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Transformation of supply chain management to agile supply chain management: Creating competitive advantage for the organizations

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Abstract

Agility and resilience have become increasingly important in recent years as sudden shocks to the supply chain have become more frequent.

To improve the level of integration to increase the level of agile supply chain operations, coordinated supply metrics, supplier collaboration in product design, trust between suppliers are required, coordination within the organization, correspondence of information within the organization, products design based on interaction and sharing common interests are highlighted.

When there is no integration and synchronized process of the supply chain, the relationship between the company and the supplier is poor, the distribution becomes unequal and the customer is not satisfied, which will lead to failure of business. To stay sustainable in time-based competition, companies must have a supply chain that responds to customer demand for shorter lead times and can meet expectations during times of high demand.

Keywords: Supply Chain Management; Agile Supply Chain; Competitive Advantage; Competitive Strategies

1. Introduction

The business, economic and political environment is increasingly subject to unexpected shocks and disruptions. Many of the strategic problems facing companies today are rooted in: new rules of competition, globalization, downward pricing pressure, and customer takeovers.

An agile supply chain is ready delivering items and services quick, accomplishing cost-saving even as doing so, being flexible to adjustments in marketplace situations and purchaser needs, and hold the general productiveness of the organization. At instances organization's capability to innovate current items and services in a manner to higher healthy client needs and the way quickly it may enforce this innovation is likewise an essential element of the agile supply chain.

Companies want to have properly installed inner concepts in place that can function a reference factor to have green and efficient agile supply chain management. These concepts can be primarily based totally on a marketplace examine and evaluate of all preceding conditions while the commercial enterprise faces many problems withinside the management of its supply chain management. These concepts need to permit the organization to make short adjustments to its system without disturbing various elements of the organization [1].

This paper explores the concept of supply chains agility to contribute for competitive advantage.

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2. Supply Chain Management (SCM)

Supply chain management has three main components

- (a) Creating the supply chain network structure,
- (b) Developing supply chain business processes, and
- (c) Managing operations of the supply chain

D. M. Lambert and M. C. Cooper [2] explored the structure of the supply chain network consists of member companies and the links between these companies. Key members of a supply chain include all independent businesses or strategic business units that perform value-added activities in business processes designed to produce a specific outcome for a particular customer or market. Support members are companies that simply provide resources, knowledge, utilities, or assets to key members of the supply chain. Examples of supporting businesses include businesses that lease trucks to manufacturers, banks that lend money to retailers, or businesses that supply production equipment, print marketing brochures, or provide administrative support.

A business can be located at or near the original source of supply or near the end customer, or somewhere between these ends of the supply chain.

Business processes are activities that create a specific outcome of value for the customer. Management functions integrate business processes throughout the supply chain. Traditionally, in many companies, the upstream and downstream parts of the supply chain have not been efficiently integrated. Today, competitive advantage increasingly depends on the integration of eight key supply chain processes - customer relationship management, customer service management, demand management, order fulfillment, process Manufacturing, sourcing, developing and marketing products and managing profits - under an efficient value delivery network [3].

As for the supply chain management function itself, in some companies management emphasizes the functional structure, in others the process structure, and in others still a combination of processes and functions. The number of business processes needed or beneficial to integrate and manage between companies will likely vary. In some cases, it may be appropriate to link a critical process, and in other cases it may be appropriate to link some or all of the key business processes. However, on a case-by-case basis, it is important for leaders to analyze and discuss in depth the key business processes for integration and management. With the shift from the traditional “push” model to the modern “pull” model, supply chain management has changed: e-commerce integration has resulted in (a) greater cost efficiency, (b)) flexible distribution, (c) better service, and (d) the ability to track and monitor shipments.

3. Agility

Agility cannot be defined as the simple ability to change, but it can be defined as the cultivated capacity that enables an organization to respond to environmental change in a timely, efficient and effective manner [4].

Agility is also strategically relevant; they do not pursue change for the sake of change, but they also pursue it for competitive advantage. The agile environment is unpredictable [5].

Growing demand, changing usage, and changing raw materials can create agile development that enables organizations to work with agile behaviors [6].

Depending on the field of activity, the agile principles control agile development [7].

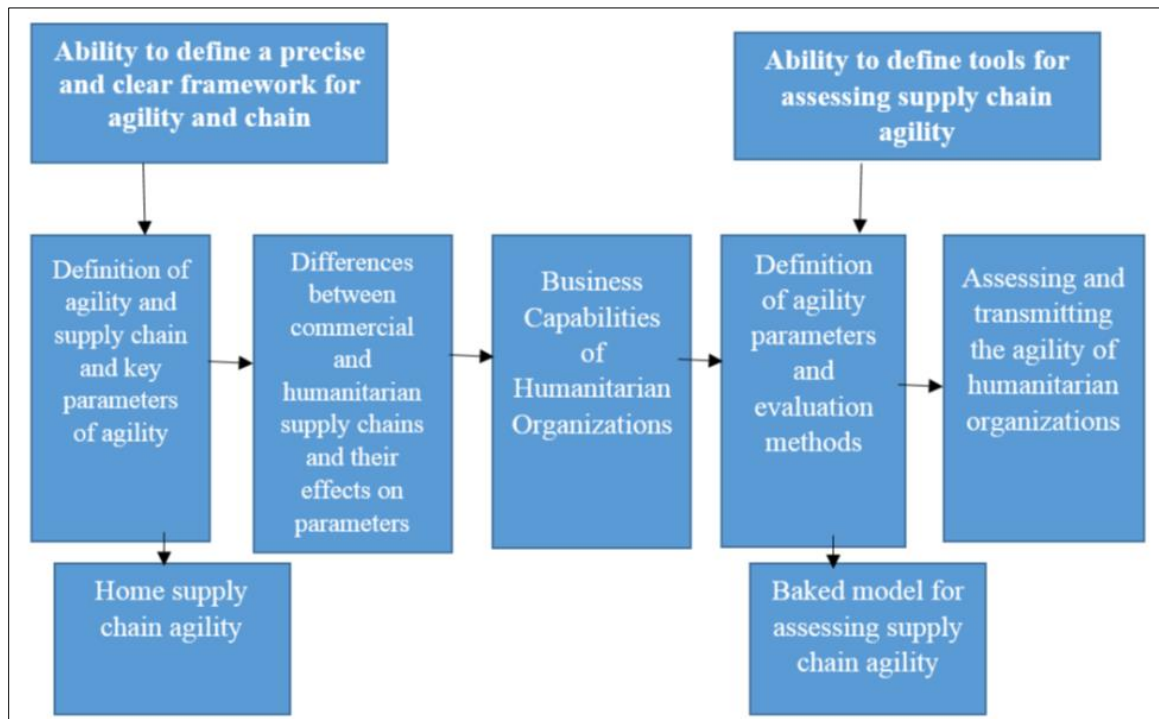
Agile development works on agile engines whose mission is to bring about changes in the business environment. Agile drivers drive changes in organizational strategy. Agility is based on agile drivers and provides the ability to model from a set of inputs and adapt to changes in business processes. Agile enablers are responsible for making environments affected by other environments [6].

