

Market share growth through agile supply chain

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Abstract

Lean and agile are not maturely exclusive approaches and their application should be heuristic. Their marriage might provide competitive advantages. In order to develop the market, application of these approaches simultaneously should consider supply chain flexibility dimensions. Those which have more impact on market share expansion. Flexibility is a key feature of an agile network in uncertainty. In this paper supply chain flexibility extents are introduced. The impact of most important SC flexibility components on firm's performances is explored.

Keywords

Flexibility – Agility - Supply chain management

Introduction

In today's challenging business environment, markets are becoming more and more unpredictable, and products' life cycle are reducing as well. Turbulent and volatile markets are becoming the norm as life cycles shorten and global economic and competitive forces create additional uncertainty (Christopher, M. 2000). Response to unpredictable market demands and customer requirements is a key factor for remaining in this volatile market. Besides, companies' globalization and joint venture requires responsive supply chain to meet customers' demand more than before. A key feature of present day business is the idea that is supply chains that compete, not companies (Christopher et al., 2001). In other words, for being successful, firms must increase their flexibility from an operational level to a strategic, cross-organizational attitude. It is clear that real competition is not firm-to-firm, but supply chain-to-supply chain. (Duclos et al., 2003)

There are many studies about the relation between supply chain flexibility and environmental uncertainty, business performance, and functional interfaces. Also many scholar have stressed that flexibility can improve the company's competitiveness. But managers do not have a comprehensive view of flexibility because they focus more on machine flexibility than on total system flexibility. This does not lead necessarily to competitiveness and leading the market (Sanchez and Perez, 2005). In addition high flexibility in one plant does not mean overall flexibility. All parts of the supply chain have to contribute to this goal. (Dubois et al., 2004)

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Capability to meet customers' demand in ever-shorter delivery time is essential in time based competition era; furthermore, synchronized supply is required to ensure meeting the demand fluctuations. Moreover, nowadays in markets, the recognition of agility is absolutely essential. In contrast, conventional managers have not recognized the importance of logistics and supply chain management as an integral aspect for gaining advantage in the market. Changing in technology and fashion has resulted shorten product life cycle. In this changed environment product, unavailability means losing sale opportunity forever in the event of non-supply. (Christopher et al., 2002)

This paper organized as follow: supply chain leanness and agility from different points of view are presented firstly, and then some Le-agility approaches from defined relevant literatures are discussed. After that, supply chain flexibility dimensions are reviewed and finally, impacts of these components on firms' performance, particularly market share growth, are compared.

Supply chain in competitive market

Competitive advantages would belong to those firms that organize, coordinate, and handle relationship with their partners and hence maintain better, closer, and more agile linkage through supply chain. . According to Christopher et al., (2001), competitive advantage would be result of capabilities of linked businesses that are combined together and we call it supply chain. As a traditional view of business, based on single firm, the supply chain is a fundamental shift in business relationship.

As a result of global economy and shortening product life cycle, it is clear that today markets and customers' demand are more uncertain; therefore, the need for agile respond has grown. Combining these ideas leads us to the conclusion that for being successful in these markets an agile supply chain is required. As Christopher (2000) argues, in today's challenging global markets, the rout to sustainable advantage lies in being able to leverage the respective strength and competencies of network partners to achieve greater responsiveness to market needs.

Lean and agile

Lean and agile are aspects of different approaches in handling and managing the network. As termed by many researchers, lean is doing more with less; it is mainly used in linkage to manufacturing to imply zero inventory just in time approach. In accordance with Christopher et al., (2000), agility is a firm's ability and capability that comprises organisational structure, information systems, and logistics that resulted quickly responds to demands changing and customers' requirements. Flexibility is a key characteristic of an agile organisation. Hence, agility source lies in flexible manufacturing systems (FMS). Webster's dictionary makes the distinction clearly when it defines lean as containing little fat, whereas agile is defined as nimble.

