Development of Management Information Systems for Supply Chain Optimization

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Submission date: 31-Mar-2024 09:27AM (UTC+0530)

Submission ID: 2335640469

File name: 5._Development_of_Management_Information_Systems_for_Supply_Chain_Optimization_24-29_.docx (63.06K)

Word count: 1967

Character count: 12320

JIEM : JOURNAL INFORMATIC, EDUCATION AND MANAGEMENT
Vol. 5, No. 2, August 2023, pp. 24 ~ 29
ISSN: 2716-0696, DOI: https://doi.org/10.61992/jiem.v5i2.77

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Article Info
Article history:
Received 10 August 2023
Revised 12 August 2023
Accepted 14 August 2023

Keywords:
Management Information Systems, Supply Chain, Efficiency, Information Technology, System Integration.

ABSTRACT
Development of Management Information Systems for Supply Chain Optimization is research that aims to improve supply chain efficiency and performance through the application of information technology. The research method used is system requirements analysis, system design, and implementation of an integrated software-based system. The research results show that the use of management information systems allows better monitoring of all activities in the supply chain, including inventory management, raw material procurement, production, distribution and inventory management. With the adoption of this technology, organizations can optimize the flow of information and identify weak points in the supply chain, thereby improving responsiveness to changes in market demand and reducing operational costs. The conclusion of this research is that the development of management information systems plays an important role in increasing the efficiency and resilience of supply chains in facing dynamic market challenges.

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1. INTRODUCTION

The supply chain is one of the key elements in modern business strategies that are oriented towards efficiency and flexibility [1]. In an increasingly complex and dynamic environment, supply chain management plays a critical role in ensuring the smooth flow of materials, information and services from suppliers to end consumers. This research highlights the importance of developing Management Information Systems (MIS) as a strategy to optimize supply chain performance.

The theoretical framework underlying this research is based on two main concepts: information management and supply chain. Information management refers to the process of

collecting, storing, processing, and disseminating relevant information to support organizational decision making. On the other hand, the supply chain concept includes a series of activities related to planning, procurement, production, distribution and inventory management of goods or services [2].

Previous research has shown that the integration of information systems in supply chain management can produce a variety of benefits, including increased visibility, better coordination between business partners, increased operational efficiency, and faster response to market changes. However, despite the clear potential benefits, implementing MIS in a supply chain context is still faced with numerous challenges, including system complexity, interface interoperability, and the need for cross-functional and cross-enterprise integration.

In this context, this research aims to fill the knowledge gap by investigating the development of appropriate MIS for supply chain optimization [3]. Taking into account existing challenges and opportunities, this research proposes a conceptual framework that integrates information management principles with best practices in supply chain management, with the hope of providing practical guidance for organizations seeking to improve their supply chain performance through the appropriate application of information technology .

This research is expected to provide valuable insights for business practitioners, academics and researchers interested in the fields of supply chain management and information technology. Thus, this research contributes to the theoretical and practical understanding of how MIS development can be one of the keys to achieving competitive advantage in a rapidly changing business environment.

2. THEORETICAL BASIS

1. Information Management in the Supply Chain
Information management plays a crucial role in optimizing supply chains. This theory highlights the importance of systematizing the collection, storage, processing and distribution of relevant information in order to improve visibility and coordination in the supply chain [4]. The concept of information system integration in supply chain management is an important foundation in efforts to achieve better efficiency and responsibility to market changes and customer needs.

2. Supply Chain Integration Model
This theory emphasizes the importance of cross-functional and cross-company integration in the supply chain. Models such as the SCOR (Supply Chain Operations Reference) Model and the Supply Chain Integration Model (SCM) provide a framework for understanding the relationships between various elements in a supply chain and how information systems integration can support the achievement of optimal supply chain goals.

3. Information Technology and Management Information Systems
This theory explores fundamental concepts in the development and application of information technology in the context of business management, including management information systems (MIS) [5]. Approaches such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and Supply Chain Management (SCM) Systems are the main focus in understanding how information technology can be applied to increase the efficiency and effectiveness of supply chains.

4. Supply Chain Management Strategy
This theory includes various strategies and concepts in supply chain management, such as Just-In-Time (JIT), Vendor-Managed Inventory (VMI), and Lean Manufacturing. Understanding these strategies provides a solid foundation for designing appropriate management information systems to support the implementation of best practices in the supply chain.

5. Risk Management and Supply Chain Resilience
In optimizing the supply chain, it is important to consider aspects of risk management and resilience. Theories related to risk management, such as supply chain risk analysis and risk mitigation, as well as the concept of supply chain resilience, provide insight into how MIS can help organizations face unexpected challenges and increase their resilience to disruptions.

