

Supply Chains Drive Business Strategy Especially in a COVID-19 Environment

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Abstract

Purpose – The purpose of this paper is to propose a dynamic model where supply chain strategy is leveraged to drive business strategy that will mitigate risk and stabilize operations during times of disruption.

Design/methodology/approach – This study included a systematic review of literature relating to pre and post COVID-19 supply chain design. An analysis of the literature provides a foundational understanding of past and present supply chain models used to develop and propose a conceptual framework.

Findings – Firms' business, organizational, and IS strategy should directly align with the overarching supply chain strategy, supply chain network design, and supply chain IT design. The Extended Resource-Based View (ERBV) by Teece (2007) was foundational to the redesign. The process included the identification of dynamic supply chain management capabilities and sustainable supply chain performance as well as weaknesses brought about the COVID-19 pandemic.

Originality/value – The proposition makes use of a cyclical process to continuously reevaluate and align business strategies and supply chain strategies in response to market disruption and conditions.

Keywords COVID-19, Supply-chain management, Literature review, Dynamic capabilities, Sustainability, Environmental uncertainty, Extended resource-based view, Supply chain capabilities.

Paper type Research/Conceptual paper

Introduction

For decades, companies have looked at their supply chain as a strategic part of their business. Some have done well; others have failed miserably. As an example, when Auto Trader started in 1997, their business strategy was to print magazines and distribute them mostly to convenience stores around the country. Soon after, they were printing world-wide with publications in England, Europe, South Africa, New Zealand and Australia. The IS strategy supported this model for many years, electronically sending information across the country and around the world to various print sites. However, by 2010 the World Wide Web had taken off, large numbers of people were now online, and with this new technology the IS department was able to support the realignment of the business strategy to go 100% online, eliminating print all together (Robinson, 2017). Changes in business strategy like this need to be made within the context of the over-arching supply chain strategy. For instance, this change also greatly affected Auto Trader's supply chain. No longer would they buy newsprint, ink, press time, nor would they have print distribution. Furthermore, there was no longer a need for distribution managers or circulation directors. Clearly, technology advancements were a catalyst for Auto Trader to co-create their business strategy, organizational strategy and IS strategy which was highly dependent on their supply chain strategy.

Conversely Blockbuster's business, organizational, IS, and over-arching supply chain strategy did not evolve to the changing trends in technology. Netflix however, introduced a supply chain model that took advantage of online ordering and the post office mail services to capture the DVD rental market from Blockbuster. Having lost sight of competitive forces that detrimentally impacted their supply chain strategy, Blockbuster was unable to react quickly enough and ultimately went out of business. Buckley (2015) stated that "in most industries, strategy is an ongoing process and needs to be adapted

according to changing environments and sometimes due to changing objectives of the firm." Dittman (2013) explains that the supply chain of a firm often manages 60 to 70 percent of the cost and controls 100 percent of the inventory within the company. He concludes that the supply chain is the lifeblood of the firm, provides the foundation for all revenue generation, and as such must be guided by a robust strategy.

Today supply chains have become quite sophisticated and ever so important to the company's competitiveness. To compound this, a huge number of companies are either global or dependent on global supply chains. This dependency has slowly made them more and more vulnerable to a wide range of risks, yet even with decades of studies on this, most companies have looked the other way. That is until 2020 when COVID-19 spread world-wide and many of these dependent companies had an eye-opening experience. COVID-19 illustrated to these companies their supply chain vulnerabilities. Kilpatrick (2020) put this into context pointing out that 200 of the Global Fortune 500 companies have a direct presence in Wuhan where the virus originated. Dunn & Bradstreet also estimates that 163 of the Fortune 1000 companies have Tier 1 suppliers in the Wuhan area and that 938 have one or more Tier 2 suppliers in this same area. This is significant not only because Tier 2 suppliers feed Tier 1 suppliers, but also because very few organizations can trace their supply chain beyond their Tier 1 suppliers. This supply chain risk has a domino effect causing plant closures and supply shortages that can very quickly lead to a devastating supply chain disruption (Kilpatrick, 2020).

