

REVIEW ARTICLE

Information Technology Enabled Supply Chain: A Systematic Literature Review

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Abstract

Information technology (IT) enabled supply chain helps in reducing cost and improving supply chain efficiency so as to compete globally. The aim of this paper is to do systematic literature review of IT-enabled supply chain and factors for successful implementation. The research presents the increased focus on supply chain, IT-enabled supply chain and the importance of 12 critical success factors enabling implementation of IT-enabled supply chain. This review will help practitioners in preparing business case for IT-enabled supply chain and focus on factors effecting successful implementation of IT-enabled supply chain. This review helps in collating and presenting the key work done in the past and provides guidance for future research work that can be conducted.

Keywords: *Supply chain management (SCM), Technology, Information technology (IT), Critical success factors, Barriers, IT-enabled supply chain.*

Introduction

In order to remain competitive, organizations need operational and service excellence and organizations need to operate supply chain efficiently [1]. Information Technology (IT) is a key enabler and can achieve breakthrough in the area of supply chain design, configuration and planning [2]. The need is to deploy IT-enabled supply chain to foster collaboration, flexibility, speed and accuracy.

The existing literature on IT-enabled supply chain is non-comprehensive and segregated. This has inspired the authors to do a review of existing literature on IT-enabled supply chain. The main objectives of this study are to analyze and present review on

- Increased interest in supply chain and IT-enabled supply chain
- Factors effecting successful implementation of IT-enabled supply chain

Methodology

The literature has been reviewed from 1999

to 2016, with a total of 40 papers being reviewed. The analysis of journals and books reviewed year-wise is provided in Fig. 1 and the number of journals by publisher (excluding the books) has been detailed in Fig. 2. The details of journals reviewed have been provided in table 1.

Supply Chain Management (SCM)- An Overview

SCM has evolved over years from traditional manufacturing/ distribution model to integrated JIT (Just-in-Time) to Lean manufacturing, cellular operations, mass customization to agile SCM. The focus on supply chain has increased because of the following.

- Organizations are spending as much as three-quarters of their revenue on supply chain activities [3]
- Performance of an organization is enhanced by supply chain responsiveness [4]
- Strategic supply chain relationships helps in increasing market share, improving

time to market and reducing supply chain lead times [5]

- Minimizes monetary risks and increases profits [6]
- Improves responsiveness and flexibility by integrating suppliers and customers [1]
- Enhances sustainable competitive advantage [7]

- Satisfies the needs of the ultimate customers [8]
- Increased external pressures- technology advancement, maintaining lower cost, intensified competition [6]
- Reduces uncertainty and enhance customer service [9]
- Minimizes bull-whip effect [10]