Agile rules can be defined based on agile development, which will indicate a way to change very quickly in a changing environment [8].

4. Agile management

Agile management includes the implementation of activities related to the diversification strategy, providing products that consumers cannot find elsewhere. Responding quickly to changes in demand is paramount. This activity in logistics involves the use of agile and agile operations to provide an outstanding level of service to the end customer [9]. It can be measured as follows: the ratio of products delivered to the order, the number of errors made in the sorting process, the ability to "cancel" the order, the percentage of orders that are 100% complete on demand, damage levels, discounts due to non-compliance with delivery deadlines, ease of preparation of goods according to orders, etc. This strategy enables you to respond to threats such as short delivery times, changes in demand, and natural disasters. It needs to be pointed out. From the point of view of the supply chain, each problem is related to logistics indicators, which can be caused by many different reasons. For example, late deliveries to customers can be the result of poor logistics, but also due to poor demand forecasts, production problems, road works, traffic jams, and carrier strikes. Often, logistics providers are blamed for failures in different parts of the system [9]. Agility is especially important when product life cycles are shorter, market needs change faster, and needs become more sensitive. This is also the best way to satisfy more demanding customers because there is less risk of customer dissatisfaction, less risk of lost orders and too slow response. However, agility has its own risks, e.g. it needs free space to ensure the flexibility of operations and it reduces productivity [10].

Waters D.[9]points out that agility has two aspects. First is the speed of response, agile organizations have close relationships with customers and respond quickly to customer requests. The second is the ability to connect logistics to specific customer needs. This principle is based on the importance of the customer, obviously without the customer there would be no commercial organization, no income, no profit, no activity and would no longer be an organization [11]. A. Charles [12] in his doctoral thesis inspired by humanitarian organizations searched for the effective factors of agility in business organizations [13]. A step-by-step overview of Charles's search solution is shown in Figure 01. He argues that intermittent work in an environment of high uncertainty has prompted aid organizations to specialize in agile systems. Profitable organizations have ten things to learn from these organizations. Volatility in demand, imbalance between production and demand and uncertainty are factors that have a negative impact on trade supply chains, requiring a high degree of agility [14].



Source: [13].

Figure 1 Step-by-step diagram of Charles's research solution

5. Agile Supply Chain (ASC)

A. Charles [15] has observed that the best companies create supply chains that can react to sudden and unexpected changes in the market. Agility, the ability to react quickly and cost-effectively to unexpected changes, is essential because in most industries, supply and demand fluctuate faster and more widely than in the past. In fact, the best companies use agile supply chains to set themselves apart from their competitors. For example, Zara has become the most profitable clothing brand in Europe by building agility in every link of its supply chain. At one end of the product process, Zara created an agile design process. As soon as designers spot possible trends, they create sketches and order fabrics. This gives them a foot in their competition as fabric suppliers claim the longest lead times. However, the company only approved the design and started production after receiving feedback from its stores. This allows Zara to create products that cater to the tastes of consumers and reduce the number of items they have to sell at a discount. At the other end of the supply chain, the company has created a super-efficient distribution system. Partly as a result of these decisions, Zara has grown by more than 20% annually since the late 1990s, and its double-digit net profit margin is enviable in the industry.

