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Andrew L. Dornier

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Collaboration: How collaboration in the Supply Chain will drive optimization to meet the needs and challenges of the future

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Integrated Supply Chain Management

By

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I. Introduction and Statement of the Problem

In the complex and competitive global economy, companies are faced with the realization that they need to reconfigure and evolve their supply chain processes, networks and strategies continually to the meet emerging needs and challenges. As stated in the Supply Chain Magazine article "2016: Future of Supply chain", businesses face increasing political momentum around issues such as resource scarcity, climate change, security and new regulations, bring to light critical challenges that our industry will face in the coming years. Until now, the most important parameters for supply chain designs have been related to issues such as cost efficiency and on-shelf availability. As a result of the growing importance of these emerging issues, new factors are becoming increasingly critical, such as traffic congestion in urban areas, energy consumption, CO2 emissions and the permanent rise in transportation cost (Dachs & Derycke 2008). How businesses tackle these emerging problems will not be simple; however, collaboration could be part of the solution to meet some of these future supply chain requirements because strategic collaboration and partnerships (e.g. Horizontal Logistic, 3PL, etc.) may provide better solutions for businesses, especially smaller ones, through economic of scales, collaborative initiatives, innovated technology platforms, geographical expertise and intellectual property. Supply Chain collaboration is defined as a long term relationship where participants generally cooperate, share information, and work together to plan and even modify their business practices to improve joint performance (Whipple et al,. 2010).

If firms can improve supply chain efficiencies through forging partnerships, it will create value for the company. Embracing the idea of relinquishing controls of at least certain aspects of its supply chain, can facilitate massive improvements in a company's supply chain. As companies continue to understand the interdependence of supply chains and how collaborative

efforts with external parties can result in improvement efficiencies and add more value to their products, the collaboration with strategy partnerships and external firms might be the solution in the future.

II. Purpose of the Study

The primary purpose of this research is to explore the current and anticipated challenges for supply chains and identify how collaboration in the supply chain can mitigate or solve some of these challenges. As many larger firms found that effectively managing all of the business units of a vertically integrated firm was quite difficult, a trend over the past twenty or more years has been to pare down their organization to focus more on core capabilities and competencies. In turn, firms moved toward trying to create alliances or strategic partnerships with suppliers, transportation and warehousing companies, distributors and others third party firms. To better understand this shift, I will research and discuss the barriers and risk associated with collaboration in the supply chain because to effectively adopt collaboration in a supply chain you must have culture of trust and openness. Individuals' requirements are overall better met in concert with others than by striving to make it on one's own capability/resources (Anonymous 2010).

In addition, the study will identify future supply chain challenges and provide specific examples of how collaboration could be implemented to address the challenges. For example, the concept of the "last mile" is an intriguing challenge that supply chains face because this concept focuses on how the last miles of logistics are typically the most inefficient. As the number of cities with populations of more than eight million is projected to double by 2019, rapid growth is causing more urban congestion, so this "last mile" challenge will intensify. By 2020, Mumbai, Delhi, Mexico City, Sao Paulo, New York, Dhaka, Jakarta, and Lagos will achieve 'mega city"

status – or more than 20 million people and there will be many more consumers in smaller, more congestion locations (Burnson 2013). Aimi, who is co-author of the 2013 report Magic Quadrant for Global Third-Party Logistic Providers, emphasizes that the time is now for more 3PL forecasting. "The phenomenon of the "mega city" will drive the need for intentional sharing of logistics and infrastructure resources," he says. "This so-called "collaborative logistics" means that companies will work together to reduce additional waste and inefficiencies of supply chains operating in isolation." (Burnson 2013) As stated previously, the easiest way to tackle congestion is through this collaborative nature. As such, 3PL companies provide individual firms with a solution to work collaboratively with other firms, including sometimes their direct competitors, to manage congestion and increase the efficiencies in the extremely inefficient last mile. In a world of razor-thin margins and fierce change, the ability to manage shipments more cost-effectively could wind up being the difference between profit and loss (Workman 2009).