By combining an understanding of these theories, the development of an effective Management Information System can be one of the keys to optimizing supply chains and achieving competitive advantage in a dynamic and complex business environment.

3. RESEARCH METHODOLOGY

1. Types of Research Approach
This research uses a combinative qualitative and quantitative approach. A qualitative approach is used to understand in depth the organizational context, challenges in the supply chain, and the needs of information system users. Meanwhile, a quantitative approach is used to measure the effectiveness and efficiency of the information system being developed [6].

2. Development Method
The system development method used is the evolutionary prototype method. This enables repeated iterations in system design and development, allowing stakeholders to provide continuous feedback and adapt their needs according to changes occurring in the business environment [7].

3. Variable Type
The variables in this research are divided into two main types: independent variables and dependent variables. The independent variables include the features and functions of the information system developed, while the dependent variables include supply chain performance measured in terms of efficiency, responsibility to market changes, and user satisfaction.

4. How to Collect Data
Data was collected through a combination of observation, interviews and document analysis methods. Observations are carried out to understand the processes in the supply chain directly. Interviews are used to obtain the views of various stakeholders, including supply chain managers, operational staff, and potential users of the information system. Document analysis is used to examine existing documentation about existing business processes and information systems [8].

5. Data Processing and Verification Techniques
The data collected will be processed using qualitative and quantitative analysis techniques. Qualitative analysis involves the process of coding and categorizing findings from interviews and observations to identify emerging patterns and themes. Meanwhile, quantitative analysis

involves the use of statistical methods to measure the performance of information systems and supply chains in terms of predetermined performance indicators [9]. Data verification is carried out through data triangulation, namely comparing and matching results from various data sources to ensure the accuracy and reliability of research findings.

Through a combination of qualitative and quantitative methods and the use of appropriate data processing and verification techniques, this research is expected to provide a comprehensive understanding of the development of Management Information Systems for supply chain optimization [10].

4. RESULTS AND DISCUSSION

Results:

The development of a Management Information System (MIS) for supply chain optimization has resulted in successful implementation of the system in the context of the study organization. The developed system includes a variety of features and functions designed to increase supply chain efficiency and resilience. The use of this information system has succeeded in increasing visibility, coordination and responsibility for market changes.

Discussion:

1. Increased Supply Chain Efficiency
The implementation of MIS has resulted in significant improvements in supply chain efficiency. Integration of information systems enables more effective management of all stages in the supply chain, from procurement of raw materials to delivery of final products to customers. Process automation and real-time monitoring enable organizations to identify and address potential bottlenecks quickly, thereby increasing throughput and reducing overall cycle time.

2. Increased Responsibility to Market Changes
MIS plays an important role in increasing responsiveness to rapid and dynamic market changes. With integrated information systems, organizations can quickly adapt their planning and operations to changing market demands. Real-time data analysis and performance monitoring enable supply chain managers to identify market trends, anticipate customer demands, and adjust production and distribution strategies in a more timely manner.

3. Cost Optimization and Risk Reduction
The use of SIM has also helped organizations optimize operational costs and reduce risks in the supply chain. With better monitoring of inventory, efficient inventory management, and better coordination with suppliers and business partners, organizations can avoid additional costs associated with inventory shortages or excesses, as well as reduce risks associated with disruptions in the supply chain.

4. Increased Customer Satisfaction
Finally, SIM implementation has had a positive impact on customer satisfaction. With better timeliness in product delivery, better visibility into order status, and faster responsiveness to customer requests, organizations can increase customer loyalty and strengthen their business relationships.

Overall, the development of MIS for supply chain optimization has brought significant benefits to organizations, including increased operational efficiency, better market responsibility, reduced costs, and increased customer satisfaction. However, keep in mind that MIS implementation is an ongoing process, and organizations need to continually evaluate and adapt to ensure the system remains relevant and effective in the face of ever-changing business challenges.

5. CLOSURE

The development of Management Information Systems (MIS) for supply chain optimization has brought about significant changes in the way organizations manage and run their business operations. With the right adoption of information technology, organizations can increase the efficiency, responsibility and resilience of their supply chains in the face of an increasingly complex and dynamic business environment.

Through this research, we have proven that SIM development is not just a technology investment, but is also a vital strategy in achieving competitive advantage. Integrated information systems enable organizations to optimize information flows, coordinate cross-functional activities, and respond quickly to changing market demands.

However, we also recognize that SIM development is not an easy and simple process. It requires a strong commitment from all levels of the organization, a significant investment in resources, and the ability to continuously learn and adapt to rapidly evolving technology.

In closing, we hope that the results of this research can provide insight and inspiration for other organizations interested in developing their own MIS. By utilizing information technology wisely, we believe that every organization can achieve a more efficient, responsive and competitive supply chain in the ever-changing era of globalization.

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