The lack of a supply chain risk mitigation strategy seems improbable because of the recent supply chain disasters and upheavals, like the eruption of the Eyjafjallajökull volcano in Iceland which caused enormous disruption to air travel across Europe (Bellew, 2020), the Japanese earthquake and tsunami in 2011, the Thailand floods and the

numerous hurricanes in the United States and Philippines. One would think that with events like this and surely more to come, companies would be well prepared for the COVID-19 pandemic. Sadly, most were not. In fact, Choi (2020) pointed to a study conducted by Resilinc in late January and early February 2020 which found that roughly 70 percent of the 300 companies surveyed were still in the data collection and assessment phase as a result of the pandemic. All these companies were manually trying to identify any of the suppliers that had a site in the specific lockdown regions of China.

Literature Review

For as long as modern-day business has existed, there has been a need for organizations to clearly define their organizational objectives by formulating a business strategy. Strategy, be it the overall business strategy, organizational, or IS strategy, provides a plan of action for organizations to achieve certain goals. One of the primary objectives of strategy is to have a well-focused understanding of the competitive environment and how to deal with it. As Buckley (2015) pointed out, strategy is formulated at four levels: corporate, business, product and brand level. Because strategy at these levels are interrelated and at the same time interdependent, the various levels are typically taken into consideration during strategy development but may be formulated by different employees within the firm. For example, the senior executives of enterprises typically develop corporate strategy, while formulation of the business or product strategy occurs at the middle or divisional level with collaboration being key to the process. Interestingly, Buckley (2015) found that companies often work with an "emergent" strategy, typically reformulating their strategies at the implementation state.

While many firms spend ample time developing strategies at an organizational level, due to the labor, cost, and time limitations, many

organizations do not develop a comprehensive Supply Chain Strategy. As a result, when disruption occurs, supply chain members often revert to manual and anecdotal mechanisms to react and respond. Without a comprehensive Supply Chain Strategy, members throughout the global supply chain remain disconnected. They are slow to regain access to their customers due to lack of visibility and collaboration. Integrating the supply chain network, through the collaboration and development of a comprehensive Supply Chain strategy, enable fast reconfiguration to cope with chaotic environments that result from natural and human-made disruptions. Integrated supply chains are strategic and therefore more resilient than organizations acting in isolation (Buckley, 2015).

For a Supply Chain strategy to provide a sustainable competitive advantage, it is necessary to monitor changes internal and external to the firm and to realign the business strategy with the supply chain strategy as necessary. Furthermore, to allow for dynamic realignment, additional capabilities will most likely be necessary, which may require changes to the supply chain IT design and supply chain network design. Teece (2007) argues that firms must build routines for sensing and seizing opportunities in order to build dynamic capabilities. There is guidance for supply chain planning routines (Liberatore et al. 2012), and opportunities can occur at any level of the unified planning process. This is particularly true for firms that exchange information at multiple levels, as in a collaborative planning, forecasting, and replenishment (CPFR) process (Marion, 2018). Collaborative planning can lead to improved operational situations and forge a culture of resilience by focusing on value-generating initiatives throughout the extended supply chain.

The authors agree that strategy realignment is imperative. However, there are cases where this was not done, or the coordination between all stakeholders within the extended supply chain was lacking. For example, in the 90's and into

the early 2000's Blockbuster video came on strong and ultimately dominated the DVD rental market. The alignment of their business and supply chain strategy was coordinated. Distribution of the correct number of videos with the most sought-after content was to the correct location week after week. Unfortunately, both consumer demand and supplier capabilities were rapidly changing with no changes made to the overarching supply chain strategies or business strategies. In 2000, Blockbuster executives refused a proposal to buy Netflix made by Reed Hastings, founder (Satel, 2014). By not properly anticipating changing consumer demands, by 2010 Blockbuster was out of business. This is akin to Kodak who went bankrupt in 2012 after ignoring the new digital camera movement.