III. Significance and Implications of the Study

The significance of this research resides within its ability to highlight current and future supply chain challenges and opportunities, and to identify how collaboration up-and-down the supply chain can optimization the entire supply chain to create value for customers and supply chain partners. The importance of finding solutions for the supply chain challenges is crucial to the global economy because supply chain managers need to focus on eliminating waste and inefficiency to drive value and create new opportunities. Although this concept is fairly easy to understand, there are many barriers and risks to supply chain collaboration which needs to be fully understood and managed. "The ability for firms to implement collaboration into their supply chains will be crucial to the firm's longer survival. The use of collaboration tools can have a significant impact on a company's top and bottom lines (Carter, Slaight, and Blascovich

2007)". In addition, I believe collaboration is the solution to improving three crucial supply chain issues: The last mile or congestion, sustainability and globalization. The challenge of the last mile in the supply chain is an excellence topic because most supply chain management activities from the production floor to a centralized delivery point can be standardized; however, the last mile of the supply chain is anything but standardized or controllable due the decentralization of delivery points, varying of timing of parcels and customer expectations. Sustainability is another challenge that I believe is important for supply chain managers to embrace. The focus on companies implement cost saving efficiencies in the supply chain is no longer the only requirement. In today's society, providing some assurance to the market place that your supply chain is sustainable is extremely important. Lastly, the globalization of supply chain is one of the most important developments in supply chain management. The ability of companies to utilize a global network in sourcing, producing/manufacturing, marketing and delivering products to consumers has forever changed the world. This is why the potential impact of collaboration on these three challenges could play a impactful role in optimizing the supply chain.

IV. Methodology

The primary method of approach for this project will consist of a Literature Review of collaborative supply chains. This will begin with reviewing supply chain management to understand what past authors have noted on this topic. A focus will be on identifying the current and future challenges the supply chain management field face. This will be illustrated through review of secondary data analysis.

V. Research Contributions

This research project will provide a specific contribution to the field of supply chain management by providing a comprehensive review for other supply chain management

professional and students to further understand and become educated on the challenges and opportunities with collaboration.

VI. Outcome Anticipated

This research project will serve as an additional investigation into how supply chain managers can tackle supply chain challenges of the present and future through collaboration. It is further expected that this research will help inspire current and future supply chain professionals to utilize collaboration to mitigate the serious problems such as congestion, globalization and sustainability as well as take advantage of untapped opportunities.

VII. Literature Review

Supply Chain Management (SCM)

Supply chain management (SCM), which was created by the business trends of the 1990s (Kopczak and Johnson 2003), is undergoing a radical transformation. In the past, the focus of SCM was on ensuring the low cost delivery of products by drawing on the capabilities and capacities of suppliers and logistics services providers (Lummus, Melnyk, Vokurka and Burns 2007). However in today's world, customers are more demanding; competition is escalating (Kotler, 1997). Stevens and Johnson (2016) adds that the current challenges presented by the global economy, accelerating rates of change, and the emergence of new and innovative competitors will undoubtedly persist. The role of SCM as an enabler of business will not go away but more than likely increase that pressure on the supply chain. These changes have led to supply chain managers increasingly recognize the need for SCM to not only reducing costs, but to also create business value (Lummus, Melnyk, Vokurka and Burns 2007). Cooper and Ellram (1993) stated that a successful supply chain management requires a long-term orientation with the sharing of risks and rewards balanced over time between partners and that collaboration

between supply chain partners has been referred to as the driving force behind effective supply chain management (Cooper and Ellram, 1993, Min et al., 2005). Min et al. (2005) noted that supply chain collaboration can positively impact operational effectiveness and efficiency as well as profitability. As such, Sanders and Premus (2005) suggest that collaboration may be considered the ultimate core capability for supply chains because of the vast amount of benefits it provides firms.

