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# INVESTIGATING THE ENHANCEMENT OF CONSTRUCTION SUPPLY CHAIN MANAGEMENT WHEN INCORPORATED WITH ARTIFICIAL INTELLIGENCE

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## ABSTRACT

The integration of artificial intelligence (AI) with mobile applications for supply chain management is examined in this review of the literature. It emphasizes the revolutionary effect of AI on supply chain process optimization by looking at a variety of academic publications. According to the abstract, there is general agreement that supply chain operations can benefit from AI-powered mobile applications in terms of increased productivity, lower costs, and reduced risk. Real-time tracking, inventory management, and demand forecasting using machine learning algorithms are some of the major themes. The compilation of multiple studies emphasizes how important AI applications are for supply chains that want to be resilient and adaptive. The abstract also highlights how mobile platforms are becoming increasingly important as a channel for smooth AI integration, giving decision-makers access to data and insights in real time. All of the reviewed literature points to the strategic integration of AI in mobile supply chain applications as a key factor in today's business environments that foster innovation and competitiveness.

**Keywords:** supply chain, Artificial intelligence, construction, Mobile application, Technology.

## INTRODUCTION

By incorporating AI into a mobile application, you can transform your supply chain using state-of-the-art technology. Optimize decision-making in real-time, increase efficiency, and streamline operations. Enable your company to quickly adjust to changing market conditions and enjoy a smooth and astute supply chain management experience. Use an AI-powered mobile application to embrace the future of logistics and promote creativity and agility throughout your whole supply chain. Launch your company into a new era of supply chain excellence by gaining unmatched visibility and control. Examining the complex interactions that occur between many stakeholders participating in the value-adding construction process is part of supply chain management problem (Chen, 2022). This technology can fill this need in construction by making supply chains traceable, transparent, and unchangeable for all project partners (Cataldo, 2022). The study offers specific information to practitioners in the industrial building supply chain as well as a broader foundation for future measurement (Dharmapalan, 2022).

This study assists decision-makers by examining the effects of altering shop capacities on available equipment (Ho, 2022). The goal of construction supply chain management (CSCM) is to ensure the seamless flow of goods and services to the building site by collaborating with supply chain (Lu, Exploring smart construction objects as blockchain oracles in construction supply chain management, 2021). In the proposed green supply chain, this article also analyses the synergy between supplier selection and project planning and scheduling (RezaHoseini, 2020). This study aimed to identify major material difficulties faced by contractors and to provide solutions to avoid schedule and cost overruns (Heaton, 2022). The research findings will allow construction managers to compare different SCs while learning how supply chain features increase or decrease durability and, ultimately, risk exposure in construction SCs (Ghufran, 2022). The study integrates artificial intelligence and deep learning technology to create a supply chain management system for small and medium-sized businesses, as well as to improve the intelligent algorithm (Liu, 2023). Over the last decade, the manufacturing industry has been a leader (Qiao, 2021) in the adoption of Artificial Intelligence (AI) technology to improve production processes and increase customer satisfaction. (Singh, 2023). AI technology is rapidly being employed in the off-site building area to develop cutting-edge and creative products and procedures (Arashpour, 2017). Many on-site production difficulties are based within the supply chain, so construction supply chain management has profound practical consequences (Singh, 2023). According to certain research, material-related expenses might account for up to 70% of building costs (Singh, 2023).

## LITERATURE REVIEW

The strong supply chain decision-making process is essential to the sophisticated production of prefabricated goods. Prior studies in this area concentrated on maximizing purchasing decisions to reduce cost overruns in off-site construction supply networks. Nonetheless, there are still decision parameters that need to be developed and solved analytically, such as strategic preferences to use multi-supplier configurations and include or exclude specific suppliers (Arashpour, 2017). The proposed green supply chain, this paper also addresses the synergy between supplier selection and project planning and scheduling. Furthermore, the paper delves into the pressing operational challenges faced by the construction industry in balancing supplier selection, fleet selection, and project time planning. By reducing project delays, logistical costs and greenhouse gas propagation can also be minimized (RezaHoseini, 2020). The industrial sector has seen significant success with supply chain management (SCM). Supply Chain Management is an innovation that appears to be especially suited for construction projects. Its goal is to boost confidence among supply chain partners, thereby increasing the speed of inventory. The application of SCM strategies is thought to be beneficial in achieving greater competitiveness for construction firms, as the industry is a major social and economic activity in each region (Maqbool, 2020).

