

# Information System-Based Supply Chain Management Strategy to Improve Company Operational Performance

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## ABSTRACT

Supply chain management is an integrated series of processes that encompass all steps from raw material procurement to the delivery of final products to consumers. The efficiency and effectiveness of the supply chain are crucial for the operational success of companies in achieving competitive advantage. This research aims to analyze an information system-based supply chain management strategy to enhance company operational performance. The methodology used in this study is a qualitative literature review with data collection from Google Scholar from 2001 to 2024. The results of the study indicate that the Information System-Based Supply Chain Management (ISBSCM) strategy has significant potential to improve company operational performance through the integration of information technology throughout the supply chain processes. By leveraging integrated information systems, companies can enhance efficiency, visibility, and responsiveness to market changes. However, the implementation of this strategy is not without challenges, including data security issues, costs, and change management.

**Keywords:** Supply Chain, Information System, Company Operational Performance

## INTRODUCTION

The supply chain is an integrated series of processes that encompasses all stages, from sourcing raw materials to delivering final products to consumers. The operational success of a company in achieving competitive advantage heavily depends on the efficiency and effectiveness of the supply chain it operates (Farida & Setiawan, 2022). In this context, efficiency refers to the optimal use of resources, while effectiveness pertains to achieving company goals in a proper and efficient manner. By managing the supply chain efficiently and effectively, companies can enhance their operational performance, increase customer satisfaction, and achieve competitive advantage in an increasingly competitive and dynamic market. Supply chain management has become a primary focus for many companies to ensure the smooth operation of their business and maintain their competitiveness in the global market.

The impact of the information technology revolution on business dynamics has resulted in fundamental changes in the paradigm of supply chain management. The implementation of sophisticated information systems has become an indispensable foundation for handling the complexity and dynamics of modern supply chains (G. Zhang et al., 2023). In addition to improving transparency and visibility across all processes, information systems also enable companies to achieve more effective coordination among business units, partners, and other stakeholders in the supply chain (Xia et al., 2023). More than just technological tools, well-integrated information systems serve as the foundation for timely, accurate, and relevant information management. Companies can respond to market changes more swiftly, enhance operational efficiency, and optimize the performance of their supply chains in the face of increasingly complex and dynamic business challenges.

Supply chain management is an arena fraught with diverse challenges for companies, including but not limited to market demand fluctuations that are often difficult to predict, uncertainties related to raw material inventory influenced by external factors such as regulatory changes or weather conditions, and risks associated with logistics and transportation that can affect the smooth distribution of products. Moreover, the complexity of effectively coordinating with suppliers and other business partners is also a significant challenge in optimizing supply chain performance (Ahmed et al., 2024). Companies must be able to address these challenges through mature strategies, the use of advanced information technology, and close collaboration with all relevant stakeholders (Brunetti et al., 2020). In facing the ever-changing market dynamics, the ability to identify, respond to, and manage these challenges will be key to success in maintaining operational smoothness and enhancing competitiveness in the competitive market.

The integration of information systems throughout the supply chain network plays a crucial role in helping companies tackle the challenges they face by increasing the level of visibility, responsiveness, and operational flexibility (Alkhatib & Momani, 2023). Through integrated information systems, companies can gain a deeper understanding of each stage in the supply chain, from sourcing raw materials to delivering final products to consumers. This empowers companies to quickly respond to changes in the business environment, including market demand fluctuations and uncertainties in raw material inventory. Furthermore, the use of integrated information systems also enhances responsibility in supply chain management by enabling more accurate tracking of each process step (Unhelkar et al., 2022). With better access to relevant data and information, companies can make more timely and accurate decisions, thereby improving operational efficiency and the ability to respond to market changes more effectively.