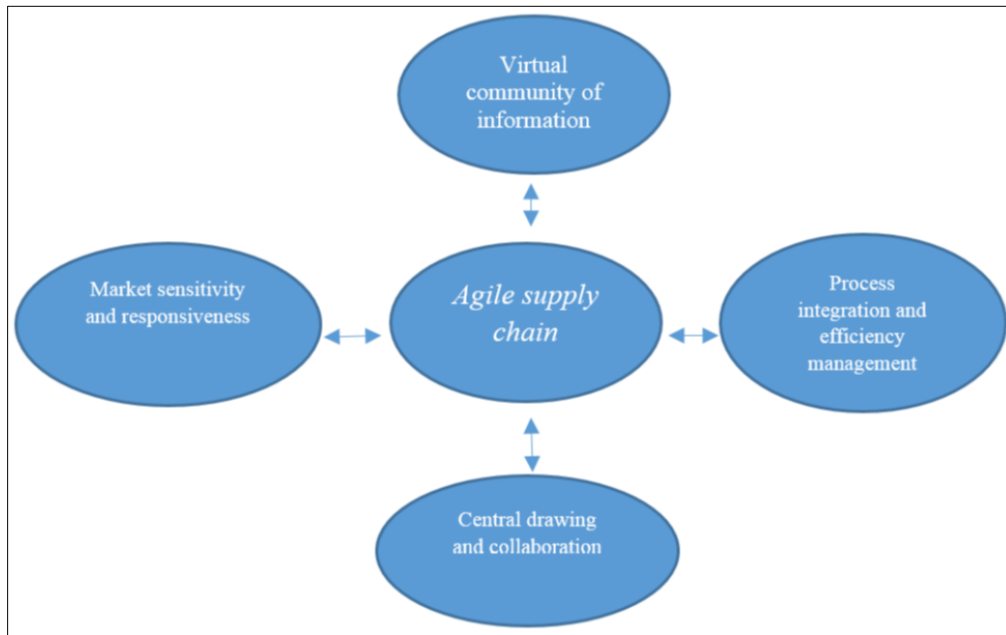
Agility and resilience help supply chains recover more quickly from these sudden setbacks. In September 1999, an earthquake hit Taiwan, shipments of computer components to the United States were delayed for weeks and in some cases for months. Most computer manufacturers such as Compaq, Apple and Gateway failed to deliver products to customers on time and suffered losses. One exception is Dell. The company changed prices for PC configurations overnight to shift consumer demand away from hardware built with components that weren't available to machines that didn't require those parts. Dell is able to do this because they already have backup plans in place. It's no surprise that Dell has gained market share after the earthquake [16].

Supply chain agility and resilience is no longer just about the ability to manage risk. It now assumes that the ability to manage risk means being better positioned than the competition in terms of weather and even benefiting from disruption. The key to increasing agility and resilience is building flexibility in structure, process, and supply chain management [17].

Steve Banker [18] reported several companies have been the subject of articles showing their agility during the pandemic. Here are some of the processes, strategies, and technologies that have enabled these companies to quickly adapt to significant changes in their demand patterns:

- A global supply chain - companies with operations in China, where the pandemic began, began to prepare for Covid in other regions faster than companies.
- Dual Supply - a supply chain should be designed so that there is no point of failure.
- Strong Demand Forecast - Forecast of falling demand during recession. Demand forecasting solutions at a granular level, using machine learning and using downstream data in their forecasting, have forecasts that can improve faster in response to a changed environment.
- Logistics network and risk visibility - a real-time data-driven supply chain collaboration network solution is key here. Agile companies can predict when a country is about to close and get products out of that region before they are blocked.
- Companies with strong Sales and Operations Execution (S&OE) Processes - Supply chain organizations often work around a planning boundary that separates long-term - consistent plans with project needs to deliver in the coming months - and execute operations (S&OE) - plan and deliver what the customer needs in the coming days or weeks.
- Concurrent Planning - These solutions are the key technology supporting mature S&OE processes. Simultaneous planning aligns the execution plan with the integrated long-term business plan. When new short-term plans are created, the link to the revenue and profit targets based on the original IBP plan is immediately visible.
- Agile Project Process - Agile involves continually making small changes, more often, receiving feedback, and then rapidly adapting based on feedback. While companies have to adapt their processes to new conditions, companies with agile processes adapt more quickly.
- Strong relationships with key business partners - the goal is to be the preferred partner with major suppliers, contract manufacturing partners and major carriers. Agility and leverage are linked. A business with an agile supply chain can start making money faster as demand changes. But on its own, agility isn't enough to help a business survive a slump in demand. In short, resilience is a business strategy. Agility reflects the design, process, and technology of the supply chain.

The most popular supply chain model that numerous researchers have quoted is the Harrison, Christopher, and Van Hook models, comprising the four main features listed in Figure 02 [19]



Source: [20]

Figure 2 Typical Characteristics of agile supply chain

Supply chain flexibility is also one of the issues identified in the project's supply chain. Agility means both speed and flexibility, which can be used as a competitive advantage in a supply chain to increase the value of the entire chain. Flexibility and adapting to customer needs is common to most of the studies [21].

In the field of flexible supply chains, the first explanation of the field is management, defined by four components: planning, organization, people and food. In this area, indicators such as team planning, team goal setting, participatory design and product grouping, optimal resource utilization, procurement alignment of supply chain partners, the use of transport models, organizational structures, cross-industry cooperation, employment of multi-skilled employees, employee engagement, quick and smart decision making, and reduced hierarchy organizations should be considered components. To improve the management level in the field of agile supply chain is worthy of attention.

The strategic production and service variables are the ultimate explanation that in this regard it is necessary to focus on competitiveness, providing interoperability, integrating partner capabilities, investing in innovation, Prospect research, strategic vision, inventory management, continuous improvement and the use of quality control systems [22]. Companies' links to their suppliers will depend more on the supply chain, especially when the production of products is complex and highly dependent on the supply chain, such as in the industrial sector. As a result, the competitive unit shifts away from individual firms for the supply chain [23].

Manufacturers are faced with increasing customer demand for product customization, improved quality and responsiveness [16].

To address this, companies are working with their suppliers and customers to streamline operations to reduce production costs, shorten lead times, and reduce inventory levels by how to integrate and synchronize different operational processes [24].

In addition, the ability to manage market changes, in a way that meets customer requirements but at an acceptable cost, is known as supply chain agility [25].

6. Supply Chain Management to Supply Chain Agility

The foundation of SCM begins with Forrester's study of system dynamics, arguing that the value creation process should not be limited to individual companies, but that the value creation process should extend boundaries of companies and the integration of business processes within the company and between partners. A supply chain is a series of approaches and practices for moving goods from raw materials to finished products to the end user. The researchers came up with the idea SCM from different angles. The researcher suggests that a company's SCM performance is affected by the level of supplier involvement [26].