Supply Chain Collaboration

Anthony (2000) defined collaboration in the supply chain as two or more companies sharing responsibility of exchanging common planning, management, execution, and performance measurement information. Min et al. (2005) states that the fundamental rationale behind collaboration in supply chains is that a single company cannot successfully complete by itself. Bhattacharya and Polman (2017) echoes Min et al. by stating that no one company can solve the "tragedy of the commons" by going it alone that industry collaborations are required to solve complex supply-chain challenges, such as deforestation. Sanders and Premus (2005) state that thus many firms seek to coordinate cross-firm activities and work reciprocally over time to produce superior performance (Min, Roath, Daugherty and Genchev 2005). While Stevens and Johnson (2016) states that SCM need to find a more effective way to aligned thinking and practice and accelerating the flow of promising practices across the supply network to address the ever increasing complexity.

Horizontal Collaboration

In terms of types of collaborative endeavors, horizontal collaboration is a concept that some supply chain professionals consider implementing. As defined by the European Union, horizontal collaboration is defined by as a concerted practice between companies operating at the

same level(s) in the value system (Pomponi, Fratocchi, Rossi, and Tafuri 2015). This definition of horizontal logistics is consistent with Cruijssen (2006, p. 12), who qualifies such a type of partnership as an "active collaboration between two or more firms that operate on the same level of the supply chain and perform a comparable logistics function on the landside" (Pomponi, Fratocchi, and Rossi Tafuri 2015). One of the key benefits of horizontal coordination are typically developed by combining volumes from parallel supply chains and gaining size economies, which allows for more intensive use of assets (Cruijssen et al. , 2007; Mason et al. , 2007). Horizontal coordination also has external benefits such as allowing for reduced emission rates through a more intensive use of assets (Sanchez Rodriques, Harris, and Mason 2015).

A thorough study of horizontal collaborations has been conducted by Cruijssen (2006), who identifies five different objectives for such a firm strategy: cost reduction, growth, innovation, quick response and social relevance. More specifically, Cruijssen et al. (2007) point out that more than half of their surveyed companies consider horizontal collaboration in logistics as useful to reduce costs, and improve productivity, customer service and market position. These results derive from increases in carriers' load factor, reduction of goods and services costs, additional frequency of deliveries and the possibility of tendering for larger contracts (Pomponi, Fratocchi, and Rossi Tafuri 2015). That being said, Hingley, Lindgreen, Grant and Kane's 2011 study identified that only suppliers and Logistic Service Providers (LSPs) showed a necessary willingness to participate in 4PL innovations including horizontal collaboration for increased efficiencies and customer service and reduced costs. These authors found a distinct lack of retailers' willingness to sustain a 4PL operation and horizontal collaboration, which is they suggest is likely associated with power or control issues (Hingley, Lindgreen, Grant and Kane 2011).

3PL Collaboration

When considering horizontal collaborative relationship in a supply chain, the first type of collaborative relationship that I think of in the supply chain is third-party logistics, or 3PL collaborative arrangement. A 3PL provider is an external provider who manages, controls, and delivers logistic activities on behalf of a shipper (Hertz and Alfredsson, 2003). The use of a 3PL provider to take over some or all of a firm's logistics responsibilities is becoming more prevalent, and more than 70% of companies in Western Europe, USA and Asia Pacific have logistic outsourcing experience (Hsian et al. 2010). There are a number of factors for the growth in third-party logistics. These factors include the desire to cut logistics cost, improve customer service and focus on core competencies; however, the fear of losing control of the distribution process and other relationship and trust issue restrict the extent of this growth (Bolumole 2001). Some organizations are taking 3PL to the next step in form of 4PL. Bade and Mueller (1999) define a 4PL provider is a supply chain integrator who assembles and manages the resources, capabilities and technologies of its organization with those of complementary service providers to deliver a comprehensive supply chain solution (Adidi, de Leeuw and Klumpp 2015), while Hingley et al. (2011) states that a 4PL provider is characterized by outsourcing execution to a 3PL provider for an effective management of logistic processes (Adidi, de Leeuw and Klumpp 2015).