The dynamic development of global business and increasing competition has driven companies to continuously develop strategies aimed at improving their operational efficiency. In this effort, one of the current trends that is gaining more attention is the implementation of cutting-edge technologies such as the Internet of Things (IoT), big data analytics, and machine learning in supply chain management. The implementation of these technologies provides opportunities for companies to enhance visibility, coordination, and operational efficiency across their supply chains. Through the use of IoT, companies can collect real-time data from various points in the supply chain, enabling faster and more accurate decision-making (Rejeb et al., 2020). Big data analytics allows companies to analyze large volumes of data generated by the supply chain, thereby identifying trends, patterns, and opportunities to improve efficiency (Gopal et al., 2024). Meanwhile, machine learning enables companies to automate decision-making processes and optimize operations across the supply chain. By effectively leveraging these technologies, companies can gain significant competitive advantages in addressing the increasingly complex challenges and competition in the global market.

Previous studies have explored supply chain management and information systems. (Jamaludin, 2021) developed a web-based supply chain management application system to facilitate companies in their business processes. The research methodology employed was qualitative. The study's final results include: (a) The implementation of the supply chain management information system designed for PT. ABCD can reduce supply chain uncertainty in the company. This is because the system implementation can assist the company in procurement and controlling the availability of raw materials according to the company's needs. (b) The application of the designed supply chain management information system can illustrate the correlation between suppliers and the company, as well as the company with users, which can facilitate ordering goods from suppliers to the company or vice versa, ensuring that ordered goods are delivered on time and in the right quantity. (c) Providing opportunities for suppliers to participate in the implementation of the system to offer prices online.

(Yulianawati et al., 2018) identified issues at PT Garuda Mas Semesta regarding the development of a supply chain management information system. The upstream raw material flow process was not smooth due to the lack of information presentation about the data of raw materials owned by the supplier. This led to ineffective Purchase Order creation as the purchasing department had to contact each supplier to ensure the availability of raw materials, consuming a significant

amount of time. This issue resulted in slow production processes due to delays in the delivery of raw materials. Additionally, the flow of reports or information/data from each division still relied on manual documents and forms, leading to poor data recording. Supply Chain Management can serve as a solution to these issues by integrating the company's supply chain network and its business partners, such as external parties like suppliers or raw material providers for production needs. The implementation of Supply Chain Management at PT Garuda Mas Semesta aims to enhance the smoothness of raw material supply, order delivery, internal department relationships within the company, and the company's relationships with suppliers. Despite numerous studies in the field of supply chain management and information systems, there is still room for further research in identifying the most effective strategies for integrating these two areas to improve company operational performance.

## LITERATURE REVIEW

### Supply Chain

A supply chain is an integrated network of various processes and activities involving procurement, production, storage, distribution, and marketing of goods or services, starting from raw materials to final products reaching end consumers (Hosseinzadeh Lotfi et al., 2023). The supply chain plays a crucial role in facilitating the flow of goods and information between various business entities involved, including suppliers, manufacturers, distributors, retailers, and consumers. In the supply chain, each stage of the process directly impacts the subsequent stages, making effective cooperation and coordination among all involved parties highly important. Good visibility into activities along the supply chain is essential for managing inventory efficiently, anticipating demand fluctuations, and responding to market changes quickly (Williams et al., 2013). Therefore, an effective and efficient supply chain not only improves a company's operational performance but also strengthens its competitive position in an increasingly complex and dynamic market.

### Information System

Information systems refer to an organized collection of related elements such as hardware, software, databases, and procedures designed to gather, store, process, and disseminate relevant information for an organization or related entity (Alter, 2008). The primary objective of information systems is to aid better decision-making, improve operational efficiency, and support various business, managerial, and strategic activities. Information systems enable organizations to manage and analyze data effectively, provide quick and accurate information access to users in need, and facilitate communication and collaboration among departments or business units (Aldoseri et al., 2023). With evolving information technology, information systems may also encompass elements such as the internet, cloud computing, big data analytics, and artificial intelligence, all of which play roles in enhancing the capabilities of information systems in generating value for organizations. Thus, information systems become a crucial aspect in supporting the operational, tactical, and strategic activities of organizations across various industry sectors.