The target company's ability to adjust production and manufacturing depends on its ability to rapidly change key aspects such as quantity and delivery time. Supply chain agility, which represents a company's ability to quickly adjust its tactics and operations, allows manufacturing and manufacturing companies to adapt to a wide range of products and sudden changes in demand, volume of products, and detect and respond to changing market needs. Therefore, understanding how supply chain agility affects performance is an important conceptual contribution to the study of how companies can efficiently produce and deliver in the face of challenges with fluctuating demand, dynamic markets and short life cycles of some products. However, there is little empirical research focusing on the relationship between agility and supply chain performance [27].

In this article, we explain how the presence of specific supply chain practices and information processing capabilities can have a positive impact on agile supply chain strategy and chain performance, we contribute to research that explores how businesses can produce for different needs and markets. The paper's first theoretical contribution is to capture the complementarity between the ASC strategy and specific SC practices, thus providing insight into how the ASC strategy can improve SC performance through mediating effects of these practices. We expand on existing studies that mainly focus on antecedents about supply chain agility or its impact on the financial performance of the target company. A second theoretical contribution includes showing that the agile capabilities of Information System (IS), made possible by the existence of applications in the focal company, facilitate information sharing with stakeholders, suppliers and partners, help analyze the market and introduce new products, and help analyze possible future scenarios, stimulating these mediating effects. In examining the role of IS in the supply chain, previous research has examined inter-organizational concepts such as trust, collaboration, innovation, and knowledge sharing [28].

Such effects have been described in the literature by A. F. Hayes [29] such as "Indirect effect may depend on the moderator variable" or "Indirect effect of X (independent) on Y (dependent) at M (intermediate) exists only in the presence of V (regulator there)". Statistically, this means that if we want to study the effect of X on Y through an intermediate variable M, this relationship, if it is not significant, can become so when adding a moderator. From our results, this means that for customer relationships effectively analyze the relationship between ASC strategy and SC performance, support and amplification effects of the system. Information systems that allow monitoring of changes in market conditions, sharing information with customers and introducing new products are needed. Such an IS supports the processes of collecting, aggregating, and analyzing data on customer needs and preferences, which drive business efforts to increase confidence, satisfaction, and customer loyalty [30].

If practicing supplier partnerships might be necessary, the delay seems to be part of it. Therefore, there are good reasons to develop these practices for focal companies with ASC strategies. At the same time, the presence of IS agility, i.e. the existence of applications in the focal company to facilitate information sharing with suppliers and partners, helps in market analysis and Introducing new products and helping to analyze possible future scenarios, are also needed to further improve SC's performance. A perhaps useful caveat here. While a focal enterprise can deploy applications that can provide the functionality required for rapid IS capability, this functionality may not be realized in practice due to the lack of similar IS across vendors. . For example, vendors may not have the technological sophistication required to implement IS capabilities for agility, may have applications that do not support IS capabilities for agility, or may have data standards and interfaces are not compatible. Therefore, IS's alignment between the lead company and its suppliers is crucial for the IS's capacity for agility to be useful. In other words, the practice of customer relations by itself may not produce superior SC performance from the ASC strategy, unless the agility of IS is also present. Therefore, applications that facilitate information sharing with suppliers and partners, help analyze the market and introduce new products, and help analyze possible future scenarios are necessary for customer relationships to strengthen the positive link between ASC strategy and SC performance. Therefore, based on these findings, we propose that the question of how to realistically improve SC performance from an ASC strategy through SC and IS practices that facilitate agility, requires careful consideration of specific situations and complementary relationships [31]

7. Agile Supply Chain Management

Due to the increasing development of the market and the shortening of product life cycles, it is now more difficult for companies to forecast future demand [32].

As a result, it is increasingly recognized that agility enables us to respond effectively to the ever-changing and highly competitive business environment and has become a necessary condition for competitiveness [33].

This is reflected in the Agility Forum's definition of agility as "an organization's ability to thrive in an ever-changing and unpredictable business environment." Simply put, an agile company has designed its organization, processes, and products so that it can react to change in a timely manner" [34].

The original concept was popularized in 1991 by a group of scholars from the Iaccoca Institute at Lehigh University, USA, and it is of interest to scholars and scholars. It is now widely accepted as a strategy for companies to better match supply and demand. Focus on Exit, R. Gehani [35] asserts that an agile organization can respond to customer orders quickly, can regularly introduce new products in a timely manner, and can even enter strategic alliances quickly. This implies a system of rapid change (speed and responsiveness) between product models or between product lines (flexibility), ideally in real time responding to customer needs (customer needs and wants) [36].

The external requirements for the supply chain to become more responsive and to adopt an agile strategy have been summarized by A. Reichhart and M. Holweg [37] as follows:

- Uncertain demand - This is the primary requirement to be met. For example, a 100% reliable request will greatly reduce the need to respond. An important factor here is schedule instability, which is especially important for industries that operate on a schedule.
- Change in demand - Often closely related to demand uncertainty, but conceptually different. In this situation, even if the request is 100% reliable, significant changes in the volume of the request may still require responsiveness.
- Product variety - Product variety adds to demand uncertainty and can directly increase demand for mixed availability. A large number of products increases the cost of using finished goods inventory to fulfill orders.
- Compression of lead times - This directly increases the demand for fulfillment, as there is less time to fulfill customer orders. [38]

The lifecycle of an agile product is very short and the response time is also short. The uncertainty and complexity of using the SCM parameter can increase the external vulnerability of SCM. As the vulnerability of external parameters increases, supply chain flexibility decreases to limit complexity and uncertainty. Increased agility can be achieved by applying changes to a mix of long-term and short-term commitments. Adaptability can be defined as long-term agility.

The main objective of supply chain agility is to respond to short-term or rapid changes in demand. It is also about gentle management of external disturbances [39].

The agile supply chain is very responsive to the market.