Christopher et al, (2001) explains that Lean concept works will where demand is relatively stable and hence predictable and where variety is low. In contrast, in those contexts where demand is volatile and the customer requirement for variety is high, a much higher level of agility is required. Agility, on the other hand, means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile

marketplace. Leanness means developing a value stream to eliminate all waste including time, and to enable level schedule, also including time that means decreasing lead time. In contrast, agility is the ability of an organization to respond rapidly to changes in demand, both in terms of volume and variety. Agility supply chain is an ability of supply chain that reacts quickly to change in customers' demand. These changes would be in products volume, products variety, or mix of those. [Christopher et al., (2002); (Christopher et al., 2001); Bruce et al., (2004)]

Agility should not be confused with leanness. An important difference is that lean supply is associated with level scheduling, whereas agile supply means reserving capacity to cope with volatile demand. It's not supposed "lean versus agile", but it is the integration of appropriate aspects of these approaches to the particular supply chain. It is interesting to note that when the connection between lean and agile approaches are applied where the strategic intent is to improve responsiveness rather than eliminate waste. It's led to an outcome of increased leanness and improved responsiveness to customers, while falling short of mass customization. [Christopher et al., (2002, 2000); Mc Cullen et al., (2001)]

Recent trends such as outsourcing and mass customization are forcing companies to find flexible ways to meet customer demand. The focus is on optimizing core activities to maximize the speed of response to changes in customer expectations [Duclos et al., (2003); Bruce et al., (2004)] Most of the previous literature on flexibility has focused on internal manufacturing flexibility. As supply chain flexibility would also include the internal ability of a firm to be flexible, manufacturing flexibility research can be used to help determine the components of supply chain flexibility. (Duclos et al., 2003)

The agile supply chain is market driven. Market sensitive means that the supply chain is capable and responding to real demand. Most organizations are forecast-driven rather than demand-driven. In other words, because they have little direct feed-forward from the marketplaces, they are forced to make forecast based on past sales or shipments, and convert these forecast into inventory. It is important that the characteristics of demand are recognized in the design of supply chains. However, it is not necessarily the case that a supply chain should be either lean or agile. Instead, a supply chain may need to be lean for part of the time and agile for the rest. Hence, inventory will be in the form of finished product. The aim of the agile supply chain should be to carry in a generic form-that is, standard or semi finished products awaiting final assembly or localization. This is the concept of postponement, a vital element in any agile strategy. (Christopher, M. 2000)

It has been suggested that an agile supply chain has a number of characteristics; market sensitive, which is closely to end customer, Virtual, which is based on shared information across whole chain, network based that specialist actors application brings flexibility, and process aligned where is high degree of interconnectivity between nodes. (Christopher et al., 2004)

Complexity is one of the important obstacles to structure an agile supply chain, which is dramatically increasing as firms' growing and developing their market. This complexity comes through brand proliferation and also can come from firms'

bureaucracy that has grown up over the time. Reducing complexity is one way to enhance agility through business process re-engineering.

According to Hammel et al. (2002), the result from HP's CD-RW supply chain re-engineering, the business was able to save \$50m annually. This would eliminate non-value added activities; organization structure and process, production complexity, non standard components and human resource development that lead to train multi-skill personals and encourage working in cross functional teams.

Whereas information transparency is desirable in a lean approach, it is obligatory for agility. Lean forecasting is algorithmic, but agile forecasting requires shared information on current demand captured as close to the marketplace as possible. Real world supply chains are cyclical in character. This means that this year's market winner is next year's market qualifier. (Christopher et al., 2000) Application of the market winner or market qualifier framework suggests that we may need to operate with the meanest agile system or the most responsive lean system. (Christopher et al., 2002)

Now the comparison of lean and agile approach has been explained, in the next section the new concept based on both aspects is introduced

Marring the leanness and agility, "Le-agile"

Lean and agile can co-exist, even in same site and there could be properly managed. It has been proved that combining these paradigms will provided affordable and available product for customers. This co-exist has termed "Leagile" concept. There are many ways to unite these two paradigms, which are discussed hereafter. [Bruce et al., 2004; Christopher et al (2001); Aitken, J. (2000); Christopher, M. (2000)]