If we look at the current decade, we see it characterized by the emergence of a converged commerce. The boundaries between online and brick and mortar stores are being blurred, as the handoff between technology and manual processes are becoming increasingly seamless. People and machines coexist in intermingled spaces and all of this has been reshaping the nature of the supply chain. At the forefront of supply chain technologies is the use of analytics, and big data. With the introduction of the cloud, computing power is no longer the bottleneck. It is now possible to stream large volumes of supply chain data for patterns that can provide insights that help in a myriad of ways. For example, we can now easily predict estimated time of arrivals (ETAs) for shipments based on live tracking of ocean-going vessels or mean time between failures for machines. We can also combine insights from consumer sentiment delivered through online social media feeds, on-line searches and blog posts, with inventory location and availability tracking. This allows companies to determine the best inventory positioning strategies, with response to weather patterns and consumer interest. Automation technologies like drones and robots are even taking over some of the more

mundane tasks previously performed by human beings – whether it be putting pallets of finished product in a high bay in a warehouse or inspecting the remote length of a railway track in difficult to access regions (Chintamani, nd). As a result, the speed and accuracy offered by these technologies allow human beings to focus on high value-added activity, like determining how best to serve customers.

Innovative technology such as 3D printing is also affecting supply chain design. 3D printing is being used by NASA to revolutionize the supply chain delivery of parts to the International Space Station. Previously it was necessary to send payloads of spares by a rocket to the Space Station. With the evolution of technology, NASA is now experimenting with sending the raw materials in space and allowing astronauts to “print” parts as needed for specific repairs. The concept of 3D printing is also finding use in commercial supply chains. Boeing has determined a saving on average of about \$3 million per Boeing 787 Dreamliner by utilizing 3D-printed titanium parts. Integrating transformative innovations into supply chains is the trend to ensure a compelling service experience for the customer (Johnson, 2019).

The evolution of supply chain technology seems to have no end in sight. Companies now find themselves in a unique situation, trying to anticipate the next change. Stakeholders realize that if they miss a trend or opportunity, disruptive innovators like Amazon and Tesla will step in, becoming a threat to their existence. Pearlson *et al* (2016) pointed out the reliance of IT on the business strategy and visa-versa. Design of work is also affected. We believe that because of the rapid change in supply chain technologies, there is now a huge reliance on supply chain strategy for the business as well. With the convergence of robotics, 3D printing, ID technologies, pervasive internet, increased computer power and big data, best-in-class corporations must align their business strategy with their supply chain strategy.

Research

Since entering the World Trade Organization in 2001, China has seen a massive growth of trade with the United States, a growth that has had a very substantial effect on U.S. workers as well as the U.S. economy. Scott (2013) pointed out that between 2001 and 2013, 3.2 million U.S. workers lost their jobs to Chinese counterparts, of which 2.4 million of these jobs were in the manufacturing sector. Job loss or displacement resulting from globalization are correlated to trade deficits across industry segments (Scott, 2013). The concepts of globalization and offshoring cause supply chain dependency and can result in more vulnerability over time.

The COVID-19 pandemic exposed supply chain vulnerability at the end of 2019 and into 2020. Fernandez (2020) explained that during this time many Chinese companies went into full lockdown. This resulted in unforeseen disruption for companies whose supply chains were dependent on factories in these areas. The severe lockdown's in China led to decreases in consumption and interruption to production, overall disrupting supply chains across the globe. Additionally, due to lockdowns throughout the world, many non-essential manufacturing facilities halted production causing millions of people to lose jobs world-wide. By May 2020, more than 36 million people had lost their jobs in the U.S. (Fernandez, 2020) Consumers buying habits due to the pandemic also caused undue stress on supply chains resulting in shortages of both perishable and non-perishable items around the world. As Fernandez (2020) pointed out, the impact of the pandemic throughout the extended supply chain have included the following:

- Car manufactures such as Volkswagen, Ford, GM closed due to the pandemic. In fact, US, Canada and Mexico production which represents 80% of all North American production was offline as of May 2020
- The travel and entertainment industries experienced extreme

hardship. Cruise ships worldwide have not sailed since April 2020. Currently there are no plans to reassume operations until at least September. This will result in a minimum of a five-month shutdown.