Barriers to Collaborations in the Supply Chain

With all of the benefits of collaboration in the supply chain, there certainly exist some barriers to implement these strategies. Kampstra et al. (2006) use a literature review and professional experience to identify a number of reasons why collaborations may fail including time, IT infrastructure, trust, organizational design, competition, fear of external partner

pressure, functional powerhouses, and financial reasons. While the authors discuss this to an extent, two missing elements which appear to contribute to collaborative failure are dependence on the relationship and lack of alignment/alliance scope. Hansen and Nohria (2004) suggest that many companies often erect barriers that prevent individuals from engaging in collaborative activities. Bhattacharya and Polman (2017) discuss the hurdles to collaboration included: having different cultures and sustainability goals, having difficulty trusting one another; fearing losing intellectual property; needing increased management resources and attention to manage collaborative initiatives; needing to integrate perspectives from multiple powerful stakeholders; and fearing that, if they collaborate, they will not be able to differentiate themselves from their peers. Fawcett, Magnan and McCarter (2008) stated in an article in Supply Chain Management that their research indicated that human behavior was found at the root of nearly all of the barriers to collaboration because most people are change averse and suspicious of the types of changes instigated by SCM. They added that lack of clear vision by management can lead to a poor understanding of SCM and increase the resistance to change and collaboration. Moreover, Talavera (2008) published a study in the Journal of International Business Research that a possible reason for the low adoption rate of supply chain collaboration in selected Pilipino industries may be attributed to the nature of relationship that exist between manufacturers, suppliers, and customers in the country. These relationships between manufacturer, supplier and customer are still characterized as "arm's length" or transactional, and may even be considered total adversarial due to the lack of cooperation or collaboration. Lastly, Wallenburg and Raue (2011) effectively stated that the conflicts that arise can be very mixed in nature and include the full spectrum from dysfunctional to functional conflict.

Possible Methods to Improve Collaboration

So how can firms remove or mitigate these barriers? Monahan and Hu (2015) state that lack of transparency, which is often born from a lack of trust or confidentially issues, is a large barrier to collaboration. Byoung-Chun Ha, Yang-Kyu and Sungbin (2011) echo the importance of trust by states that trust is a fundamental element for developing global collaboration. In addition to trust, Cadden, Marshall and Cao (2013) discussed the critical need for supply chain partners to understand the culture of each supply chain partner. Griffith and Myers (2005) developed a theoretical foundation for the influence of cultural norm expectations. Their findings suggest that firm performance is enhanced when supply chain processes such as information sharing and commitment levels are fit to culture-based norm expectations across culturally diverse relationship. Moreover, Monahan and Hu (2015) noted that progressive companies are developing innovative solutions to address these sorts of barriers. One of the examples the authors put forward was the use of "cleanrooms," which are often managed by a third party. These cleanrooms allow the sharing of sensitive data (e.g. consumer demand) in a legal and secure data environment that lets participants better identify and size opportunities for joint value creation. This type of innovation creates a more trusting and transparency collaborative initiative.

Additionally, Simatupang and Sridharan (2005) states the collaboration must have information sharing, decision synchronization and incentive alignment amongst partners and also identified three types of strategies that can be used to motivate difference members to align their behaviors with the overall goal. Those are 1) rewarding productive behavior, 2) pay-for-performance and 3) equitable compensation (Cruijssen and Wout 2007). While Sarkar and Cavusgil (2001) point out that cooperation achieve better results when cooperation partners have similar characteristics on certain dimensions and different characteristics on other dimensions.

Furthermore, Monahan and Hu (2015) stated that effectively managing and coordinating tomorrow's networked supply chains will require organizations to develop and adopt more structured collaboration models – scalable approaches to enabling true data transparency and frictionless creation that are largely absent in today's collaboration models. In particular they state that access to transparent, accurate data is a prerequisite for effective supply chain collaboration and coordination.

Additionally, Stevens and Johnson (2016) address the barrier of customer involvement. They discusses that customer integration involves leveraging the supply chain's capabilities as part of the customer proposition and a firm collaborating with customers to add value to both parties. They concluded that the cornerstone of supply chain customer collaboration are cultural and process integration, whereby both parties contribute their unique insights and capabilities to develop a mutually agreed forecast of demand that meets the needs of the customer, within the constraints of the firm (Stevens and Johnson 2016).

Supply Chain Management Challenges: Present and Future

Next, I will review how collaborative relations can impact the supply chain management challenges of the last mile, sustainability and globalization.

