

## AGILE SUPPLY CHAIN: COMPETING THROUGH COMPETITIVE EXCELLENCE

**Lina Anatan**

*Faculty of Economics, Universitas Kristen Maranatha*

### **Abstract**

*Global competition characterized by changing customer and technological requirement. To cope with this instability conditions, companies need to focus on cost and quality advantage. They are undergoing business efficiency and effectiveness through reassessing internal business operation such as purchasing, warehousing, material management and distribution. Speed, quality, and flexibility are being emphasized as a competitive excellence of responding to the customer's need. To become more responsive to the needs of customer and market require more than speed, it also requires a high-level maneuverability that has come to be the term agility. Agility in supply chain is one of the solutions to achieve competitive advantage as it provides many opportunities for reducing operating cost and improving customer service and satisfaction. In other words, the agility of a supply chain shown how well the relationships involved in the processes mentioned enhance the objectives of agile manufacturing. These objectives are customer enrichment ahead of competitors, achieving mass customization at the cost of mass production, mastering change and uncertainty through routinely adaptable structures, and leveraging the impact of people across enterprises through information technology.*

**Keywords:** *leanness, agility, agile supply chain, competitive excellence*

### **INTRODUCTION**

Today's market is turbulent and volatile. Global competitors operating in global markets almost always tend to have world-class performance. To be a world class manufacturer, they need three core strategies of customer focus, quality and agility and six supporting competencies consist of employee involvement, supply management, technology, product development, environmental responsibility and employee safety, and corporate citizenship (Kinni, 1996). Companies need to focus on cost and quality advantage to cope with market instability characterized by changing customer and technological requirement. They are undergoing business efficiency and effectiveness through reassessing internal business operation such as purchasing, warehousing, material management and distribution. Speed, quality, and flexibility are being emphasized

as competitive excellence to respond customer's need.

The important of time as a competitive weapon and the ability to meet customer and market demand with shorter delivery times is important and has been recognized in this circumstance. Several companies are stressing flexibility and agility in order to response to the unique needs of customer and markets. Getting the right product, at the right price, and at the right time to the consumer is not only crucial to competitive success but also the key to survival. These are crucial elements for consideration when attempting to establish a new supply chain strategy. Having the right product available, in the right place at the right time, enables the business to compete in this volatile market-place. However, the resources competencies required are often difficult to mobilize and retain by single companies.

In face of that circumstance, cooperation particularly important for innovation and leverage core resource competencies amongst themselves. In other words, supply chain management needed to achieve competitive advantage as it provides many opportunities for reducing operating cost and improving customer service and satisfaction. Williamson et al. (2004) defined supply chain management as the management of interconnection of organization which relate to each other through upstream and downstream linkage between the different process that produce value in the form of product and services to the ultimate consumer.

To become more responsive to the needs of customer and market require more than speed, it also requires a high level maneuverability that has come to be the term agility. This paper discusses the relationship between agility and leanness, agility attributes as sources of competitive excellence two models of supply chain management, and how to become an agile supply chain?

#### **THE RELATIONSHIP BETWEEN AGILITY AND LEANNESS**

A company is characterized as agile if it is flexible and can respond relatively quickly to customer orders, modest changes in production volume and schedule changes. This agility copes with changes in customer requirements including price, quality, customization, and promised delivery dates (Christian and Zimmers, 1999). Agility is a business-wide capability that embraces organizational structures, information systems, logistics processes and in particular, mindsets (Power et al., 2001). Agility is being defined as the ability of an organization to respond rapidly to changes in demand, both in terms of volume and variety (Christopher, 2000).

Agility relates to the interface between the company and the market. The

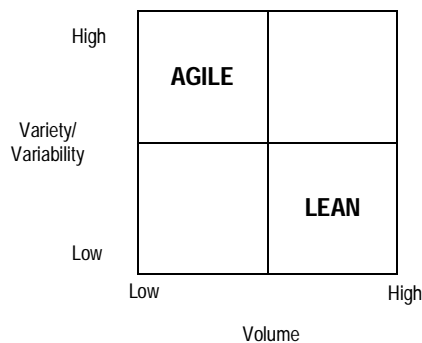
market conditions in which many companies operate are volatile and it has unpredictable demand, hence the increased urgency to search for agility. Essentially, it is a set of abilities for meeting widely varied customer requirements in terms of price, specification, quality, quantity and delivery. Agility has been expressed as having four underlying principles consist of delivering value to the customer, being ready for change, valuing human knowledge and skills, and forming virtual partnerships (Katayana and Bennet, 1999).