It has main features like

- Virtual integration of physical inventory verification is suitable for widely sharing supply and demand information between buyers and suppliers.
- Deep process integration between partner actions, detailed demand information allows between buyer and supplier.
- Supply chain partners working together can create competitive networks with their end customers. These skills can be defined as agile or lean.
- The growth of the niche market, more and more new products, its lifespan and the changing situation of many markets can affect the development of SCM.
- Rapidly changing markets, rising costs, international competitiveness and short new product development times can result in a short rapid development lifecycle.
- Changing customer or custom requirements, increasing quality expectations, and minimal lead time can create operational vulnerabilities.

- New efficient production facilities, system integration, and introduction of new technology may affect the development of a product or service.
- Environmental protection, workplace expectations, regulatory pressures and working styles can create changes in the development and use of supply chain value.
- Based on changes, new integrations of existing processes can affect the rapid growth of the organization.

As specified in the operation of the SCM, some internal parameters of the SCM system may be affected. Supply chain composition can be divided into basic segments such as sourcing, manufacturing, and delivery. This component can act as inbound and outbound supply chain logistics [40].

As defined in the agile concept, this parameter should be differentiated into fast triggers (E), fast capabilities (C) and fast engines (D). Depending on the range, different settings will work with different areas shown in the different modules listed below. This parameter helps to find out whether the operation of the system is agile in an expected or unexpected environment [41].

- Strategy (E): A partnership strategy that helps suppliers share information and ensure supply security through flexible contracts.
- Possibility (D): Change of requirement information is to upgrade or downgrade a requirement affecting productivity of product system
- Customization (D): This is the value-added content of the product according to the new requirements of stakeholders or resources.
- Speed (C): This shows the completion of activities in the shortest possible time for the developed product/service i.e. delivery time
- Sensitivity (C): It gives sensitivity to display output response time
- Productivity (D): It shows how effective activities are if changes occur and outputs are effective.
- Flexibility (C): It allows to adapt to expected and unexpected changes in activities
- Interoperability (E): It shows the dependencies between different modules as measured by interoperability.
- Integration (E): It shows how the collaboration of the flow of matter, communication and information affects the interaction between processes, products and suppliers.
- Visibility (D): It provides the ability to access information from other modules
- Self-organizing (E): Self-organizing module stream with variable conditions
- Modularity (C): Allows changes to affect the modular structure of the process.
- Scalability (C): The process can scale when applied to changes in production
- Durability (E): Modules can withstand the worst conditions.

8. Agile Supply Chain and Competitive Advantage

The turbulent market conditions of the 21st century have increased the need to develop more competitive strategies for growth [42].

Value is not inherent in the product or service, but is perceived or experienced by the customer. So, to be competitive in creating value for customers, a company must understand and deliver value that is considered important by customers. By satisfying customers and gaining competitive advantage, companies in the supply chain

8.1. Competitive Advantage

M. E. Porter [43] explained that competitive advantage takes place within the scenario of a corporation. A corporation has a services or products this is refereed with the aid of using its goal marketplace clients to be higher than the ones of its competition. It is the gain a business enterprise has over its competition, acquired with the aid of using providing customers with extra cost, thru decrease prices, or with the aid of using imparting great blessings and offerings which can be extra appropriate for better prices. The overall desires of SCM are to create cost for clients, competitive advantage and enhance profitability for corporation's within the deliver chain, cost elements that may be critical to clients and effects into benefit in competitive advantage and enhance profitability. Within a business enterprise, patron cost is created thru collaboration and collaboration to enhance efficiency (fee reduction) or marketplace efficiency (extra benefit) in approaches which can be maximum precious to the client.

Influence clients to make alternatives and behave in approaches that enhance the financial overall performance of deliver chains and deliver chain corporations.

8.2. Competitive Strategies

M. E. Porter [43] explored that a firm's relative function in an enterprise is dictated with the aid of using its desire of competitive advantage (manage of fee as opposed to differentiation) and its desire of scope for opposition. The scope of opposition distinguishes between corporations that focus on large enterprise segments and companies that target a slim segment. Generic strategies are beneficial due to the fact they characterize strategic positions on the handiest and broadest levels.

There are one of a kind dangers inherent in every general method, however being "the entirety for everyone" is a surefire recipe for mediocrity - getting "caught withinside the middle". Thus, a company can create a competitive advantage via:

- Cost leadership: A cost advantage takes place while a business enterprise gives the equal offerings as its competition at a decrease cost.
- Differentiation: The advantage of differentiation takes place while a business enterprise gives extra offerings on the equal charge than its competition. These are together referred to as place benefits due to the fact they denote a corporation's function in its enterprise as an advanced provider or fee leader.
- Focus: A focused technique includes that specialize in a slim competitive advantage as opposed to the enterprise as a whole.

8.3. Aligning Agile Supply Chain to Competitive Strategies

In this turbulent market environment, it's critical to outline the marketplace, the character of the goods and offerings, the marketplace winners and the marketplace eligibility elements to decide the method. As stated withinside the document, the first-rate deliver chain method to apply to satisfy patron expectancies while call for is unsure is an agile deliver chain. In an unsure commercial enterprise environment, competitive benefit is completed whilst you pick out the drivers of change, be agile, adaptive and responsive via an agile deliver chain method; and align your deliver chain method with the general commercial enterprise method to benefit competitive advantage, as defined below. The riding force of change: The essential driving force of agility is change.

To compete and manage an unstable market, companies are looking ahead beyond costs. Customers are becoming more demanding, with their unique needs and changing market conditions forcing companies to focus on speed, quality and flexibility. The basic resources required to manage and mobilize market demand are becoming more and more difficult for management companies. In such an environment, companies are under pressure to cooperate and control the underlying resources among themselves while competing with each other. Therefore, cooperation between parties in the supply chain is important for companies to provide greater responsiveness at the very planning stage [44]. Time is considered a competitive weapon and has long been recognized [45].