Pareto approach, which is applied an analysis of the firm will show 80% of total volume will be generated only by 20% of products (figure I). It could be argued that top 20% of products are more predictable and they can be leaded by lean principle, while on the other hand, the rest of the products could be lead by agile approach. (Christopher et al., 2001)

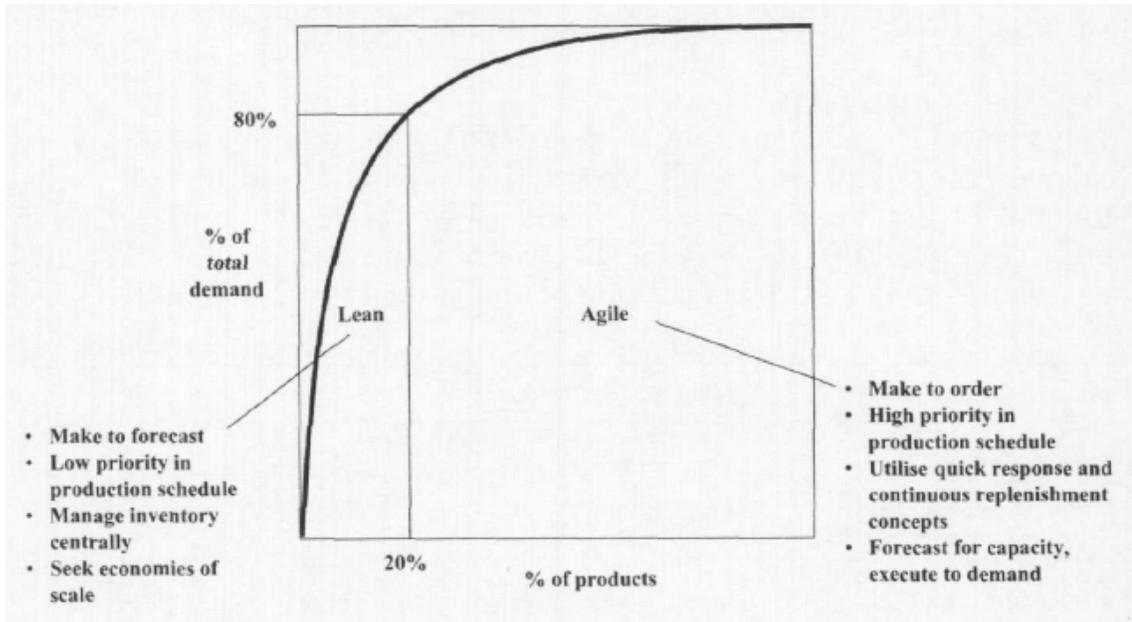


Figure I: Pareto distribution
 Source: Martin Christopher; Denis Towill. 2001

De-coupling point approach, that has been argued as Leagile application (figure II), is the idea that holds inventory in some module and then is completed to final product when the customer requirement and need is known. In the other words, inventory could be hold in the form of semi-finished products waiting for clearance of final assembly to meet local customer’s customization. Leagile view combines lean and agile approach at a decoupling point for optimized SCM. This is the concept of postponement, which is widely implied by many organisations in a range of industries. (Christopher et al., 2001; Bruce et al., 2004; Christopher, M. 2000; Christopher et al., 2000)

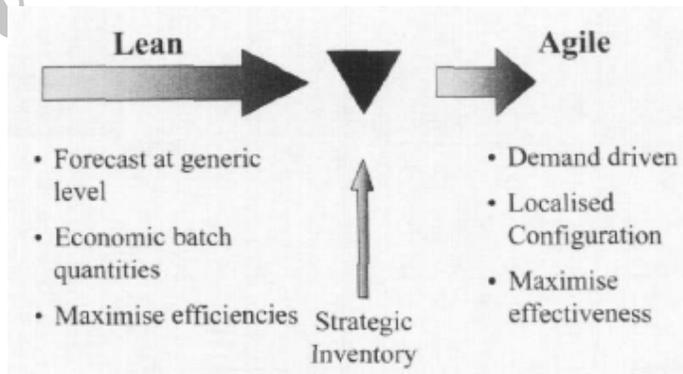


Figure II: The decoupling point
 Source: Martin Christopher; Denis Towill. 2001

Other hybrid strategies that implied lean and agile paradigm are based on separating demands into ‘*Base and surge*’. Where base demand can predict from past pattern history and apply lean concept to meet economy of scale; whereby surge demand cannot typically predicted and used agile principle for these surge demand products that usually are flexible and high cost process (figure III). There is many company employed

this procedure like Zara, Benetton, National Bicycle (Christopher et al., 2001), or Next. (Christopher et al., 2002)