The Capacity for innovation is a key component in enhancing the market competitiveness of construction supply chain businesses. In order to better understand the relationship between explicit and tacit knowledge sharing and innovation capability in the construction supply chain, this study will examine the effects of collaborative innovation activities and the application of building information modelling (BIM) (Qiao, 2021). The potential of block chain technology to improve the transparency, traceability, and immutability of construction data as well as to foster collaboration and trust throughout the supply chain has captured the interest of the global construction industry (Lu, 2021). The study examines representative businesses that use artificial intelligence and sustainable supply chain management in the Taiwanese construction material industry. The public data from the annual statistics reports of the businesses are used to choose the performance indicators of inputs and outputs using the Delphi method and data envelopment analysis. Additionally, empirical data analysis is done to offer a point of reference for the enhancement. This study uses a systematic review of the literature to determine how artificial intelligence (AI) benefits supply chain management (SCM). This study sought to identify existing and future AI methods that can improve SCM research and practice in order to fill the current scientific vacuum in this area (Toorajipour, 2021). **T**he study focuses on factors related to long-term sustainability in the construction industry's supply chain. In

order to investigate sustainable supply chain management (SSCM) research in the construction industry, this work attempts to address this information (Cataldo, 2022).

Presented that one of the biggest challenges facing businesses in the globalized world is reducing risk through the development of robust supply chains (SCs). Nevertheless, there is a lack of research on the critical components that support robust and sustainable supply chain management in building projects. Determining the causal relationship between the key factors that influence resilient and sustainable supply chain management (RSSCM) in building projects is the goal of the current study (Ghufran, 2022). Explains that in order to overcome disruptive events, this study looked into the dynamics of effects between an organization's SC risks and RCs. Previous studies looked into ways to enhance the effectiveness of building projects in spite of the intricate relationships and interdependencies that come with the risks throughout the whole SC (Malik, 2022). Explains that in order to reach a consensus among 15 experts regarding the order of material handling issues and possible fixes related to design-build projects, the fuzzy Delphi method was employed. The study found that the top three primary causes of onsite material problems are complexity, material flow, and a lack of information sharing (Heaton, 2022).

Improving supply chain performance and making decisions with greater efficiency depend on the availability of material status information. The development of information technologies (IT) has improved supply chain visibility through information sharing. Enablers must, however, attain performance gains in order for shared information to be used effectively for actionable decision-making (Dharmapalan, 2022). Demonstrates limited quantitative models exist to help businesses with issues related to allocation and scheduling. Optimizing production planning in prefabrication supply chains is one of the goals of this research's use of optimization. A cost-minimization optimization model that takes job demands and shop capacities into account is presented in this paper. The model, according to computational results, produces a production schedule at a lower cost than the early due date (EDD) approach (Ho, 2022). The suggested solution approach is based on the tabu search (TS) algorithm, and both small- and large-scale examples are used to validate it. The proposed model is compared using this method with two related models. The comparisons demonstrate that the suggested model improves the equilibrium between the costs of various project supply chain sectors (Abdzadeh, 2022). The goal of this study is to identify possible barriers to CSCs implementing AI practices. Through a thorough literature review and brainstorming sessions with industry experts, the study first identifies potential problems with the implementation of AI-based frameworks in CSCs. After the exercise, 17 crucial issues regarding the adoption of AI in CSCs were identified, and these issues were then examined using the fuzzy Decision Making Trial and Evaluation

Laboratory (DEMATEL) approach (Singh, 2023). Explains that in order to help stakeholders in an off-site construction supply chain align their disparate decisions, this paper develops a block chain-enabled supply chain coordination system. In order to accomplish this, the probabilistic distribution of plan reliability is estimated using Bayesian updating. This allows for the computation of a supplier rebate, which encourages the contractor to schedule deliveries with the goal of minimizing joint supply chain costs (Kim, 2023). The novel multi-objective mixed integer linear programming model presented in this paper takes into account order quantities, inventory management procedures, the possibility of splitting a material order, and the selection of appropriate suppliers as integrated decisions that need to be optimized. Weighted lateness, a gauge of the effects of material delays, and the total cost of procurement are traded off in an optimal way. Fuzzy scenario-based parameters are applied to material prices, supplier capacities, and ensuing delays (Chen, 2022).