Managing customer demand for shorter lead times and a commitment to meeting uncertain peak demand is critical in time-based competition [46]. Meeting market needs that demand speed, reliability and sustainability.

It also requires a high degree of flexibility, sensitivity and accessibility, what is now known as "Agility". The need for businesses to respond to customer needs, changing competitive stages, and an ever-widening ecological anarchy are fueling enthusiasm for the idea of "agile" [47]. Supply Chain Management (SCM) helps companies integrate their business activities by working with partners to meet unexpected customer needs. A synchronized supply chain that can reduce uncertainty can effectively meet customer needs [48].

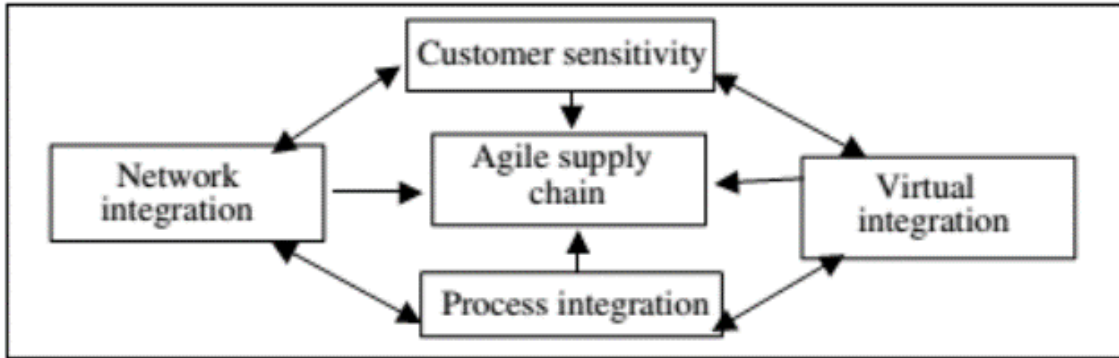
Supply chains are considered to be responsive to the market and require a high degree of flexibility [49]. This requires organizations to work together to build an integrated supply chain network focused on supporting end-user needs, regardless of the performance standards they adopt. In this way, the goal of agility is to build a seamless supply chain (SSC), in which "all actors think and act as one" [50]. Thus, all physical and regional boundaries are removed to facilitate the rapid flow of materials, money, property and information. "Agility means using virtual society and market knowledge to exploit profitable opportunities in a volatile market" [51].

C. Wu and D. Barnes [52] developed a supplier selection model in a flexible supply chain, which is a four-way feedback model. Vendor selection takes place in four stages, namely 1) preparation for partner selection 2) pre-sorting 3) final selection 4) comment on the application; dynamic feedback model for supplier selection in a flexible supply chain. Christopher [25] determined that a company with an agile supply chain can respond to changes in volume and demand patterns.

A supply chain must have the following characteristics to be "really agile":

- Market Sensitivity - It refers to an organization's close connection with its end users and their demand trends
- Virtual: At the heart of this feature is the integration of the entire supply chain for a smooth flow of information between partners
- Network-based - it focuses on achieving agility using the skills of professional supply chain participants
- Process integration: Achieve a high degree of inter-process connectivity between chain members

R. Ivan Hoek, A. Harrison and M. Christopher [53] had identified four dimensions of agile supply chain practices (Figure 03):

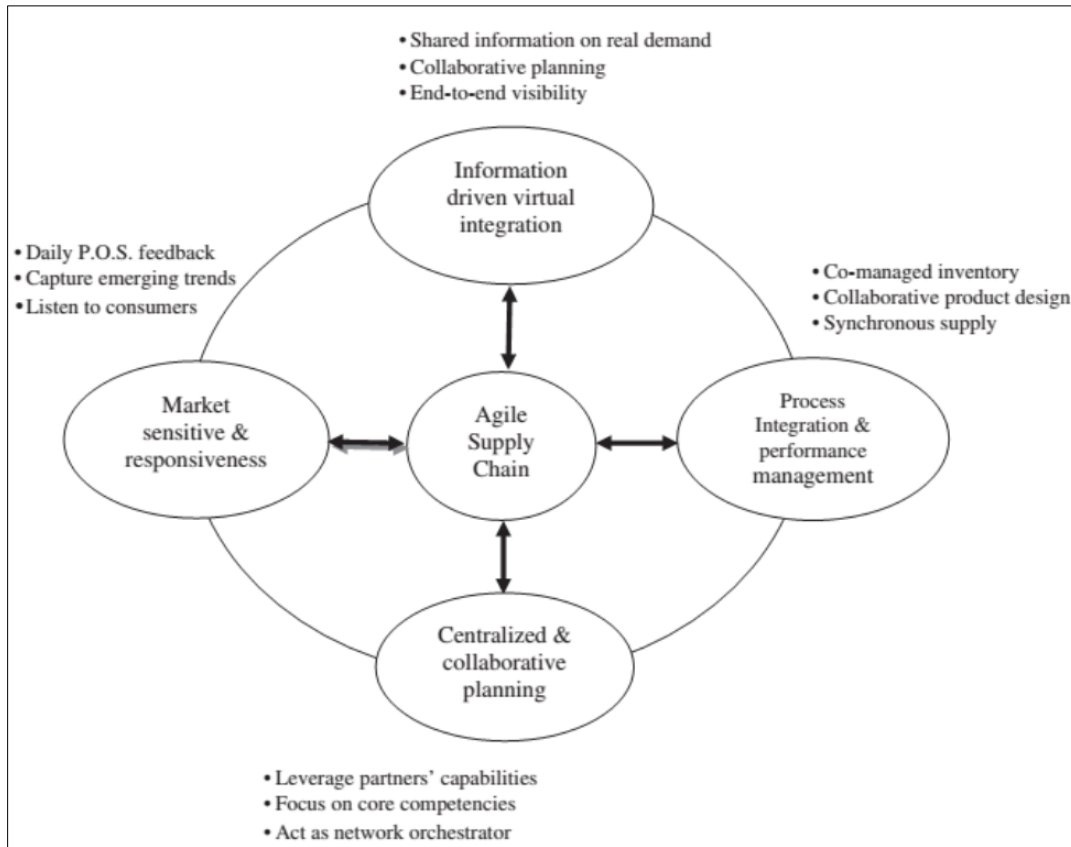


Source: [53]