The concept of agility is different from leanness, but there is a relationship between both of them that can be explained in this paper. Lean is about doing more with less. Lean concepts work well where demand is relatively stable and hence predictable and where variety is low. Conversely, in those contexts where demand is volatile and the customer requirement for variety is high, a much higher level of agility is required. The term is often used in connection with lean manufacturing to imply a “zero inventory” just-in-time approach (Christopher, 2000). He said that many companies that have adopted lean manufacturing as a business practice are anything but agile in their supply. Lean manufacturing has demonstrated the broad potential of the elimination of waste in improving business performance. The emphasis is associated with reduced inventory.

The relationship between agility and leanness can be explained that leanness may be an element of agility in certain circumstances, but it will not enable the organization to meet the precise needs of the customers more rapidly as seen in Figure 1. Figure 1 suggests three critical dimensions of variety, variability, and volume that determine which approach, agile or lean, make greatest sense. The lean and agile paradigms, though distinctly different, can be and have been combined within successfully designed

and operated total supply chains (Mason-Jones and Towill, 1999). The need for agility and leanness depends upon the total supply chain strategy, particularly considering market knowledge, via information enrichment, and positioning of the decoupling point. Agility is needed in less predictable environment where demand is volatile and the requirement for variety is high, while leanness is work best in high volume, low variety and predictable environment.

**Figure 1.** Agile or Lean Condition



**AGILITY ATTRIBUTES: SOURCES OF COMPETITIVE EXCELLENCE**

Business environment as the source of turbulence and change impose pressures on the business activities of the company. These uncertainties, unpredicted changes, and pressures urge companies to approach appropriate ways that could lead to a stable position and protect from losing their competitive advantage. In this circumstance, companies have to become an agile organization and require some agility capability as sources of competitive excellence. Agility is a strategic approach towards success with regard to the new and different rules and circumstances of the modern and post-modern business environment

The agility capabilities propose the essential of abilities that would provide the

required strength for responding to changes, and the agility providers which so-called capabilities could be achieved and supposed to be sought from four major areas of the manufacturing environment. These areas are organization, people, technology, and innovation. It is strongly believed that creation of the mentioned providers would not be possible without attempts to integrate the whole set, and also without a powerful support of information system/technology.

The capabilities that an agile organization should have to be able to make appropriate response to changes in its business environment are divided into four major categories. The first category is *responsiveness*, the ability to identify changes and respond fast to the changes, reactively or proactively, and recover from the changes. It includes three items as follows: 1) sensing, perceiving and anticipating changes, 2) immediately reaction to change by effecting them into system, and 3) recovery from change.

The second category is *competency*. Competencies are means the extensive set of abilities that provide productivity, efficiency, and effectiveness of activities towards the aims and goals of the company. Following items form the capability structure: strategic vision, appropriate technology (hard technology and soft technology), or sufficient technological ability, products/services quality, cost effectiveness, high rate of new products introduction, change management, knowledgeable, competent, and empowered people, operations efficiency and effectiveness (leanness), cooperation (internal and external), and integration.

The third category is *Flexibility*: Which is the ability to process different products and achieve different objectives with the same facilities. It consists of items such as: product volume flexibility, product model/configuration, flexibility, and organizational issues flexibility, and people flex-

ibility. *And the last category is Quickness* which is the ability to carry out tasks and operations in the shortest possible time. It include items such as: quick new products time to market, products and services delivery quickness and timeliness, and fast operations time.

#### **SUPPLY CHAIN MODELS: LEAN AND AGILE SUPPLY CHAIN**

A key feature of today's business is that it is supply chains that compete, not individual companies (Christopher, 1992), and the success or failure of supply chains are determined in the market-place by the end consumer. Getting the right product, at the right price, at the right time to the consumer is not only the key to competitive success but also to survival. The most important elements for consideration when attempting to establish a new supply chain strategy are customer satisfaction and market-place understanding. Companies require a supply chain model that deals with strategic and customer issues to cope a rapidly changing business environment, organizations those are lean supply chain and agile supply chain.