The operations and supply chain management, artificial intelligence (AI) is being viewed more and more as a source of competitive advantage (OSCM). Nevertheless, a lot of organizations still have trouble implementing it successfully, and there aren't many empirical studies in the literature that give specific examples. The purpose of this study is to clarify the ways in which AI applications can assist with OSCM procedures and to pinpoint the advantages and obstacles associated with their adoption (cannas, 2023)**.** Highlights a lot of aspects of corporate operations could be revolutionized by artificial intelligence (AI). Artificial Intelligence (AI) has the potential to improve supply chain inefficiencies, optimize logistics and transportation routes, and forecast demand based on data analysis. This may result in shorter lead times, lower costs, and better ability to adapt to shifts in demand. Using the Scopus database, this paper examines and evaluates the applications of artificial intelligence (AI) in supply chain management (SCM) (Mohsen, 2023). The paper builds an intelligent model and enhances the intelligent algorithm to create a green supply chain management system for small and medium-sized businesses using deep learning and artificial intelligence. Combining these two elements enhances the impact of green supply chain management on small and medium-sized businesses (Liu, 2023). The integration of artificial intelligence (AI) in supply chain management (SCM) is examined in this article's theoretical and practical implications. The most recent generation of large language models (LLMs), which demonstrate human-like abilities across a range of domains, is an example of the tremendous advancements in AI in recent years. Existing viewpoints fail to recognize the potential for disruption provided by AI tools, thus it appears that SCM as a discipline is ill-prepared for this impending revolution (Hendriksen, 2023).

## TEXT DATA IN VOS VIEWER

The VOS Viewer software is designed to process and analyze text data in order to extract valuable insights for supply chain management using artificial intelligence. To sort through the massive amounts of textual data pertaining to the supply chain, the software uses sophisticated natural language processing algorithms. It helps to gain a deeper understanding of the key elements influencing the supply chain by spotting patterns, trends, and sentiment in textual data. The VOS Viewer software uses artificial intelligence (AI) to improve communication, decision-making, and supply chain efficiency by leveraging the rich insights from textual data analysis.

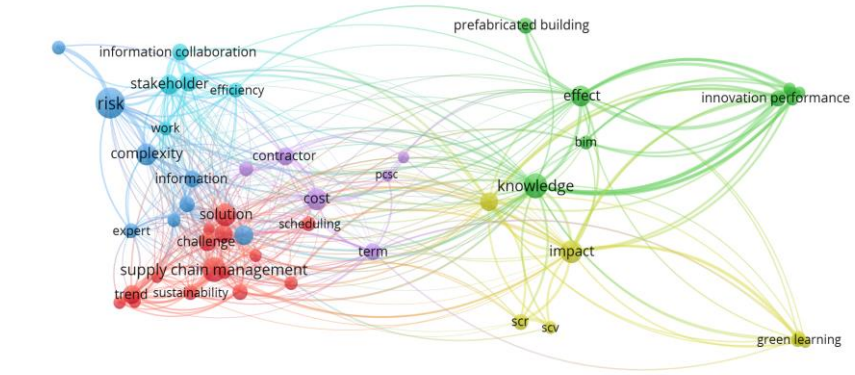


**Fig 1: Text data**

**Source: VOS Viewer**

## CONCLUSION

In summary, efficiency and transparency are improved when artificial intelligence is incorporated into mobile supply chain management applications. This invention minimizes errors, lowers expenses, and streamlines processes. AI-powered real-time data analytics improves overall supply chain responsiveness by facilitating well-informed decision-making. Artificial Intelligence-enabled mobile applications enable businesses to quickly adjust to changing market conditions and customer needs. AI's smooth integration guarantees improved inventory control, reducing the likelihood of stock outs and overstocks. In the end, supply chain operations are transformed by the interaction of mobile technology and AI, creating an

ecosystem that is more resilient and agile. It is essential for companies hoping to prosper in the quickly changing world of contemporary supply chains to embrace this evolution.

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