Last Mile of the Supply Chain

One of the most interesting challenges to supply chains is managing the home delivery service portion of the supply chain, which has been coined the "last-mile" issue (Punakivi et al. 2001). The last mile issue has been a particular problem from a logistics infrastructure standpoint, most notably because of trade-offs between routing efficiency and customer convenience. Bretzke and Wolf-rudiger (2013) state that the last mile is a particularly sensitive process for parcel services that often makes up around 50% of the overall transportation cost.

Since a study by White found that "fifty eight percent of customers abandoned their online shopping carts because shipping costs were more than expected (White 2015)", it's easy to appreciate the importance of understanding and identifying the opportunities that lies in the nuts and bolts of how a product/package's chain of custody is outsourced and moved throughout the last mile (White 2015).

Additionally, Boyer et al (2005) states that another issue with the last mile, which firms must address when extending their supply chains to the last-mile, comes from the consumer standpoint. Specifically, the method consumers place orders have a significant impact on transaction costs and customer service. Furthermore, Kull, Boyer and Calantone (2007) suggest that a successful last-mile supply chain initiative therefore seems to require attention to the customer order cycle (Kull, Boyer and Calantone 2007).

Although last mile concept applies to rural areas, it is especially concerning in urban areas with intense congestion. Bretzke and Wolf-rudiger (2013) state that by 2050, 70% of the world's population, or approximately 6.3 billion people, will live in the world's major urban areas. At the forefront of the urbanization trend, we see the development of so-called ''megacities'' which, by definition, have a population exceeding 10 million urban inhabitants. Traffic congestion is frequently reported to be a megacity's most pressing infrastructural problem, even outranking issues related to power and water supply as well as health and safety. Supply chain concepts and collaborative endeavors will be important as the world continues to see increase in population density. In addition to normal constraints in urban areas (e.g. traffic), the last-mile may be affected by political measures and cost, such limiting a city's street access roads to certain hours or particular districts (Bretzke, Wolf-rudiger 2013). Bretzke and Wolf-rudger (2013) suggest that such a limitation of access has an immediate impact on vehicle

productivity, thereby facilitating a readiness for horizontal cooperation between competitors, who are typically rather skeptical toward such arrangements.

Greasley and Assi (2012) discuss the improvement of the last mile delivery performance for retailers using the "hub-and-spoke" delivery link, which aims to drive efficiencies into the supply chain through notions of collaboration. A hub and spokes logistic network is composed of hubs that have the role to carry out transfer operations and of spokes or storehouses that have the role to connect the end customers with the hubs (Zapfel and Wasner 2002). Another possible last mile solution is provided by Graham, Mehmood and Coles (2005). In this study, the authors propose the possibility that the last mile issue can be solved with a network of 3D printing suppliers that could permit many final objects to be made near to or even by consumers on just-in-time printing machines. This is a good example of possible horizontal collaboration because a firm may have its product manufactured via 3D printing by a competitor along the supply chain. As the authors suggest, this revolution in making would have many implications for the economy and society in the future by seriously augmenting or indeed replacing, current systems of manufacturing production and consumption all occurring at a distance. This type of "out-of-box" thinking and collaboration is what will drive the necessary innovation in the future.

Sustainability of the Supply Chain

Although the last-mile is extremely important to urban areas, the impact of urban areas on sustainability is important. To illustrate this point, Bretzke and Wolf-rudiger (2013) states that while our cities cover no more than one percent of the earth's total surface, they consume 75 % of the total amount of energy used and are responsible for approximately 80 % of all greenhouse gases. However, it's not just urban logistics that impacts the environment. As Blanco (2014) asserts ships, trucks, trains, airplanes, shipping containers, and warehouses that the

logistics function uses to deliver products and services both locally and globally account for almost 6% of the CHG emissions generated by human activity. Additionally, Blanco cites EPA estimates that freight movements consume over 35 billion gallons of diesel each year in the U.S. Burning this fuel produces more than 250 million metric tons of CO2, which is over 20% of all the GHG emissions generated by transportation-related fuel combustion.