Both lean supply chain and agile supply chain require high levels of product quality and minimum total lead times. Lead time is defined as the time taken from a customer raising a request for a product or service until it is delivered. Total lead time has to be minimized to enable agility, as demand is highly volatile and thus difficult to forecast. If a supply chain has long end-to-end lead time then it will not be able to respond quickly enough to exploit market-place demand. (Towill, 1996).

Lead time needs to be minimized in lean manufacturing as by definition excess time is waste and leanness calls for the eli-

mination of all waste. Enhanced responsiveness is important as an addition to the high level of efficiency in cost, quality and smooth operations flow, which have been associated with lean supply chains. These primary objectives of a lean supply chain can be realized by using the most basic forms of data communication on inventories, capacities, and delivery plans and fluctuations, within the framework of just-in-time (JIT) principles (Womack et al., 1990). The aim of integration is to ensure commitment to cost and quality, as well as achieving minimum distortion to plans, schedules and regular delivery of small volumes of orders. Table 1 illustrates the comparison of attributes between lean and agile supply chain.

Based on Table 1, we can conclude that lean supply chain focused on cost reduction and flexibility for already available products. Employs a continuous improvement process to focus on the elimination of waste or non-value added activities across the chain. Primarily aims at cost cutting, flexibility and incremental improvements in products. As the rate of market change increases, the lean supply chain approach has evolved into "multiple niche competition," Customer requirements are continuously evolving and product life cycles are growing shorter, therefore, along with being lean, supply chains must respond to the market. Agile supply chain focused on understanding customer requirements by interfacing with customers and market and being adaptable to future changes. Aims to produce in any volume and deliver to a wide variety of market niches simultaneously. Provides customized products at short lead times (responsiveness) by reducing the cost of variation.

**Table 1.** The Distinguish Attributes between Lean and Agile Supply Chain

Distinguishing Attributes	Lean Supply Chain	Agile Supply Chain
Market demand	Predictable	Volatile
Product variety	Low	High
Product life cycle	Long	Short
Customer drivers	Cost	Lead time and availability
Profit margin	Low	High
Dominant costs	Physical Cost	Marketability cost
Stock out penalties	Long term contractual	Immediate and volatile
Purchasing policy	Buy goods	Assign capacity
Information enrichment	Highly desirable	Obligatory
Forecast mechanism	Algorithmic	Consultative
Typical product	Commodities	Fashion good
Lead time compression	Essential	Essential
Eliminate	Essential	Desirable
Rapid reconfiguration	Desirable	Essential
Robustness	Arbitrary	Essential
Quality	Market qualifier	Market qualifier
Cost	Market winner	Market qualifier
Lead time	Market qualifier	Market qualifier
Service level	Market qualifier	Market winner

Sources: Naylor et al. (1999), Mason-Jones et al. (2000)

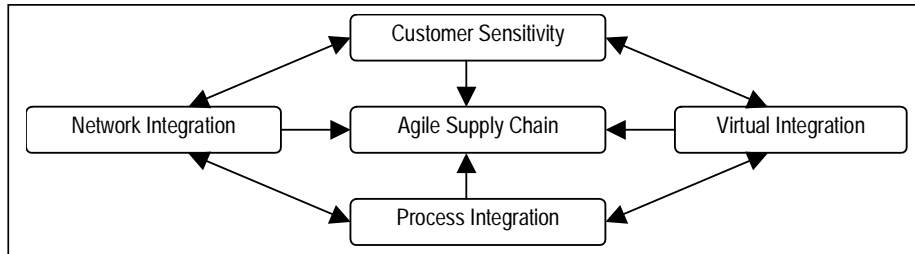
**CRITICAL DIMENSIONS OF AGILE SUPPLY CHAIN**

To achieve long term competitive advantage, companies must focus on critically important influences on customer satisfaction such as product quality, order cycle time, new product development time, customer complaints, and market position. Companies adopting agile strategy need to balance the elements of long-term competitive planning and adaptability to market requirements and supply chain alliances.

A review literature on operation management discussed supply chains in terms of long-term upstream collaboration with suppliers, downstream collaboration with customers, and lateral collaboration with competitors as a means of integrating the total value creation process. A supply chain describes the series of linked activities amongst companies that contribute to the process of design, manufacture and delivery of products and services. The agility of a supply

chain is a measure of how well the relationships involved in the processes mentioned above enhance four pivotal objectives of agile manufacturing (Hoek et al., 2001). These objectives are customer enrichment ahead of competitors, achieving mass customization at the cost of mass production, mastering change and uncertainty through routinely adaptable structures, and leveraging the impact of people across enterprises through information technology.