- Las Vegas, the entertainment capital of the world was closed on March 21, 2020 until approximately mid-June, which resulted in about a six-week hiatus. The economic backlash experienced by Italy was extreme because retail, hotels and restaurants, all of which were shutdown, account for 25% of the national GDP.
- The Tokyo Olympic games and Euro 2020 (football) were postponed one year, to 2021.
- Tourist destinations like London, Madrid, Venice and Rome were all in lockdown, and as of July 1, 2020, no U.S. citizens will be allowed into any European countries.
- All U.S. Trade fairs, and events have been cancelled.
- Most all major league sporting events in the United States such as the NBA, Golf, NASCAR have either cancelled their season or are playing with no fans. Major League Baseball and Football have come to agreements to shorten their season. The jury is still out as to whether fans will be allowed.
- A number of airlines around the world suspended operations all together.
- Some countries such as Australia and Tahiti have banned international flight. Hawaii required anyone arriving self-quarantine for 14 days, essentially eliminating all tourism.
- With container transport significantly down, Maersk cancelled over 90 sailings in the second quarter of 2020.
- With nearly 6,000 indoor movie theaters in the U.S. nearly all were closed by May 2020.

- All U.S McDonalds closed seating areas.
- Television networks and media groups saw a sharp decline in advertising revenues because of the stress caused on diverse industries worldwide.

Perhaps the hardest hit sector has been the travel industry. Hundreds of thousands of hotels worldwide have either temporarily closed or greatly reduced service. This is due to countries closing borders, restricting travel, and therefore minimizing tourism. Arguably one of the hardest hit sectors with the travel industry was the cruise lines. All the major cruise lines shut down by late April 2020 and have no plans of resuming operations until 2021. Micallef (2020) pointed out that some 30 million people went on a cruise in 2019 and the 2020 projection was 32 million. Cruise Market Watch (2019) in a detailed study found that the average person spent \$1,791 on a cruise in 2018. With 30 million people cruising that works out to a 51-billion-dollar industry that has completely collapsed. This not only affected the roughly 224 thousand cruise industry employees (CrewCenter, 2017), but also the vast supply chain that helps run this industry. Consider the dependency of the airline industry on the cruise industry. Not only did patrons cancel their cruises but their flights as well. While there are no statistics immediately available, it makes sense that at least 50% or more of the 30 million cruise travelers would have also cancelled flights. Additionally, procurement of food and beverages also came to a staggering halt. In South Florida, the epicenter of the cruise industry, some farmers had to bury their crops because of diminished demand. Frias et al. (2020) reported that R.C. Hatton in Pahokee Florida buried 2 million pounds of green beans that would have gone to South Florida restaurants, cruise ships, school cafeterias, airlines and even theme parks.

While the pandemic had a detrimental impact on many industries, this was not the case in all instances. Amazon

operating cash flow increased 16% to \$39.7 billion for the trailing twelve months, compared with \$34.4 billion for the trailing twelve months ended March 31, 2019 (Redman, 2020). But Amazon topped that with their Q2 report which was released July 23rd, 2020. In it they Amazon reported that their Q2 sales were up 40% from the same quarter in 2019, to a whopping 88.9 billion, with net profit doubling to 5.2 billion (Kim, 2020). Likewise, Apple, another tech giant posted what CNBC called "blowout third quarter with sales up 11%" (Leswig, 2020). Even grocery stores have seen a huge jump in sales. For example (Redman, 2020) reported that Kroger, the largest grocery store chain in the U.S. saw same store sales rise by some 30% in March (year-over-year) and online grocery sales are expected to rise by more than 40% in 2020.