### Company Operational Performance

Company operational performance refers to the evaluation of efficiency and effectiveness in carrying out core activities related to production, distribution, and delivery of products or services to customers (Alkaf et al., 2021). This includes various aspects such as productivity, quality, production costs, operational process reliability, and the ability to respond to market changes quickly and flexibly. Good operational performance indicates that a company can meet customer demands effectively, produce products or services that meet established quality standards, and efficiently manage resources to achieve business goals. Evaluating operational performance often involves measuring and analyzing various performance metrics such as production levels, customer satisfaction rates, product return rates, production cycle times, as well as the efficiency and effectiveness of resource utilization such as labor, raw materials, and production machinery (Chan, 2003). Optimal operational performance is key to maintaining a company's competitiveness in a competitive and dynamic market, as well as ensuring its long-term sustainability and growth.

## RESEARCH METHOD

The method used in this research is a qualitative literature review with data collection from Google Scholar from 2001 to 2024. A qualitative approach is used to analyze and synthesize various articles, journals, and scientific papers relevant to the research topic. This research will employ careful and selective search techniques on Google Scholar to identify and gather literature relevant to the research objectives. The obtained data will be qualitatively analyzed, considering main themes, key concepts, and significant findings emerging from the literature. The qualitative approach allows researchers to gain in-depth and contextual understanding of issues relevant to this research, as well as identify patterns and trends that may arise from the reviewed literature. Thus, this qualitative literature review will provide a strong theoretical foundation for understanding the concepts and frameworks related to the information system-based supply chain management strategy to improve company operational performance.

## RESULTS AND DISCUSSION

In the context of globalization marked by increasingly fierce competition, supply chain management emerges as a critical aspect ensuring smooth company operations. The supply chain encompasses not only raw material procurement and product distribution processes but also inventory management, production processes, and coordination with involved business partners. In such circumstances, the implementation of information systems becomes crucial in efforts to enhance efficiency and operational performance.

The implementation of Information System-Based Supply Chain Management (IS-SCM) strategies involves the utilization of information technology and communication as tools to optimize various processes within the supply chain. At the core of this strategy lies the integration of information systems enabling companies to gain comprehensive visibility into all stages of the supply chain, ranging from supplier resources to end customers (Lerman et al., 2022). With such integration, companies can efficiently manage information related to procurement, production, distribution, and inventory, facilitating timely and informed decision-making to enhance operational effectiveness and customer satisfaction.

The process of implementing IS-SCM strategies begins with a careful analysis of the needs and unique characteristics of the company's supply chain. This step includes a thorough identification of vulnerable points, potential risks, and opportunities to significantly enhance efficiency (Duchek, 2020). During this phase, companies need to conduct in-depth research to understand the internal and external dynamics influencing their supply chain operations. Once all these elements are identified, the company can proceed to the system design stage tailored to its specific needs and goals. This step involves selecting appropriate software, developing reliable technological infrastructure, and harmoniously integrating with existing systems within the company. Through this structured and detailed approach, companies can ensure the optimal and effective implementation of IS-SCM strategies according to their needs and objectives.

Information system integration within the supply chain context serves not only as a means to monitor the flow of goods and information in real-time but also has the potential to enhance collaboration with suppliers and other business partners (González-Gallego et al., 2015). For example, with the adoption of integrated information systems, companies have the capability to automate raw material ordering processes when inventory reaches predetermined levels. The positive impact of this automation includes potential risk reduction associated with stock shortages or excess inventory. Furthermore, information system integration enables smoother data exchange between companies and suppliers, which in turn can enhance supplier responsiveness to demands and changes in the business environment quickly and effectively. Thus, information system integration within the supply chain provides a solid foundation for greater operational efficiency and resilience to market fluctuations.