Kiron, Kruschwitz, Hannaes and Reeves (2015) conducted research found that as sustainability issues have become increasingly complex, global in nature and pivotal to success, companies are realizing the that can't make the necessary impact acting alone. The sentiment was nearly unanimous among managers, which 90% of respondents agree that businesses need to collaborate to address the sustainability challenges they face. Despite the nearly unanimous consensus on the importance of sustainability collaborations, the authors' research noted that the practice of sustainability collaboration lags behind belief, with only 47% of firms that were actively engaged in sustainability-related partnerships. That being said, Kiron al et (2015) noted that a sixty-one percent of those forty-seven percent of businesses assessed their collaboration as "quite" or "very" successful. However, you can also decipher those numbers into a story that indicates less than thirty percent of all surveyed managers say their companies are engaged in successfully sustainability partnership, which demonstrates the potential improvement (Kiron, Kruschwitz, Haanaes, Reeves 2015)

McCrea (2011) asserts that the modern day supply chain must address a widening array of sustainability issues that include environmental issues that include environmental stewardship, labor compliance, health and human safety, social responsibility, and more. Lieb (2010) research indicates that many of the major global 3PL service providers have made important commitments to environmental sustainability improvements during the past several years. Lib

(2010) continues that those companies they researched had made capital expenditures, implemented organizational changes, and modified operating practices to address such issues. Although there research was not conclusive of the main driver for this shift to being more sustainable, the two most commonly cited reasons in their research was that organizational desire to do the right thing with respect to environmental concerns and pressure from customers.

Furthermore, Leib's states that there has been significant progress in sustainability with 3PL partnerships; however, they expect sustainability issues to attract even more managerial attention in the 3PL industry to the expectation of more stringent environmental regulations. Lieb (2012) states that such regulatory changes will put considerable pressure on companies to operate "greener" supply chains, which should provide real market opportunities for the 3PL that have focused on sustainability issues.

How do Supply Chains get Greener?

How do supply chains get greener? Haung and Yu (2011) state that environmental collaboration, which is a concept that refers to the process in which business partners work together collaboratively for a common purpose, can help achieve a goal of green supply chains. These partners include all stakeholder groups that include: internal users, suppliers, manufacturers, wholesalers, retailers, competitors, regulatory authorities and customers. The rationale behind environmental collaboration is that all stakeholders need each other; therefore, they must work in synergy for mutual benefit and success (Un, Cuervo-Cazurra & Asakawa 2010). Dean (2010) and Hansen (2009) state that the pursuit of innovative solutions to business challenges, rather than mere compromise is another fundamental premise of collaborations. Said in another way, Todeva and Knoke (2005) suggest that the success of a business enterprise in the present depends on how well the firm is linked to other organizations that influence and are

influenced by its activities. As such, environmental collaborations have emerged as a critical activity to the long-term prosperity of business enterprises. Azevedo, Carvalho and Machado (2011) asserted that collaboration among supply chain members is the most critical success factor of green supply chain management (GSCM).

Furthermore, Yang et al (2013) states that green supply chain collaboration refers to the extent to which supply chain partners seamlessly integrate and mutually cooperate in performing value chain addition activities, such as procurement, transportation, warehousing, distribution, manufacturing and reverse logistics, in a manner that fosters organizational performance. While Chen and Hung (2014) identified that the core benefits of green supply chain collaboration include synergies in procurement, cost reduction and operational leverage that translate into improved financial performance (Mafini and Muposhi 2017).

Globalization of the Supply Chain

The trade-off for lower costs associated with the globalization of the supply chain is that the supply chain is inherently more complex than single markets due to the numerous subtleties involved in cross-border operations, such as different laws, cultures, languages, norms, environmental/social regulations and other geopolitical concerns (Thompson and Knee 2010). So, how can collaboration mitigate some of these abundant challenges of globalization? Lee (2004) states that the global economy requires global supply chain management strategies to engage and collaborate with many partners, resources and copious amounts of information. The dynamic alignment and agility required to operating in globalization requires visibility and responsiveness. Furthermore, Lee (2004) adds that both of these characteristic require real time information available to all decision makers with operation-synchronization mechanisms and feedback loops; hence, to achieve alignment and agile in the supply chain you need