Hoek et al. (2001) identified four dimensions of agile supply chain practice shown in Figure 2. Those are: 1) Customer sensitivity through continuous enrichment as against focusing on waste elimination. 2) Virtual integration, with emphasis on instantaneous response in addition to stable production flows, 3) Process integration through self-managing teams as against work standardization and conformance, and 4) Network integration through “fluid” clusters of associates who venture into temporal opportunities.

**Figure 2.** Element of An Agile Supply Chain

Source: Hoek et al., 2001

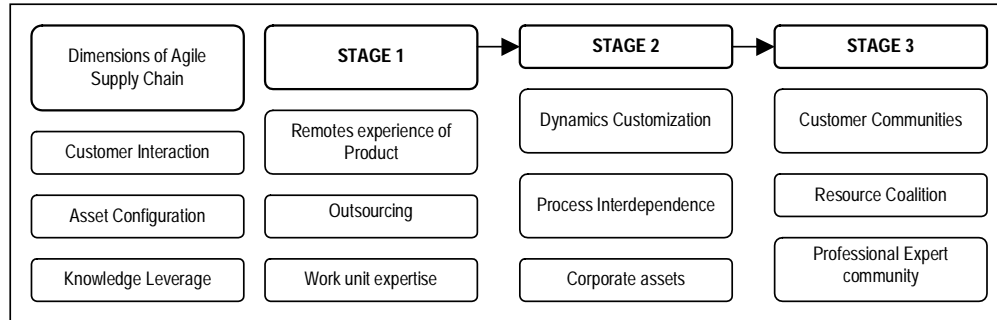
Customer sensitivity means that collaborative initiatives should be driven by quick response to customer requirements. The agile supply chain should be sensitive not only to the customer but also to the markets, it means that the supply chain should have capability in reading and responding to the real demand. It required integration and specialization based on relative areas of excellence in core competencies. Network integration requires that companies in the chain have a common identity, which can range from commitment to agile practices, compatibility of structure, information architecture and tradable competencies. The use of information technology is needed to share data between buyers and supplier. It has an effect in creating a virtual supply chain that was information-based rather than inventory based. Virtual integration, the third dimensions, envisages access to information, knowledge and competencies of companies through the Internet. The last dimension of agile supply chain is process integration. It means collaborative working between buyers and suppliers, joint product development,

common systems, and shared information. The inter-dependence in supply chain integration is needed, so that core modules of products can be delegated within networks of agile competitors. In this process, shared information between supply chain partners can be fully leveraged.

#### **HOW TO BECOME AN AGILE SUPPLY CHAIN?**

As discuss in the section before, to be an agile supply chain, a supply chain require a number of critical dimensions, they are: 1) Customer sensitivity, 2) Virtual integration, 3) Process integration, and 4) Network integration. Venkatraman and Henderson (1998) argue that agility and capability of a supply chain can be assessed in terms of the stage attained on three interdependent dimensions of supply chain maturity. The three dimensions are shown in Figure 3 as customer interaction, asset configuration and knowledge leverage. The challenge of an agile supply chain is how to improve and ensure balance across the three dimensions.

**Figure 3.** The Dimensions and Stages of Supply Chain Maturity



Source: Venkatraman and Henderson, 1998

The three stages of supply chain maturity can be used to evaluate progress on each of the three dimensions of supply chain agility. The first dimension of supply chain agility is customer interaction. At the first stage of remote experience of products, includes efforts to reach out to customers through sales catalogues, television demonstrations and, most recently, web-based advertisements, demonstrations and shopping (Yusuf et al., 2004). The objective of this first stage is to help company to identify clusters of unique preferences for dynamic customization at the second stages. Dynamic customization can be targeted at communities of customers on the third stage. Community of customers must have strong commitment to customer-specified product upgrades rather than variety as an end in itself (Yusuf et al., 2004). If the third stage has been achieved, the more rapidly in introducing technology product will be achieved.