Companies mandating individuals to work from home has also had a positive effect in the way of social distancing. Furthermore, there has been an increase use of online platforms for meetings. Iqbal (2020) reported that in December 2019, Zoom, a popular video conferencing tool had roughly 10 million daily meetings. By the end of April 2020, just four months later that number had risen to 300 million!

Taking a step back, in 2003 China represented just 3% of the world's economy. Today that number is above 16%. As a result, interruption to the Chinese economic activity creates a ripple effect in markets around the world. We saw this in a shell-shocking way during early 2020 as COVID-19 nearly shut down China completely. Because China is currently the world's largest importer and exporter, companies in all countries throughout the world are affected by interruptions in China. Fernandez (2020) pointed to evidence from various markets which confirms that global supply chain disruption caused by the current crisis is generating spillover effects at different levels throughout supply chain networks. Compounding this, the World Trade Organization (WTO) is expecting global

trade to decrease up to 32% in 2020 due to the pandemic.

Ivanov (2020) pointed out that epidemic outbreaks are a special risk case when it comes to supply chains as they tend to create long-term disruption, disruption propagations (i.e., the ripple effect) and high uncertainty. Examples of these risks include natural disasters such as earthquakes and tsunamis (e.g., Japanese tsunami in 2011 and its impact on SCs worldwide), and man-made disasters such as the BASF factory explosion in Germany in 2016 which resulted in a shortage of raw materials in global supply chains. Recent examples of pandemics include SARS, MERS, Ebola, Swine flu, and most recently, coronavirus (COVID-19/SARS-CoV-2). Having a lean and globalized structure, many companies supply chains became prone to epidemic outbreaks. In fact, as Ivanov (2020) points out, over 94% of Fortune 1000 companies have reported their supply chain being disrupted by COVID-19. He also found that some 51,000 companies world-wide have one or more tier-two suppliers in the Wuhan region where the current virus started. Even more alarming is that 938 of the Fortune 100 companies have tier-one or tier-two suppliers in the Wuhan region, and that the world's largest supply chains own more than 12,000 facilities (i.e., factories, warehouses and other operations) in COVID-19s quarantine areas.

Even as shipping ports reopen, and workers return to work, supply chain disruption will continue for some time to come. Breger (2020) explained that the problem is not having full visibility into the extended supply chain. One needs to know the intricacies of their supply chain such as access points and stakeholder dependencies. The need for backup plans is critical. For example, if there is a disruption in any part of the chain, a risk mitigation plan must be in place. The pandemic makes it quite clear that enterprises need to formulate a Supply Chain Strategy inclusive of key components such as a SC Network Map, a Business Impact Analysis, a Risk Analysis,

a Disaster Recovery Plan, and a Business Continuity Plan.

At this writing, most of the production for pharmaceuticals is in the United States, China and India. Because of this and because of the pandemic, we have learned a lot about just how vulnerable our drug supply chain is (Yu, 2020). For example, Boehm (2020) found that there are nearly 2000 drug-manufacturing facilities around the world with 510 of them in United States. While this may seem to be a reasonable amount, the challenge in is in the supply chain. Huang (2019) explains that about 80 percent of the active pharmaceutical ingredients (APIs) used to make drugs in the United States come from China and India. Likewise, Gary Cohn former chief economic advisor to President Trump invoked a Department of Commerce study that found that 97 percent of all antibiotics in the United States come from China. While there has been some suggestion that the United States switch to India as an alternative API supplier because of these security and safety concerns, Huang (2019) responded, "doing so would be no different from rearranging the deck chairs on the Titanic."

At issue is the fact that India imports over half of its active pharmaceutical ingredients from China. Because the Indian government is selectively restricting API import and export as well as the logistical challenges created by COVID-19, India overall is having issues supplying APIs around the world. As Sengupta (2020) points out, if changes do not occur soon, this could easily lead to a worldwide short of numerous pharmaceuticals. He went on to say the norm of the future will be factories that can modularize production and shift/adapt lines to meet changes in demand. Sengupta also believes that those businesses who have not yet shifted to the cloud, especially the fence-sitters will be moving to the cloud soon to ensure business continuity by giving employees remote access to critical systems while they work from home.