collaboration. In addition, White (2015) states that "keeping your finger on the pulse of customers' wants and delivery preferences and offering them flexible and appealing shopping options from specific delivery windows to certain zip codes, to in-store pick-up or convenient nearby drop-off and pick-up locations where item can be left securely-will prove beneficial." To illustrate this point, White (2015) provides an example of how return preference vary dramatically across geographies with Europeans consumers (66%) preferring to ship return items directly to the retailer compared to Brazilians customers (71%) who prefer to return items directory to the store. Hence, the author provide a good example of new challenges in the globalized supply chain and the important of tying customer behavior, market data and metrics back to your supply chain network strategically (White 2015).

Trzushkawska-Grzesinska (2017) introduces the concept of "control towers" in Journal of Economics & Management, which could mitigate some concerns of globalization through strategic collaboration. The primary function of control towers would be to coordinate with "control towers" to focus on controlling: supply base performance, conversation processes, balancing between supply and demand, inbound logistics, outbound logistics and procurement. Furthermore, Trzushkawska-Grzesinska (2017) believes supply chain control towers would be used to increase the visibility and achieve supply chain collaboration and agility. Although these control towers are more of a conceptual idea in the market place, in the future companies could either develop their own control tower service or purchase the service from a service provider. In fact, Ochicka and Wieteska (2017) stated that ten of the companies on the Gartner 2016 Supply Chain Top 25 have developed ground-breaking "control towers" to gain and integrate data originating from external and internal sources to achieve the end-to-end supply chain visibility (Ocicka and Wieteska 2017).

Overview of Literature Review

As discussed in the literature review, supply chain management is going through a radical transformation in recent years and with constant increase in technological advancements and the increase demands of customers. I believe supply chains will continue to evolve through the foreseeable future and the pace of change will only intensify. Through my research, collaborative engagement in the supply chains, whether through horizontal logistics or 3PL, could help firms address the future challenges, such as the last mile, sustainability and globalization. Although collaboration could achieve benefits of lower emissions and cheap over delivery cost, there are a number of barriers to impede collaboration such as lack of trust, IT infrastructure, cultural norms, geopolitics and fear of losing a competitive advantage. However, firms must understand their challenges and weight those barriers against the potential benefits of collaboration to state competitive in today's economy. During my research, I believe the most surprising discover was the impact of human nature on collaborative supply chains and rather than technological innovation, which is what I was expecting. The role of trust, cultural understanding/awareness and our innate reluctances to embrace change, which are essential to collaborative relationships, were the larges barriers to collaborative supply chains.

VIII Discussion

How can Collaboration in the Supply Chains Drive Optimization?

Based on the articles researched, it is easy to grasp how collaboration inherently drives optimization across a firm's supply chain. The fierce competition in today's market is led by advances in industrial technology, increased globalization of demand and supply sources, tremendous improvements in information availability, plentiful venture capital, and creative business design (Bovet and Sheffi 1998). "In highly competitive markets, the simple pursuit of

market share is no longer sufficient to ensure profitability, and thus, companies focus on redefining their competitive spaces or profit zone. In the future, the focus will be on coordination across the entire supply chain (Bovet and Sheffi 1998)." The coordination of the supply chain to take advantages of inefficiencies, reduce capacity cost and to take advance to economies of scale certainly helps drive optimization for supply chains; however, collaboration upstream and downstream and even across the supply chain can optimization sustainability goals and increase reliability of a firm's supply chain. To achieve these cooperative and collaborative supply chains, firms will have to overcome the inherent barriers, such as lack of trust and culture awareness, and forge enhanced relationship through better understand of each party throughout the supply chain.

Can Collaboration Address Future Challenges of the Last Mile?