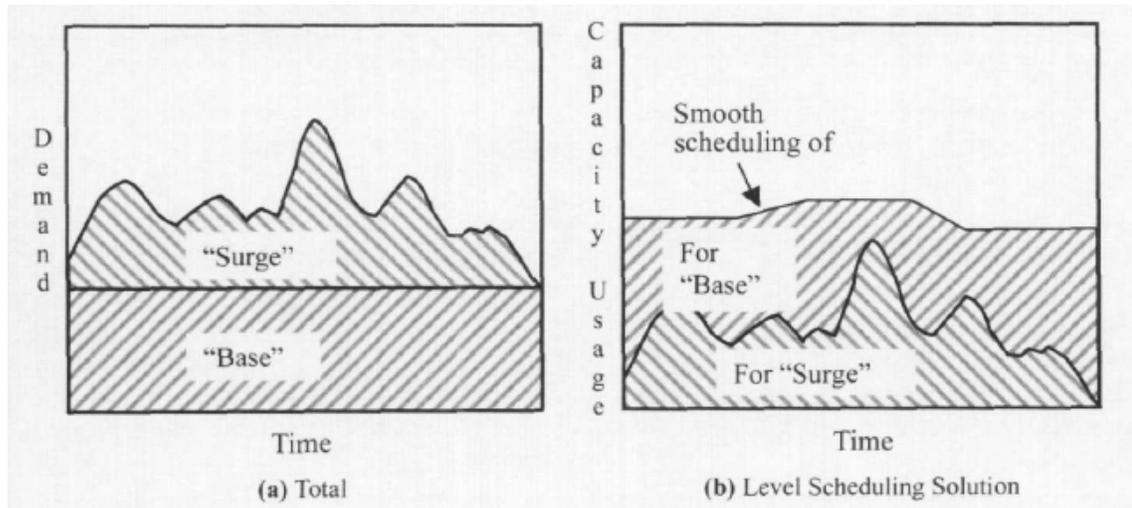


Figure III: Base and surge demands
Source: Martin Christopher; Denis Towill. 2001

In this section some of the most important strategies regarding to Le-agility was described. Application of these approaches might be useful for designing a responsive supply chain. Moreover, achieving market share growth through agile supply, needs underlining supply chain flexibility aspects. Hereafter supply chain flexibility components from different perspective are discussed.

Supply chain flexibility dimensions

As discussed above, flexibility is a key characteristic of agility. Many operation literatures describe several type of flexibility that is related to customer focused supply chain. The first flexibility as describe in many references is *product flexibility* or as many other definition, customization. Product flexibility is a value-adding attribute that is visible to customers. Some of researchers define product flexibility as ability to handle difficult, non-standard orders and to meet special customer requirements through product with specific and numerous features. Achieving this flexibility requires an effective collaboration among others functions; like marketing, product design and development, and engineering. (Vickery et al., 1999; Sanchez and Perez, 2005) In another point of view, this dimension of flexibility is termed as *operation system flexibility*, which is defined as the ability to customize processes to reflect customer trend in every node through supply chain. (Duclos et al., 2003)

The second type of flexibility in operation literature is *volume flexibility*, the ability to effectively meet customer demand by changing products aggregation. This flexibility impacts customer respond by preventing out of stock condition for products that are in high demand period. This would be a quick increase or decrease production in order to meet customer demands for unusually rapid response products. (Vickery et al., 1999; Sanchez and Perez, 2005) Also this dimension has been termed *supply flexibility*,

competency to reconfigure supply chain related to customer's demands or the capacity to quickly expand the capabilities of a given product mix. It is ability to be operated profitably at different overall output levels. (Eric P. et al., 2003; Duclos et al., 2003)