Needless to say, shortages of any kind, including drugs, may prompt countries to act in their own self-interest, to restrict the export of these drugs or their chemical precursors (Yu, 2020). As an example, on March 25, 2020, India banned the export of the anti-malaria drug hydroxychloroquine (HCQ) to ensure enough availability of the drug within their country. Pundits felt that President Trump who touted the drug's use early on was responsible for India's decision. However, Sermo (2020) explains that in a study by the largest healthcare data collection company and global social platform for physicians, observed that Hydroxychloroquine was chosen as the most effective therapy amongst COVID-19 patients (75% in Spain, 53% Italy, 44% in China, 43% in Brazil, 29% in France, 23% in the U.S. and 13% in the U.K.). Luckily, the India export ban lasted only a few short weeks, ending on April 7, 2020.

Model Proposition:

Pearlson *et al* (2016) introduced the Information Systems Strategy Triangle, explaining that it relates business strategy with IS and organizational strategy. Pearlson *et al* (2016) pointed out that "successful firms have an overriding business strategy, a plan articulating where a business seeks to go and how it will get there, that drives both organizational strategy and IS strategy". Things like hiring practices, organizational design, vendor policies as well as decisions related to hardware, software, and other IS components are driven by a firm's business strategy (Pearlson *et al.*, 2016). Organizational strategy and IS strategy therefore are affected by the business strategy. Best-in-class firms understand the importance of tightly integrating their business, IS, and organizational strategies.

Dittman (2013) is convinced that supply chain excellence drives shareholder value and controls the heartbeat of the firm. Even so, many companies have a supply chain that is hindered by the lack of a comprehensive strategy. Dittman (2013) explained that unlike other areas

of the firm, the supply chain process is a horizontal end-to-end process that guides the seamless flow of product across a host of enterprises. Products flow from suppliers to customers, passing through each firm's value chain of primary service (Inbound and outbound logistics, operations, marketing and sales, and service) and support (organization, human resources, technology, and purchasing) activities. Ultimately, the end customers' requirements guide the flow of product and information that flows throughout the extended supply chain. Because this is such a highly complex, cross-functional, cross-company challenge, Dittman (2013) also believes that a supply chain strategy represents a different set of challenges in relation to supply chain development, and overall acceptance.

Acceptance, or buy-in, needs to start at the executive level, and move down through middle management to the front line. This needs to occur not only within the local firm, but also within the firms of strategic alliance partners. All members of the extended supply chain need to work towards common goals. Without the buy-in of employees, at all levels, amongst all strategic alliance partners, the over-arching supply chain strategy can fail. Supply chain professionals know this and often feel a great deal of trepidation about creating a business case to support a supply chain strategy. Although supply chain benefits typically fall into three categories: lower cost, lower working capital and increased customer satisfaction, a good business case clearly demonstrates how the expense, personnel, and capital consumed by each initiative will deliver a quantified benefit. Still, managers worry that the business case supporting their Supply Chain strategy will not stand up to the political scrutiny of the corporate review process, or that it will not be found to be credible. As a result, supply chain managers are often conservative with regards to the estimated benefits because they do not want to fall short and under deliver (Dittman, 2013).

Technology has helped connect members within an extended supply chain. Over the course of the last few decades, since the introduction of ERP packages, aiding in transportation optimization, demand and supply planning, and warehouse management, technology has continued to progress at lightning fast speeds. This has created opportunities not only for more innovative corporations, but also for laggards to surpass the front runners in supply chain operations through the appropriate use of disruptive technology (Chintamani, nd). In fact, the past 30 years has seen an unprecedented amount of evolution in the supply chain, driven by technology-enabled business practices.