Figure 3 Elements of Agile Supply Chain

- Customer sensitivity - This can be achieved through continuous improvement and a focus on lean production instead of minimizing waste in the process
- Virtual integration - It increases the visibility of information on the network Process
- Integration - Standardize work and autonomous teams and compliance to improve process integration
- Network integration - Can be achieved by closely linking with actors in the network and trying to find opportunities

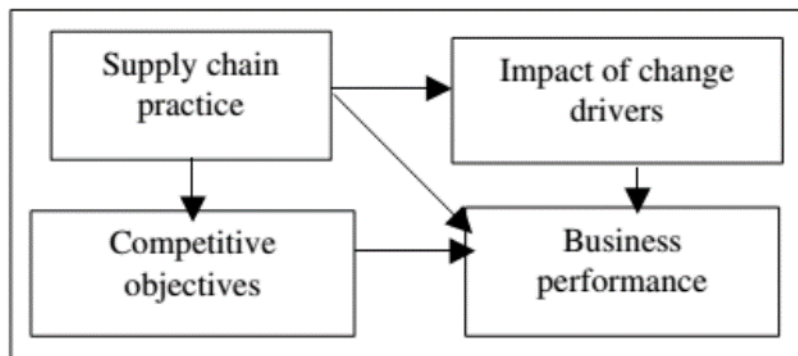
A. Agarwal, R. Shankar and M. K. & Tiwari [49] presented a flexible supply chain model, including information-based virtual integration, process integration and performance management, centralized planning and collaboration, and responsiveness (Figure 04):



Source: [49]

Figure 4 Characteristics of Agile Supply chain

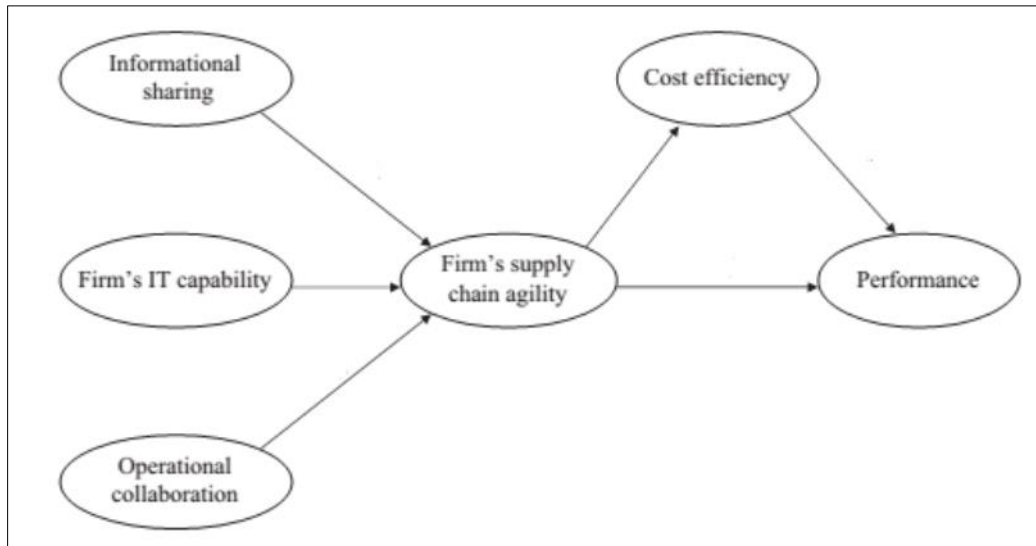
Y. Y. Yusuf, A. Gunasekaran, E. O. Adeleye and K. Sivayoganathan [44] developed a conceptual model to assess supply chain agility that has four dimensions: (i) supply chain practices (ii) competitive goals (iii) impact of the factors driving change and (iv) business performance; (Figure 05).



Source: [44]

Figure 5 Conceptual Model for assessing Agile Supply Chain

J. Yang [54], developed a conceptual framework that tracks business performance in supply chain agility. Factors contributing to manufacturers' flexible supply chains include technical (IT capabilities) and relational (information sharing and trust, and operational cooperation) factors. The author finds that there is a strong relationship between the enterprise's IT capabilities and operational performance and the agility of the enterprise in the supply chain. The author infers that profitability acts as an intermediate variable between a manufacturer's supply chain agility and performance (Figure 06):



Source: [54]

Figure 6 Conceptual framework to investigate antecedents of manufacturers' supply chain agility

In today's competitive era, supply chain agility is the only way to meet frequently changing customer demands with high quality, short lead times, low cost, and superior customer service. Supply chain agility is enabled as companies focus on shortening lead times and the smooth flow of information and materials between partners. A variety of factors driving supply chain integration and responsiveness can help you build a strong supply chain that reduces response times to meet uncertain demand, business capabilities, and customer satisfaction [55].