Strategic emphasis on fashion product or goods, which has short life cycle, is response to customer as quick as possible. This is described as *launch* or new product flexibility, it would be a competitive advantage to introduce product as first competitors into the market. The ability to quickly introduce many new products with different variety is significantly important to flexibility that requires integrated activities entire supply chain. (Vickery et al., 1999; Sanchez and Perez, 2005) In some literatures this flexibility is termed as *market flexibility* that is ability to mass configure in designing and modifying products and have close relationship with customers. (Duclos et al., 2003)

The leading firms clearly understand the importance of collaboration in the new product development process and work closely with their suppliers to reduce complexity, cut cost and lead time, and be innovative to remain competitive as product matures. Improving new product launch capability is very important for companies and they imply demand driven supply network (DDSN) framework (Figure IV) in order to maintain competitive advantages in volatile markets. (Burkett, M. 2005)

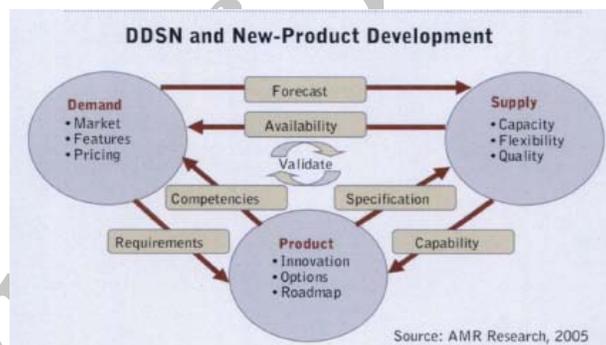


Figure IV: Demand Driven Supply Network
Source: Burkett, M. 2005

Another crucial supply chain flexibility dimension with high impact on distribution is *access flexibility*, or *distribution flexibility* (Vickery et al., 1999; Sanchez and Perez, 2005), this is considered as ability to provide intensive distribution coverage. This dimension enables company to provide their product close to the customer. Access flexibility is facilitated by close coordination between supply chains downstream. In the other words, it's described as *logistics flexibility* which is ability to cost effectively receives and deliver product as source of supply and customer change. (Duclos et al., 2003) As appropriate, closer to customer means closer in time more than distances. (Christopher et al., 2002)

Other flexibility side refers to responsiveness to target market, or *responsiveness flexibility*. This is a firm's ability to leverage supply chain capabilities to meet exceeded customer needs. (Vickery et al. 1999; Sanchez and Perez, 2005) Moreover, there are other components defined as supply chain flexibility aspect, like *organizational flexibility* which is competency to align labours and same resources to coverage supply chain requirement to meet customer needs. Another component of supply chain flexibility is *information flexibility* that considers changing information in supply chain to reconfigure infrastructures to meet customer's requirements (Duclos et al., 2003). Besides, Sanchez and

Perez (2005) present other three flexibility dimensions; *Trans-shipment*, *Postponement* and *Sourcing*.

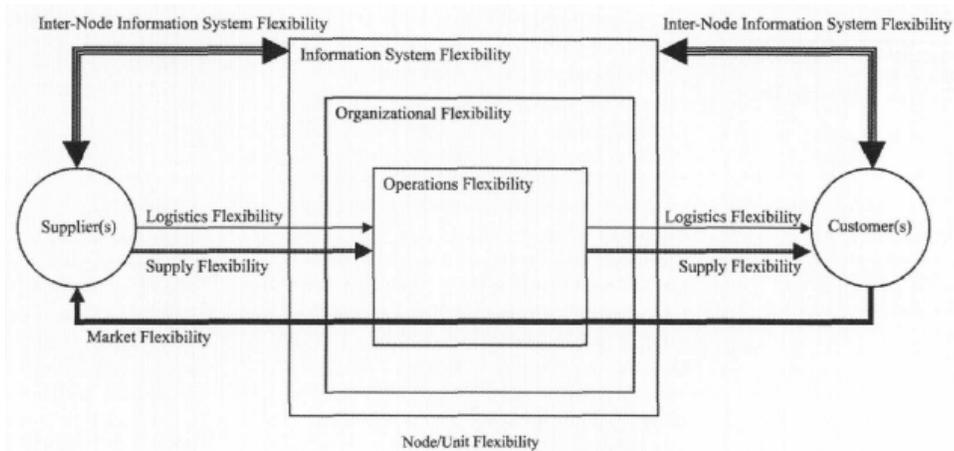


Figure V: Supply Chain flexibility's components

Source: Duclos et al., (2003)