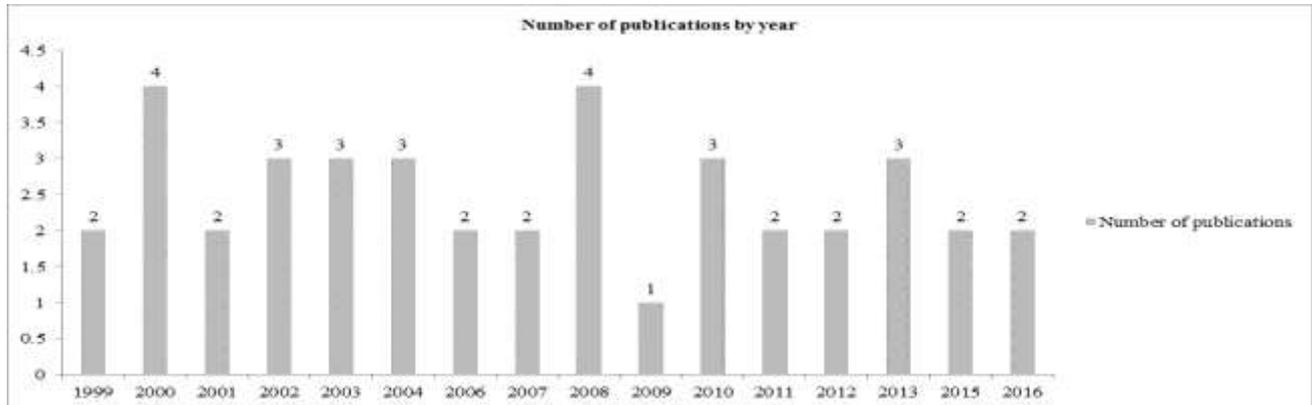


Fig. 1: Number of publications by year

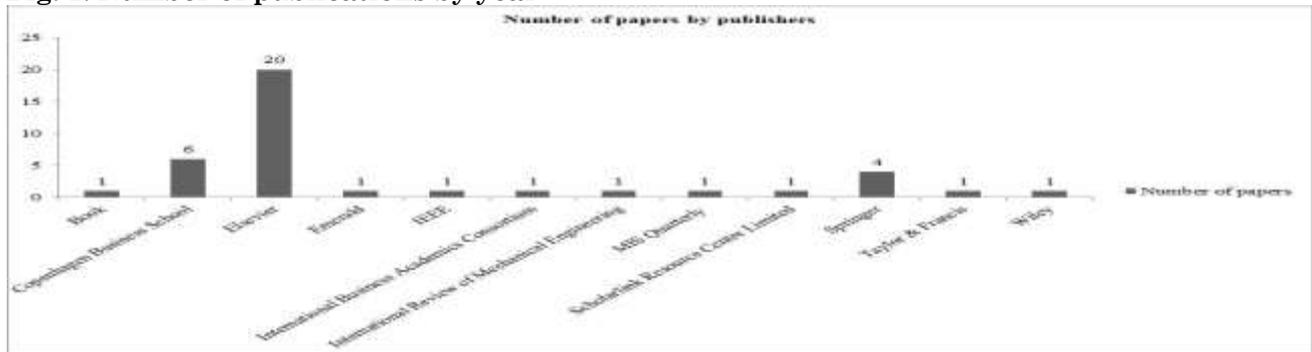


Fig. 2: Number of papers and books by publisher

Table 1: Name of journals considered for review

Business Process Management Journal
Computers in Industry
Copenhagen Business School
Engineering, Construction and Architectural Management
IEEE Transactions on Engineering Management
Industrial Management & Data Systems
Information Systems Frontiers
International Journal Business Information Systems
International Journal of Business and Information
International Journal of Electronic Commerce
International Journal of Information Management
International Journal of Operations & Production Management
International Journal of Physical Distribution & Logistics Management
International Journal of Production Economics
International Journal of Production Research
International Review of Mechanical Engineering
Journal of Business & Industrial Marketing
Journal of Business Logistics

Journal of Emerging Trends in Economics and Management Sciences
Journal of Enterprise Information Management
Journal of Manufacturing Technology Management
Journal of Operations Management
Journal of Organizational Computing and Electronic Commerce
MIS Quarterly
Production Planning & Control
Supply Chain Management: An International Journal
Technovation

IT-enabled Supply Chain

IT-enabled supply chain helps in improving overall competitiveness [11], supply chain performance [12], operational efficiency [13] and financial performance [14] by reducing order cycle time [15] and cost [16]. IT-enabled supply chain also increases collaboration among supply chain partners by sharing workflow, capabilities and information with each other [17]. The previous research has been presented below indicating growing interest in IT-enabled supply chain.

- Helps in harmonization (external and internal IS harmonization within the supply chain) & improving systems [18]
- Brings operational benefits (cost reduction, service improvement) and strategic benefits (innovation, improvement in product planning) [19]
- Growing interest in supply chain collaboration with suppliers and customers [20]
- Visibility across the supply chain [18]
- Reducing non-value added items [1]
- Competitive pressure- more competitors in the industry are adopting advanced technologies and therefore companies are forced to adopt advanced IT in order to remain competitive [21]
- Makes possible development and implementation of a variety of flexible supply-chain design options to provide significant cost and value advantages [22].

Various information systems have been developed to support supply chain functions efficiently. IT's effective usage is in developing a system that operates quickly and efficiently [23].

The systems can be categorized into [24].