Ivanov (2020) feels that in turbulent times (SARS, tsunamis, earthquakes, pandemics etc.) to ensure supply chain resilience, one needs to ponder the answers to the following questions:

- How long can our supply chain sustain a disruption?
- How long will it take for our supply chain to recover after this?
- Which supply chain operating policy is the most efficient to use with this disruption?
 - Accepting the temporal shortages
 - Using prepared contingency plans
 - Changing the operational policies during the disruption

We propose that firms' business, organizational, and IS strategy should directly align with the overarching supply chain strategy, supply chain network design, and supply chain IT design. Furthermore, we proposition the use of a cyclical process to continuously reevaluate and adjust both firm and supply chain strategies in response to market demand (Figure 1).

Figure 1. Proposed cyclical process with SC Strategy as the primary, all other strategies support the SC Strategy

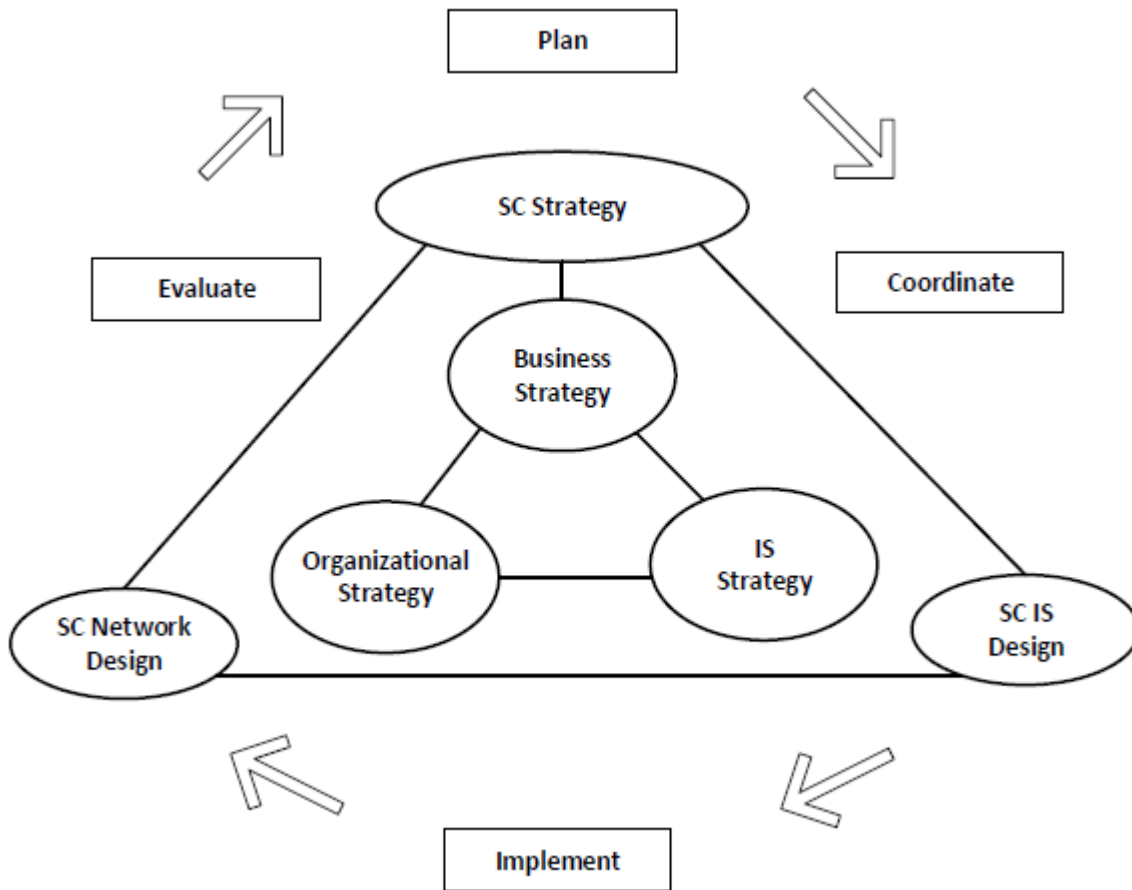


Figure 1 depicts how the process starts with the focal firm formulating organizational goals, within the context of the supply chain strategy. Furthermore, the model depicts how the firm level IS Strategy needs to be coordinated with the Supply Chain IT Design, ensuring visibility and transferability of data between and amongst supply chain members. Finally, both the organizational strategy and the supply chain network design need to ensure structures and processes are positioned to support the business and supply chain strategy, leveraging the firm and supply chain infrastructure. KPI's should be established at both the firm and supply chain level to enable evaluation of operational and supply chain performance by comparison to best-in-class firms. Deficiencies in results can be used as a catalyst to evaluate the business and supply chain strategy and make necessary changes.

The model works in an iterative fashion. A primary component is the alignment of the strategies of the focal firm with that of strategic alliance partners. Every iteration starts with planning and ends with an evaluation and improvement identification. The rapid pace of technological advancements is a catalyst for firms to continuously evaluate their business and supply chain strategies in a cyclical manner, then "tweak" as needed or drastically pivot in a new direction.

We are approaching this model using the resource-based view (RBV) and dynamic capabilities as the underlying theory. The RBV proposes that firms that can build resources that are valuable, rare, inimitable, and non-substitutable can achieve a sustainable competitive advantage (Barney, 1991). Teece (2007) extended the RBV by arguing that the advantages from most capabilities will eventually be eroded, and therefore, it is necessary to continuously update a firm's resources and capabilities in order to maintain a competitive advantage.

Liberatore (2012) posits that a firm's market position and bottom-line financial performance is linked to supply