At this point different dimensions of supply chain flexibility have been mentioned. These dimensions influence on firm performances. In next section the impact of these components on firm's performance are underlined.

Supply chain flexibilities and firm performance

Supply chain flexibilities should be measured from an integrative, customer-oriented view. Vickery et al. (1999) presented analysis of supply chain flexibility in furniture industry and its relationship to firm performance, which are product, volume, launch, access, and responsiveness. These dimensions are applied to evaluate the impact of Supply Chain flexibility components on firm's performance. As it can be seen in table I, volume, target market and launch flexibility have the highest correlation with market share growth.

The relationship between SC flexibility and firm performance in Furniture industry						
Flexibility Dimension	Firm Performance					
	ROI	ROI Growth	Market Share	Market Share Growth	ROS	ROS Growth
Product	0.26	0.12	0.06	0.14	0.01	-0.05
Volume	0.28	0.26	0.36	0.41	0.22	0.27
Launch	0.29	0.42	0.21	0.28	0.15	0.23
Access	0.16	0.14	0.30	0.16	0.20	0.07
Target market	0.34	0.47	0.18	0.36	0.21	0.36

Table I (correlation between supply chain flexibilities and firm performance)

Source: Vickery et al. 1999.

Similarly, Sanchez and Perez (2005) explored the relationship between the dimensions of supply chain flexibility and firm performance in automotive supplier industry. They found a positive relation between a superior performance in flexibility capabilities and firm performance, although different dimensions of flexibility are not equally important for firm performance. Table II shows this relation.

The relationship between SC flexibility and firm performance in Automotive supplier industry						
Firm Performance \ Flexibility Dimension	ROI	ROI Growth	Market Share	Market Share Growth	ROS	ROS Growth
Product	0.494	0.359	0.390	0.341	0.259	0.236
Volume	0.266	0.151	0.239	0.290	0.209	0.226
Launch	0.321	0.360	0.585	0.597	0.315	0.455
Access	0.425	0.322	0.405	0.457	0.310	0.320
Target market	0.352	0.357	0.393	0.350	0.209	0.192

Table II (correlation between supply chain flexibilities and firm performance)
Source: Sanchez and Perez, 2005

It is significantly that launch flexibility and target market flexibility are considerably important for growth-related performance. However Volume flexibility stands as the highest importance for market share growth in furniture industry, it has the lowest impact on market share for automotive supplier industry. On the other hand, Access flexibility is considerable important for automotive supplier industry, while it is unimportant for furniture industry. These indicators are important not only in market share side but also in financial aspect. In addition, volume flexibility and launch flexibility incorporate time-based performance. This clearly shows that time-based competitive approaches are crucial to meet the customers' requirements rapidly. These supply chain flexibility dimensions, which have most affects on market and customers, are results of effective coordination and capabilities consideration.

Reflection

It is important to stress that organizations need to evaluate their performance affected by supply chain flexibility aspects. There are some characteristics of the supply chain that enhance the company's flexibility performance. While some of these characteristics are not overall influenced by the company's strategy and policies, others may be positively influenced. Moreover, customer perspective and agile strategies should be included in the measurement. As a result, companies can develop their market by deploying these consequences, and they can also include some basic flexibility dimensions at shop floor level that impact on firm performance as well.

In this paper Lean approach, agile strategy, and Le-agile, a mélange of both argued. Then, different aspects of flexibility in supply chain and their relationships with firm' performance discussed. It is clear that marketing strategies that underpinned by an agile supply chain will be successful.

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