- Transactional IT systems- acquire process and disseminate raw data about the company's supply chain and to compile reports to summarize these data. Examples are Enterprise resource planning (ERP), manufacturing resource planning (MRP II), distribution resource planning (DRP), electronic data interchange (EDI), and other e-commerce systems, etc.
- Analytical IT systems- descriptive and normative models for effective decision making within and outside the company. It includes demand forecasting, activity-based costing, developing customer profiles based on point-of-sale data, and various rule-based (or heuristic) decision making models, etc.

Factors Influencing Successful IT Adoption

The implementation of IT-enabled supply chain has various stages. Stage 1 is to gain knowledge about the use of IT tools and technologies, define vision for IT adoption, and formulating strategy for IT adoption [25]. Stage 2 includes activities for problem identification, requirements specification, and evaluation of options and selection of system [26]. Stage 3 includes customization/customer-specific changes [27]. Stage 4 is about maintaining systems, supporting users, and upgradation [28].

The major factors influencing IT adoption in an organization are divided into 3 categories.

Organization Related Factors

- Size of the organization [29] technology activities of the organization are influenced by the size of the organization.
- Type of organization [30]- organizations can be divided into three types

- Reactive- these organizations are satisfying a request from the trading partner. Generally restricted to applying barcodes to finished goods, with perhaps some EDI transactions, etc. These implementations add cost to the business
- Tactical- extend implementation to specific processes within the business to improve efficiencies. Real cost savings are a primary objective
- Strategic- introduce integrated supply chain management techniques across the entire supply chain in a planned and staged manner
- Business of the organization [31] - organizations that have to compete in global markets have higher technology adoption compared to the ones that are operating in local markets only

External Influencing Factors

- Competitive advantage [32]- most significant motivator that determine the level of technology adoption and technology implementation in a firm
- Selecting the right software package [2]- Financial strength, industrial knowledge and experience based strength of software vendors need to be considered while selecting the software package
- Cost of IT adoption [31, 33]- adoption of IT requires significant investment and higher costs prohibit organizations in adopting IT
- Supply chain partners [34, 35, 36]- trust between partners and cultural alignment between organizations influence IT adoption

Employee Related Factors

- Top Management commitment and support [31]- level of involvement of top management for IT-enabled supply chain impacts implementation success
- Understanding the rationale of implementation [37]- Employees must be prepared for the implementation and should understand the rationale for implementation, else it will lead to failure of implementation
- Technical skills of the employees [38]- technical competence of resources working in an organization is key to success of IT-enablement

- End-user involvement [40]- Involving users in the implementation enables it by giving the importance and personal relevance of a system to a user
- Training and education [39]- Proper training and education of end-users is critical for successful implementation

Result and Discussion

The literature review highlights that in order to successfully compete in today's market supply chain plays an important role. In order to have a competitive supply chain, IT plays a key role and organizations need to invest in both transactional and analytical IT systems. Implementing IT-enabled supply chain is a key challenge for practitioners and thus based on the literature review 12 factors impact successful implementation of IT-enabled supply chain.

Some important factors appeared from the literature review have been divided into three broad categories- 'Organization related factors', 'External influencing factors' and 'Employee related factors'. The 'Organization related factors' focus on size, type and nature of business of an organization. The 'External influencing factors' focus on competitive advantage, selecting the right software package, cost of IT adoption and supply chain partners. The 'Employee related factors' focus on top management commitment and support, understanding the rationale of implementation, technical skills of the employees, end-user involvement and training and education.

Conclusion

The main objective of this study was to study the increased interest in supply chain and IT-enabled supply chain along with identification of factors effecting successful implementation of IT-enabled supply chain.

The literature review has helped in presenting the same along with providing future research directions. The paper has collated 12 factors in three categories which impacts successful implementation of IT-enabled supply chain.

The review provides implications for practitioners by providing them a

consolidated list of factors that need to be considered for implementing IT-enabled supply chain. The practitioners need to focus on all three factors- 'Organization related factors', 'External influencing factors' and 'Employee related factors'.

The authors would like to acknowledge the limitations of the current review. The review has analyzed papers from 37 journals and has focused only on 12 factors though the success of implementing IT-enabled supply

chain is dependent on many other factors which have not been considered in this review. Future research can be taken by reviewing other factors along with the use of statistical tools.

Acknowledgments

The authors would like to acknowledge the comments provided by independent reviewers in improving the paper quality.

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