

Responsive supply chain: A competitive strategy in a networked economy[☆]

Angappa Gunasekaran^a, Kee-hung Lai^{b,*}, T.C. Edwin Cheng^b

^aDepartment of Management, University of Massachusetts—Dartmouth, North Dartmouth, MA 02747-2300, USA

^bDepartment of Logistics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, PR China

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Abstract

Supply chain management (SCM) has been considered as the most popular operations strategy for improving organizational competitiveness in the twenty-first century. In the early 1990s, agile manufacturing (AM) gained momentum and received due attention from both researchers and practitioners. In the mid-1990s, SCM began to attract interest. Both AM and SCM appear to differ in philosophical emphasis, but each complements the other in objectives for improving organizational competitiveness. For example, AM relies more on strategic alliances/partnerships (virtual enterprise environment) to achieve speed and flexibility. But the issues of cost and the integration of suppliers and customers have not been given due consideration in AM. By contrast, cost is given a great deal of attention in SCM, which focuses on the integration of suppliers and customers to achieve an integrated value chain with the help of information technologies and systems. Considering the significance of both AM and SCM for firms to improve their performance, an attempt has been made in this paper to analyze both AM and SCM with the objective of developing a framework for responsive supply chain (RSC). We compare their characteristics and objectives, review the selected literature, and analyze some case experiences on AM and SCM, and develop an integrated framework for a RSC. The proposed framework can be employed as a competitive strategy in a networked economy in which customized products/services are produced with virtual organizations and exchanged using e-commerce.

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1. Introduction

Companies are undergoing a revolution in terms of implementing new operations strategies and technologies in response to the challenges and demands of the

twenty-first century. Businesses in the twenty-first century have to overcome the challenges of satisfying the demand of customers for products of a high quality, but low price. To this end, firms need to be responsive to customers' unique and rapidly changing needs. Companies are now seriously exploring the potential of the concept of supply chain management (SCM) to improve their revenue growth. In particular, they are attempting to develop agile supply chains to get their product to market faster at a minimum total cost. Effective SCM is an essential strategy for success in the global and e-markets. SCM incorporates the entire

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* Corresponding author. Tel.: +852 2766 7920; fax: +852 2330 2704.

E-mail addresses: agunasekaran@umassd.edu (A. Gunasekaran), lgtmlai@polyu.edu.hk (K.-h. Lai), lgtcheng@polyu.edu.hk (T.C. Edwin Cheng).

exchange of information and movement of goods between suppliers and end customers, including manufacturers, distributors, retailers, and any other enterprises within the extended supply chain. The responsive supply chain (RSC) addresses new ways of running companies to meet these challenges. RSC represents a global industrial paradigm for manufacturing in the twenty-first century. In a changing and competitive environment, there is a need to develop in a cost effective solutions to organizations and facilities that are highly flexible and responsive to changing market/customer requirements. The objective here is to describe a framework for building a supply chain that is flexible and responsive.

Youssef, Burgess, and Gunasekaran [1–5] have concurred about the need for manufacturers to be flexible and to cater to changing market conditions through “agile manufacturing.” Youssef [1] described agile manufacturing as, “A Manufacturing system with extraordinary capability to meet the rapidly changing needs of the marketplace. A System that can shift rapidly amongst product models or between product lines, ideally in real-time response to customer demands.” AM requires firms to adapt to the strategic requirements of the supply chain. Strategic agility planning requires a strong partnership between suppliers and customers, and information systems for effective supply chain management [6]. Agile supply chain requires the capability to survive and prosper in a competitive environment of continuous and unpredictable change by reacting quickly and effectively to changing markets, driven by customer-designed products and services [3,7].

Agile manufacturing is a natural development from the original concept of “*lean manufacturing*.” In lean manufacturing, the emphasis is on the elimination of waste, where the philosophical emphasis is similar to that of SCM. The requirement for organizations and facilities to become more flexible and responsive to customers led to the concept of “agile” manufacturing as differentiated from the “lean” organization. This requirement for manufacturing to be able to respond to unique demands moves the balance back to the situation prior to the introduction of lean production, where manufacturing had to respond to whatever pressures were imposed upon it, at the risk of compromising on cost, speed, and quality. Therefore, agility should not only be based on responsiveness and flexibility, but also on the cost and quality of goods and services. This requires the integration of AM and SCM to develop a RSC with the objective of achieving agility in a supply chain environment.

Gunasekaran and Yusuf [8] have defined Agility in manufacturing as, “The capability of an organization, by proactively establishing a virtual manufacturing with an efficient product development system to (i) meet the changing market requirements, (ii) maximize customer service level, and (iii) minimize the cost of goods, with an objective of being competitive in a global market and for increased chance of long-term survival and profit potential. This must be supported by flexible people, processes and technologies”.

Considering the implications of AM and SCM, it is essential to develop a strategy that combines the positive features of both of them. This strategy could be called “the responsive supply chain (RSC).” The main objective of this paper is to define what RSC is, and then develop a framework for a RSC based on the review of strategies, methods, and techniques of AM and SCM. For this purpose, the literature available on AM and SCM has been reviewed with the view of identifying the major factors for developing a RSC.

The organization of the paper is as follows: Section 1 presents the introduction to the research subject and its scope and relevance. The concepts and definitions of RSC are presented in Section 2. Section 3 reviews selected literature available on AM and SCM. Some case examples on RSC are presented in Section 4. In Section 5, a framework is offered for developing an RSC. Section 6 concludes the paper.

2. Definition of responsive supply chain (RSC)

Agility is interpreted as using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile market place. This requires the slashing of process lead times and costs throughout the chain. It is not simply enough to enable agility; similar steps must also be taken to reduce information lead times and costs, resulting in the concept of the “information enriched” competitive and responsive supply chain [9]. The five necessary basic functional activities in a value stream include: (1) procurement (maximum purchasing discounts), (2) inbound logistics (low transportation costs), (3) operations (low production costs), (4) marketing and sales (wide product range/high availability), and (5) outbound logistics (low transportation costs).

SCM is defined as the coordination of resources and the optimization of activities across the value chain to obtain competitive advantages. SCM facilitates organizational coordination required in an agile/virtual enterprise. These include: (i) the development of an interconnected information network involving a selected group of trained suppliers, (ii) a successful balance

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