Furthermore, the implementation of IS-SCM strategies provides opportunities for companies to enhance their demand forecasting capabilities through the utilization of sophisticated data analysis. By leveraging big data and cutting-edge machine learning techniques, companies can



uncover consumption patterns that may be hidden within a plethora of available data (Nita, 2016). The positive impact is that companies can plan production and distribution with higher accuracy, reducing the risk of mismatch between demand and inventory. With this approach, companies can respond more quickly to market trends or customer needs, thereby improving overall operational performance.

Beyond merely enhancing operational efficiency, the implementation of IS-SCM strategies also directly impacts customer satisfaction levels. With the ability to provide more accurate delivery time estimates and improve responsiveness to changes in demand, companies can strengthen relationships with customers and enhance brand loyalty (Chaudhuri & Holbrook, 2001). Furthermore, with an integrated information system in place, companies can tailor their services to meet the specific needs of customers, both individually and as a whole. Consequently, companies can create more personalized and satisfying customer experiences, which, in turn, will help retain and attract new customers. In a broader context, increased customer satisfaction also has the potential to enhance the company's reputation in the eyes of the public and expand their market share.

Although the implementation of IS-SCM strategies offers significant benefits, the challenges that need to be addressed cannot be overlooked. One of the main challenges that arise is in terms of data security and privacy. With the increasing integration between various information systems, companies are faced with the responsibility to ensure that the sensitive data they manage remains protected from potential cyber threats and risks of information leakage that could be detrimental (Cremer et al., 2022). Therefore, companies must implement stringent measures regarding cybersecurity, including the use of strong encryption technology, sophisticated identification and authorization systems, and strict privacy policies to ensure that customer data and internal company data are well-protected. Additionally, companies also need to enhance employees' awareness and skills in dealing with evolving cybersecurity threats through continuous training and education. Thus, while continuing the implementation of IS-SCM strategies, companies must carefully consider data security and privacy aspects to mitigate potential risks that could disrupt operations and damage the company's reputation.

Moreover, the cost aspect in implementing and maintaining complex information systems is also a crucial consideration. Companies must conduct careful calculations regarding the required investments and ensure that the long-term benefits of IS-SCM strategies can cover or even exceed the expenses incurred. This includes not only the initial costs for acquiring and installing necessary software and hardware but also expenses related to employee training, routine maintenance, and continuous technology updates. When analyzing cost aspects, companies should also consider non-financial benefits such as increased operational efficiency, enhanced productivity, and the ability to adapt to market changes more quickly (J. Zhang & Chen, 2023). Thus, careful and strategic cost calculations are imperative in planning and implementing IS-SCM strategies effectively.

Overall, supply chain management strategies based on information systems promise great potential to substantially improve a company's operational performance. By utilising information technology effectively, companies have the opportunity to achieve higher levels of efficiency in various aspects of their operations, increase responsiveness to dynamic market changes, and create higher levels of customer satisfaction. These potentials include improvements in monitoring and managing the flow of goods and information in real-time, the ability to optimise production and distribution processes through sophisticated data analysis, as well as improving estimated delivery times and customising customer service in a more personalised manner. However, to achieve full success in the implementation of this strategy, companies must be prepared to overcome various challenges that may arise. These include increasingly complex data security issues and the need to maintain information privacy, cost considerations associated with investing in and maintaining complex information systems, and change management challenges associated with changing existing operational processes and introducing new technologies into the work environment. It is therefore important for companies to adopt a comprehensive and structured approach to these challenges in order to realise the maximum benefits from implementing an information systems-based supply chain management strategy.

## CONCLUSION

Information System-based Supply Chain Management (IS-SCM) Strategy promises significant improvements in operational performance through the integration of information technology across all supply chain stages. By leveraging integrated information systems, companies can enhance operational efficiency, increase transparency throughout the supply flow, and improve responsiveness to market changes. However, despite its potential benefits, implementing IS-SCM faces several serious challenges that need to be addressed. These challenges include data security issues associated with centralized information system usage, as well as significant cost considerations related to the development, integration, and maintenance of the required IT infrastructure. Additionally, change management challenges arise, where substantial efforts are needed to transform the company culture and established workflows to effectively support the adoption of IS-SCM strategies. With a profound awareness of these challenges, companies can plan the holistic implementation of IS-SCM, ensuring that the promised benefits can be realized while mitigating the involved risks. Recommendations stemming from all these research findings include:

