as poor data quality, a lack of organizational readiness, and ethical concerns. This research shows that AI may improve supply chain management and provide companies a strategic edge, but only if it is implemented properly.

Muthiah, (2021) Researched herein is the effect that AI has had on SCRM (supply chain risk management). The research team hopes to learn how artificial intelligence (AI) might aid businesses in their efforts to detect, evaluate, and eliminate supply chain threats. This study uses a case study examination of four businesses from various sectors as its research approach. The findings point to numerous ways in which AI might enhance SCRM, such as via real-time risk monitoring, predictive analytics, and automated decision making. In addition, the results indicate that AI may aid businesses in minimizing supply chain interruptions, strengthening resilience, and boosting stakeholder trust. Data security, privacy concerns, and prejudice are just a few of the obstacles that must be overcome before SCRM can fully embrace AI. This research shows that AI has the potential to be an effective tool for SCRM, but that it must be used with due consideration for technological, ethical, and regulatory difficulties.

Abdel-Basset, (2021) This research looks on how artificial intelligence (AI) may be used to boost SCV. The study's goal is to shed light on the deployment of AI-enabled SCV systems by illuminating the advantages and disadvantages of employing AI for SCV. Interviews with supply chain professionals and case studies of businesses that have utilized SCV systems powered by artificial intelligence were used to compile this qualitative study. The findings imply that AI may improve decision-making and cooperation among supply chain stakeholders, as well as providing real-time insight into supply chain processes. Data quality, privacy, and the need for organizational and cultural changes are just a few of the difficulties that come with AI-enabled SCV systems. Conclusions and

suggestions for businesses to make the most of AI-enabled SCV systems are drawn from the research, which finds that AI has the potential to greatly enhance SCV if applied properly.

Nguyen, (2021) This research examines artificial intelligence's (AI's) impact on supply chain risk management (SCRM) from the unique vantage point of SMEs. The study's goal is to provide light on the variables that drive the adoption of AI-enabled SCRM systems, as well as the possible advantages and limitations of employing AI for SCRM in SMEs. Data was gathered using a quantitative research technique and a survey of manufacturing-related small and medium-sized enterprises (SMEs). The findings indicate that small and medium-sized enterprises (SMEs) may gain from implementing SCRM using AI by better identifying and mitigating risks, strengthening supply chain resilience, and decreasing supply chain disruptions. High installation costs, a lack of technical competence, and data security issues are some of the difficulties with AI-enabled SCRM systems. The research also discovered that characteristics including perceived utility, perceived simplicity of use, and organizational preparedness play a role in the adoption of AI-enabled SCRM systems. Finding that AI has the potential to be a useful tool for SCRM in SMEs, the research goes on to provide suggestions on how these businesses might deal with the difficulties of implementing AI-enabled SCRM systems.

Ghasemy (2021) The effects of artificial intelligence (AI) on supply chain optimization are the focus of this research. The study's objective is to determine how artificial intelligence (AI) may improve supply chain operations and to assess the pros and cons of incorporating AI into supply chain management. Data was gathered using a qualitative research approach by conducting in-depth interviews with supply chain professionals and reviewing case studies of businesses that have successfully integrated AI into their supply chain management operations. The findings suggest that AI may aid in optimizing supply chain operations via increased accuracy in demand forecasting, shorter lead times, better inventory management, and more efficient logistics. Data quality, data security, and the requirement for organizational transformation are just a few of the hurdles that must be overcome when introducing AI into supply chain optimization. This research indicates that, with proper implementation, AI has the ability to dramatically enhance supply chain optimization, and it offers guidance to businesses on how to reap the most advantages from AI-enabled supply chain optimization.

Huq, (2021) This research project investigates how AI might be used to improve SCM's commitment to environmental responsibility. The study's goal is to provide light on the variables that impact the adoption of AI-enabled sustainable SCM systems, as well as the potential advantages and limitations of employing AI for sustainable SCM. We used a qualitative study approach, conducting in-depth interviews with supply chain professionals and reviewing case studies from businesses that have deployed AI-enabled sustainable SCM systems. Based on the findings, it seems that AI has the potential to boost SCM's sustainability in the areas of traceability, waste reduction, transportation

optimization, and supplier cooperation. Data quality, ethical considerations, and the need of organizational and cultural changes are all obstacles to AI-enabled sustainable SCM systems. Additionally, the study discovered that factors like perceived usefulness, perceived ease of use, and organizational readiness influence the adoption of AI-enabled sustainable SCM systems. The research indicates that AI may be a useful tool for boosting sustainability in SCM, and it offers advice to help businesses overcome the hurdles of implementing AI-enabled sustainable SCM systems.