M. Christopher, R. Lawson and H. Peck [56] discussed in terms of volatility, complexity and dynamism. It is because of these factors that the need for agility and quick response in the logistics process has been identified. The fashion supply system is characterized by three critical moments: time to market, time to service and response time. These three factors highlight the importance of agility in the fashion supply network. However, agility requires radical changes in organizational structure and strategy as well as a move away from forecast-based delivery. Market awareness, virtual integration, networked logistics, and process linkage are all becoming fundamental prerequisites for achieving agility and responsiveness. Quick Response (QR) brings a new dimension to fashion retail. For both retailers and manufacturing suppliers, it offers a new approach to operations that is foreign to many companies that are still operating with structures designed for the mass production era. The article provided an assessment of QR, the agility it provides, its strategic implications, and the building blocks needed to implement it. The final part of this work demonstrated how a responsive operational strategy provides a more attractive and viable procurement alternative than using low-cost inputs from less developed economies. Once the various costs (hidden and inflexible) are properly understood and calculated, the impact of agility, flexibility and responsiveness in the fashion supply system becomes important.

K. Kholik, Hamdani, Wasis, B. Utami and E. Setyariningsih [57] for proper management of the supply chain element, agile supply chain essentially implies the use of speed, proficiency, responsiveness, and flexibility. For the ability to quickly adjust the schedule, the ingenious production network has the highest adaptability. Associations that need to be able to adapt to changes in external financial issues such as changes in innovation, changing customer needs or currency fluctuations have adopted this philosophy. An agile supply chain operator association can rapidly change its operations, sources, and coordination. It was a remarkable part of a great association.

H. M. Alzoubia and R. Yanama [58] study recommends that these companies focus on redesigning their supply chains towards agility, using information sharing as a key aspect. This can only happen as these companies invest more in building their information technology capabilities to enable faster information sharing in their supply chains. This investment will also increase their ability to improve the overall performance of the organization by achieving supply chain agility. The results can also be generalized to mid-sized manufacturing companies in other regions of the world, since the challenges they face are more or less the same. Expanding the field of study to other areas to analyze the impact of agile supply chains on organizational performance by including other aspects and practices of it will be an area of future research. .

H. R. Tonday, P. D. Katore, D. S. Raut, A. D. Rathod and A. I. Morwal [59] stated the context of the COVID-19 pandemic and closures, the successful distribution and public distribution of essential items depends on the efficient and progressive management of the supply chain system using supply chain concepts. To end dependence on imports from other countries, Indian government organizations and private companies had to develop a framework based on lean and agile manufacturing concepts.

M. Christopher and D. Towill [60] found that increasingly clear that competitive advantage stems from the combined ability of the network of affiliated organizations that we now call "supply chains". This is a fundamental shift in the traditional view of a single company-based business model. It also becomes clear that today's market is increasingly volatile and therefore less predictable, hence the need for a more nimble response. Bringing these two ideas together leads us to conclude that a prerequisite for success in these markets will be an agile supply chain. What we have proposed in this article is an agile framework that depends on the context in which the company operates. So we sought to bring together lean and agile philosophies to highlight the differences in their approaches but also to show how they can be combined for greater efficiency. Increasingly, managers need to understand how market conditions and the broader operating environment will require not only an offsite solution, but context-specific matching strategies as well.

D. Zhang and H. Sharifi [61] in his paper, a conceptual model for implementing agility in industry has been presented. Based on the model, a methodology to realize rapid manufacturing in industry has been proposed. A computer-based implementation of the methodology has been proposed to help manufacturing companies use the proposed methodology. An industry questionnaire survey involving 1,000 companies from three manufacturing sectors was conducted to validate the model and provide the data needed to implement the method. Several case studies involving 12 companies were conducted to complete the questionnaire study and provide a first assessment of the methodology. Preliminary results from case studies suggest that the proposed methodology can help manufacturing companies plan strategic policies to pursue agile manufacturing.

A. Kawa and A. Maryniak [62] observed the approach to logistics has changed dramatically due to the emergence of Internet technology in companies. This is not only the digitization of certain products (e.g. music, movies, books etc.) where logistics are not required, but also the very dynamic development of e-commerce for consumers. On the one hand, the Internet has eliminated intermediate links in the supply chain, on the other hand, new distribution and sales channels have been created. The focus has shifted to the end customer ordering anywhere, anytime. The route to the store has been replaced with home delivery. After the emergence of online sales, customers have become an integral part of the logistics process and often for the first time they deal with logistics services.

M. Balaji, V. Velmurugan and C. Subashree [63] states that agility is the ability to detect changes in the business environment and react quickly by acquiring the appropriate skills. The strategic intent to be agile and leverage core business competencies to gain competitive advantage is essential. Improved supply chain flexibility can be achieved through better coordination between different levels of the supply chain, which is the greatest asset of any supply chain. This makes the supply chain more flexible and efficient. The negative effects of synergies can be eliminated by careful implementation of Total Agile Design Systems (TADS). In addition, supply chain flexibility can be improved by about 20-25% overall, which can be improved in the long term.

9. Conclusion

Agility is taken into consideration as an important issue for business enterprise growth in complicated business sceneries because it allows rival corporations to correctly carry out beneath time-to-competitive pressures. The crucial for a company's success is aligning an agile supply chain strategy with a differentiation strategy to achieve the overall goal of competitive performance and thus competitive advantage. Agile supply chains are therefore a strategy for securing a competitive advantage. Customer expectations are never static, so you can't be agile without being agile. Therefore, to maintain and maintain supply chain agility, organizations must:

- Recognize the elements that contributed to your company's previous supply chain issues. Check the company history for the biggest issues.
- Implement simple solutions to these problems.
- Design programs for solutions that are not easily resolved. Prioritize issues based on the most likely ones. Study these issues systematically.
- Provides flexibility and adaptability as you move through the resiliency phase after production. Start by soliciting input from all levels of production, even below the level of management.

- Centralize responsibility for reviewing change plans. The responsible person should have a wide range of experience. We work with consulting firms as needed, but critically evaluate their skills to ensure they are a good fit for our group.

Compliance with ethical standards

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There are no conflicts of interest.

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