1. Needs Analysis: Before implementing IS-SCM strategies, companies need to conduct in-depth analysis of the unique requirements and characteristics of their supply chains. This is crucial to ensure that the designed information systems align with the specific needs of the company.
2. Investment in Data Security: Companies should prioritize investments in data security to safeguard sensitive information from cyber threats and leaks. This includes the use of encryption technologies, continuous network security monitoring, and employee training on good cyber security practices.
3. Cost Management: Companies need to carefully calculate the investments required for the implementation and maintenance of information systems. This may involve selecting solutions that best fit the company's needs and mature budget planning to manage long-term costs.
4. Change Management: Implementing IS-SCM strategies can change existing workflows within the company. Therefore, effective change management is crucial to ensure that employees can adapt to these changes. Adequate training, clear communication, and support from management will help facilitate the transition to the use of new information systems.

By taking these steps, companies can increase their chances of success in implementing IS-SCM strategies and harness the full potential of information technology to enhance operational performance and competitiveness in an increasingly complex and dynamic market.

## REFERENCES

- Ahmed, H. F., Hosseinian-Far, A., Sarwar, D., & Khandan, R. (2024). Supply Chain Complexity and Its Impact on Knowledge Transfer: Incorporating Sustainable Supply Chain Practices in Food Supply Chain Networks. *Logistics*, 8(1), 5. <https://doi.org/10.3390/logistics8010005>
- Aldoseri, A., Al-Khalifa, K. N., & Hamouda, A. M. (2023). Re-Thinking Data Strategy and Integration for Artificial Intelligence: Concepts, Opportunities, and Challenges. *Applied Sciences*, 13(12), 7082. <https://doi.org/10.3390/app13127082>
- Alkaf, A., Yusoff Yusliza, M., Saputra, J., Muhammad, Z., & Talib Bon, A. (2021). A Review of Work Effectiveness and Efficiency, Service Quality and Organisational Performance Literature: A Mini-Review Approach. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 5127–5141. <https://doi.org/10.46254/AN11.20210873>
- Alkhatib, S. F., & Momani, R. A. (2023). Supply Chain Resilience and Operational Performance: The Role of Digital Technologies in Jordanian Manufacturing Firms. *Administrative Sciences*, 13(2), 40. <https://doi.org/10.3390/admsci13020040>
- Alter, S. (2008). Defining information systems as work systems: implications for the IS field. *European Journal of Information Systems*, 17(5), 448–469. <https://doi.org/10.1057/ejis.2008.37>

- Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: strategies emerging from a multi-stakeholder approach. *The TQM Journal*, 32(4), 697–724. <https://doi.org/10.1108/TQM-12-2019-0309>
- Chan, F. T. S. (2003). Performance Measurement in a Supply Chain. *The International Journal of Advanced Manufacturing Technology*, 21(7), 534–548. <https://doi.org/10.1007/s001700300063>
- Chaudhuri, A., & Holbrook, M. B. (2001). The Chain of Effects from Brand Trust and Brand Affect to Brand Performance: The Role of Brand Loyalty. *Journal of Marketing*, 65(2), 81–93. <https://doi.org/10.1509/jmkg.65.2.81.18255>
- Cremer, F., Sheehan, B., Fortmann, M., Kia, A. N., Mullins, M., Murphy, F., & Materne, S. (2022). Cyber risk and cybersecurity: a systematic review of data availability. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 47(3), 698–736. <https://doi.org/10.1057/s41288-022-00266-6>
- Duchek, S. (2020). Organizational resilience: a capability-based conceptualization. *Business Research*, 13(1), 215–246. <https://doi.org/10.1007/s40685-019-0085-7>
- Farida, I., & Setiawan, D. (2022). Business Strategies and Competitive Advantage: The Role of Performance and Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 1–16. <https://doi.org/10.3390/joitmc8030163>
- González-Gallego, N., Molina-Castillo, F.-J., Soto-Acosta, P., Varajao, J., & Trigo, A. (2015). Using integrated information systems in supply chain management. *Enterprise Information Systems*, 9(2), 210–232. <https://doi.org/10.1080/17517575.2013.879209>
- Gopal, P. R. C., Rana, N. P., Krishna, T. V., & Ramkumar, M. (2024). Impact of big data analytics on supply chain performance: an analysis of influencing factors. *Annals of Operations Research*, 333(2–3), 769–797. <https://doi.org/10.1007/s10479-022-04749-6>
- Hosseinzadeh Lotfi, F., Allahviranloo, T., Shafiee, M., & Saleh, H. (2023). Supply Chain Management. In *Supply Chain Performance Evaluation* (pp. 1–46). SPRINGER. [https://doi.org/10.1007/978-3-031-28247-8\\_1](https://doi.org/10.1007/978-3-031-28247-8_1)
- Jamaludin, M. (2021). Desain Sistem Informasi Manajemen Rantai Pasok pada PT “ABCD” Bandung Jawa Barat Indonesia. *Jurnal Administrasi Bisnis*, 10(2), 143–154. <https://doi.org/10.14710/jab.v10i2.36302>
- Lerman, L. V., Benitez, G. B., Müller, J. M., de Sousa, P. R., & Frank, A. G. (2022). Smart green supply chain management: a configurational approach to enhance green performance through digital transformation. *Supply Chain Management: An International Journal*, 27(7), 147–176. <https://doi.org/10.1108/SCM-02-2022-0059>
- Nita, S. L. (2016). MACHINE LEARNING TECHNIQUES USED IN BIG DATA. *Scientific Bulletin of Naval Academy*, 19(1), 466–471. <https://doi.org/10.21279/1454-864X-16-11-078>
- Rejeb, A., Simske, S., Rejeb, K., Treiblmaier, H., & Zailani, S. (2020). Internet of Things research in supply chain management and logistics: A bibliometric analysis. *Internet of Things*, 12, 100318. <https://doi.org/10.1016/j.iot.2020.100318>
- Unhelkar, B., Joshi, S., Sharma, M., Prakash, S., Mani, A. K., & Prasad, M. (2022). Enhancing supply chain performance using RFID technology and decision support systems in the industry 4.0—A systematic literature review. *International Journal of Information Management Data Insights*, 2(2), 100084. <https://doi.org/10.1016/j.ijime.2022.100084>
- Williams, B. D., Roh, J., Tokar, T., & Swink, M. (2013). Leveraging supply chain visibility for responsiveness: The moderating role of internal integration. *Journal of Operations Management*, 31(7–8), 543–554. <https://doi.org/10.1016/j.jom.2013.09.003>
- Xia, J., Li, H., & He, Z. (2023). The Effect of Blockchain Technology on Supply Chain Collaboration: A Case Study of Lenovo. *Systems*, 11(6), 299. <https://doi.org/10.3390/systems11060299>
- Yuliawan, D., Witanti, W., & Sabrina, P. N. (2018). PEMBANGUNAN SISTEM INFORMASI MANAJEMEN RANTAI PASOK PADA PT GARUDA MAS SEMESTA. *Prosiding SNATIF Ke -5 Tahun 2018*, 5(1), 63–70.

Zhang, G., Yang, Y., & Yang, G. (2023). Smart supply chain management in Industry 4.0: the review, research agenda and strategies in North America. *Annals of Operations Research*, 322(2), 1075–1117. <https://doi.org/10.1007/s10479-022-04689-1>

Zhang, J., & Chen, Z. (2023). Exploring Human Resource Management Digital Transformation in the Digital Age. *Journal of the Knowledge Economy*, 3, 1–17. <https://doi.org/10.1007/s13132-023-01214-y>