chain performance. Quite often managerial resources are directed toward processes and planning activities within the focal firm, with little regard to tangible results and outcomes that could be derived at the supply chain level. By focusing on the cyclical process model, top managers can more efficiently and effectively direct their internal planning activities with regard to the extended supply chain, resulting in better strategic decision making. Liberatore (2012) confirms stating, "Firms that actively employ supply chain planning frameworks as a standard business practice give themselves a true competitive advantage."

The aforementioned confirms the strategic planning process includes the formulation of the supply chain mission, goals, objectives, and strategies. The outputs of this process generate high-level requirements and define the capabilities that individual functions within supply chain must deliver. At this point, individual functions such as manufacturing, procurement and transportation must initiate their own planning processes to align with the overarching supply chain strategy. In doing so they will map out the respective contributions that they will make in support of the overall supply chain plan. This methodology will allow for the proactive and rapid integrated response of all stakeholders and allow for ad hoc decision-making and resource mobilization. This is especially critical with regards to globally focused supply chain efforts. There are associated dangers when companies respond to a pandemic such as Covid-19 with focus on locally or internal optimized outcomes. The objective must be to enable a global or optimized outcome for all stakeholders throughout the extended supply chain.

Conclusion

In the past two decades, many businesses especially the Fortune 1000 have outsourced elements of their supply chain to overseas interests. As a result of the COVID-19 pandemic these companies now have a realization that their supply chains are quite vulnerable. The authors propose that due to the interdependence and reliance of global stakeholders, the supply chain strategy must supersede the business strategy itself. The reasoning is that supply chain disruption can bring business operations to a halt. The proposed model begins with the establishment of a supply chain strategy and includes a dynamic capability. Supply chain capabilities and strategy should be monitored and adapted in support of the strategic goals of the business. As a result, it will be necessary to dedicate resources and establish routines for this purpose. Changes to the SC IT design or the SC network design require investments of time and money. As Schmalz (2020) points out, preparation can be expensive, and it is quite possible that a major disaster or pandemic will never come. However, the devastating impact of COVID-19 on global supply chains across many industries justifies the importance of preparedness at a supply chain level to ensure firms collectively mitigate risks and disruptions through continuity of operations.

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