METHODOLOGY

OBJECTIVES OF THE STUDY

To examine the role of AI in supply chain management.

To know the benefits of using AI in supply chain.

To analyze the trends of AI in supply chain.

RESEARCH DESIGN

Descriptive and exploratory research design will be conducted in the study. Using the descriptive research design primary data will be collected using the appropriate questionnaire to verify and assess the information that is crucial for the study.

FINDINGS

Most respondents were confident in the accuracy of AI-powered supply chain predictions.

Most of the respondents believed that AI could make a significant or complete contribution to reducing supply chain costs.

Most respondents believed that AI can at least moderately help in managing inventory levels and preventing stockouts.

Most respondents were willing to invest in AI technology for supply chain management.

Most of the respondents had at least moderate trust in AI-based decision making in supply chain management.

Most respondents believed that AI has the potential to make a significant or complete impact on enhancing supply chain visibility.

Most respondents believed that AI could make a significant or complete contribution to enhancing supply chain efficiency.

Most respondents believed that AI could help to some extent in managing supply chain risks.

Most respondents believe that AI can contribute to improving supply chain responsiveness to some degree, with the highest proportion believing that AI can make a complete or significant contribution.

Most respondents believe that AI can contribute to improving supply chain flexibility to some degree.

CONCLUSION

As we move toward a more data-driven future, the role of AI in logistics network management will only grow in significance. In today's fast-paced business world, firms who can rapidly and properly evaluate enormous volumes of data are the ones that will thrive. AI has several applications in supply chain management, including work automation, demand forecasting,

route optimization, inventory management, security and compliance monitoring, and more. These skills are essential for businesses that want to remain ahead of the curve and satisfy their clientele. In addition, AI is assisting businesses in developing a logistical infrastructure that is more effective, open, and safe. Improved transparency and safety may be achieved via the use of cutting-edge technology like blockchain to monitor items and materials in real time as they travel through the supply chain. Supply chain efficiency may be increased as a result of faster problem detection and resolution at the company level. To sum up, AI is rapidly becoming into a crucial resource for logistics network management firms seeking to remain competitive and satisfy customer needs. The usage of artificial intelligence (AI) is expected to grow much more prevalent and significant in the future as data becomes more freely accessible and technology continues to progress. The corporate world is becoming more data-driven, so companies who invest in AI and other cutting-edge technology will have a competitive advantage. AI can help supply chain managers to improve visibility, increase agility, and enhance collaboration across the supply chain. AI can help in demand forecasting, inventory optimization, transportation management, and customer service. AI also plays a critical role in enhancing supply chain security and resilience by identifying potential risks and vulnerabilities. However, the implementation of AI in supply chain management is not without its challenges. Data quality, cybersecurity, and organizational resistance are among the main challenges that need to be addressed. Furthermore, the deployment of AI requires a skilled workforce that can work with technology effectively.

RECOMMENDATIONS

Improved efficiency, visibility, and optimization are the results of incorporating AI into supply chains. They stand to gain from incorporating AI into their operations. Artificial intelligence (AI) may play a significant role in the future of a supply chain firm and in adjusting to supply chain issues.

Try An AI Simulation

Artificial intelligence's capacity to foresee the results of an action is a major plus. To see whether artificial intelligence simulations can help your supply chain, you may give this a try. With the help of a simulation, supply chain companies may better improve their processes in light of realistic circumstances. Many steps of the supply chain can benefit from the use of AI simulation tools. Supply chain managers may create a digital replica of the whole warehouse using AI simulation. The AI logistics system may then utilize the digital replica as a test bed to test out potential optimization policies.

Decide What Should Be Automated

A lack of efficiency in one part of the supply chain may have repercussions all the way to the endpoints. Effective use of AI for inventory management in warehouses can result in significant cost savings. Internet of Things tags are another useful instrument for monitoring the condition of various objects. In order to keep track

of all of these changes, the IoT tags send communications to an AI center. If there are issues in the supply chain, the AI may notify the relevant business.

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