The second dimension of supply chain agility is asset configuration. As for the first dimension, customer interaction, the asset configuration dimension matures from emphasis on outsourcing to business process interdependence, then it mature to resource coalition. The progress from first stages of commercial outsourcing of materials and components to business process interdepen-

dence means delegating critical business processes to members of a chain rather than outsourcing. Spatially distributed and interdependent business processes mature into resource coalitions. At this stage, companies will contribute and share knowledge and competence within global networks of resources, and focus on limited areas of the value creation processes where comparative advantage is higher (Yusuf et al., 2004).

The third dimension of supply chain agility, knowledge leverage, requires advance from emphasis on work unit expertise or individual job competencies and structures, to corporate assets or team. It also required free flow of tacit knowledge across work units that should extend to entire value chains as joint stakeholders in the process of conceiving, creating and delivering value. The most important thing in this stage is that a company aims to leverage competencies not only internally amongst its own employees and teams, but also within a globally linked but spatially distributed professional community of experts.

From the discussion above we can conclude that the target locus of action in the dimensions of supply chain agility would extend from task units to organization units and to inter-organizational units across the three stages of maturity towards virtual organizing. Across the three stages as well,

performance objectives would mature from operating efficiency through economic value added, to enhanced survival prospects (Venkatraman and Henderson, 1998). Enhance agility in supply chain will be the development of human resources strategy that leads to multi-skilling and encourages cross-functional working. In other words, team-based management has been demonstrated [19] to be a highly effective facilitator of organizational agility.

### CONCLUSION

The current market-place environment in which organizations conduct their business is both dynamic and complex. To compete in such a turbulent business environment, companies have to adapt and change in order to survive and to achieve sustainability.

Meeting customers' needs requires that all of these selected strategies to be integrated so that the total business may operate successfully. Speed, quality, and flexibility are being emphasized as a competitive excellence of responding to the customer's need. the development of agile supply chains will effects amongst internal resource competencies of intelligent automation, teaming and training. The negative interaction or compensation effects limited their impacts on competitive excellence and objectives, change drivers of agile supply chain, and business performance. The attrition between teaming and intelligent automation, as well as between teaming and training compel development of external competencies in the drive for enhanced competitive performance

### REFERENCES

- Christian, P.H., Zimmers Jr., E.W., (1999), Age of Agile Manufacturing Puts Quality To The Test. *Quality Progress* 32 (5), 45–51.
- Christopher, M. (1992), *Logistics & Supply Chain Management*, London, Pitmans.
- Christopher, M., Towill, D.R., (2001), “An Integrated Model For The Design of Agile Supply Chains”, *International Journal of Physical Distribution and Logistics Management* 31 (4), 235–246.
- Hoek, R.I., Harrison, A., Christopher, M., (2001), “Measuring Agile Capabilities In The Supply Chain”, *International Journal of Operations and Production Management*, 21 (1/2), 126–147.
- Katayama, H., Bennett, D., (1999), “Agility, Adaptability and Leanness: a Comparison of Concepts and a Study of Practice”, *International Journal of Production Economics*, 60, 43–51.
- Kinni, T. B. (1996), *America's Best: Industry Week's Guide to World-Class Manufacturing Plants*. New York, Wiley.
- Mason-Jones, R., Naylor, B., Towill, D.R., (2000), “Engineering the Legible Supply Chain”, *International Journal of Agile Management Systems* 2/1, 54–61.
- Mason-Jones, R., Towill, D.R., (1999), “Total Cycle Time Compression And The Agile Supply Chain”. *International Journal of Production Economics* 62, 61–73.
- Naylor, J.B., Naim, M.M., Berry, D., (1999), “Leagility: Integrating The Lean And Agile Manufacturing Paradigms In The Total Supply Chain”, *International Journal of Production Economics*, 62, 107–118.



- Power, D.J., Sohal, A.S., Rahman, S., (2001), “Critical Success Factors In Agile Supply Chain Management: An Empirical Study”, *International Journal of Physical Distribution and Logistics* 31 (4), 247–265.
- Towill, D.R. (1997), “The Seamless Supply Chain The Predator’s Strategic Advantage”, *International Journal of Technology Management*, 13, (1), pp. 37± 56.
- Venkatraman, N., Henderson, J.C., (1998), Real Strategies For Virtual Organisations. *Sloan Management Review* (Fall), 33–48.
- Yusuf , Y.Y., Gunasekaran , A. Adeleye , E.O., Sivayoganathan, K. (2004), “Agile Supply Chain Capabilities: Determinants Of Competitive Objectives”, *European Journal of Operational Research* 159, 379–392