As noted in the literature review, Bretzke and Wolf-rudiger (2013) stated that the last mile is a particularly sensitive process for parcel services that often makes up around 50% of the overall transportation cost. As the population grows and creates increase congestion in cities around the global, this percentage of the cost will likely grow and collaboration will need to increase along the supply chain to reduce costs and meet the ever growing expectation of customers. The question shouldn't be if collaboration will impact the last-mile, but how will firms implement collaborative strategies to address the challenges. Will supply chain professionals seek "hub and spoke" type collaborative arrangements, strategy alliances, outsourcing non-core competencies; utilize horizontal collaboration or some other strategy? I believe the key for addressing your last-mile frontier will be to stay innovative in your collaborative endeavors and foster health and trusting relationships throughout the supply chain.

One of those innovative endeavors should be the implementation of strategies from the sharing economy, such as AirBnB and Uber. In the 22nd annual Survey of Third-Party Providers (3PL) CEOs, which is sponsored by Penske Logistics, ride-sharing companies, mostly notably Uber, are believed by these CEO polled to potentially pose a threat to aspects of the logistics industry in the future. As an international transportation network with technology at its core, Uber operates in more than 60 countries and has attracted significant investment capital. The company could eventually pose a threat to 3PL business by providing last-mile delivery services and/or becoming a small LTL carrier and taking business away from small-volume couriers, 3PL CEOs noted in the 2015 survey (Kilcarr 2015). This type of innovation in the logistically space of supply chains could be the next great solution for the last mile challenge.

Improvements in Sustainability through Collaboration

As identified in the literature review, the need for more sustainable supply chain is a rapidly growing desire of firms and customers. In today's society, the end-user is concerned about the impact of their purchasing decisions make on the world. This impact is not just limited to the carbon footprint of the products and services that they consume but the end-user is also concern about social responsibility of those decisions, such as the working conditions of the labors/manufacturers of the product, free trade and future environmental impacts of the product produced. To address these concerns, collaboration appears to be a very good option for firms, especially smaller firms. Specifically, utilizing 3PL providers appears to be extremely beneficial for reducing emission concerns because it allows for firms to ship their goods on more efficient shipment modes. These efficiencies can be achieved through increase capacities, gaining better economies of scale and greater access/utilization of reverse logistics. Also, creating collaborative strategic relationships and alliances can increase social responsibly concerns for customers.

Additionally, increasing partnerships throughout the supply chain can impact social responsibility. As an example, Starbuck has a collaborative relationships and social development investment initiative programs with their farmer. As of 2017, Starbucks has invested more than $70 million in collaborative farmer programs and activities that include ethical sourcing, farmer support centers and forest carbon projects (www.starbuck.com). This collaborative relationship down their supply chain to the coffee farmer is providing positive social steward brand identification to end-users, which creates value for those customer even if possible increase the cost of the product.

As discussed with the last mile challenge, the sharing economy is regarded as the phenomenon that drives a sustainable development in terms of ecological, social and economic aspects. Collaborative consumption has many advantages for users (Ocicka, Wieteska 2017). The coordination of the supply chain to increase capacity factors of manufacturing, logistics and warehouse is extremely important to having more sustainable supply chains. Collaborative activities such as 3PL logistics, data sharing, strategic alliances and shared warehousing should be able to drive the achievement of mutually beneficial sustainable goals.

Controlling Globalization Concerns

As identified in the literature review, the need for more collaborative relationships throughout the supply chain is imperative due to the increased complexity of globalization. Firms operating across various borders increase their exposure to new rules/regulations, cultures, currencies, business partners, climate challenges, languages, customer expectations, etc. As noted in the literature review, many of these potential barriers can be overcome by utilizing 3PL partners that is able to manage the complexities for a particular region of the globe or specific area of the support chain. As explored by Trzushkawska-Grzesinska, the uses of "control towers"

would pay huge dividends for supply chains in balancing supply and demand of supply and coordinating logistics, especially across the vastness of the globe. Also, the use of collaborative partners in regions should help mitigate supply chain globalization issues such as lack of trust, understanding of numerous laws/regulations and insufficient regional expertise.

Example of Collaboration Driving Optimization

During my research, I reviewed an example of collaboration that covered challenges of urban congestion (i.e. last mile), sustainability and globalization. This real world example was from Ocicka and Wieteska (2017) about FM Logistic Pooling's SPHINX project developed by the French logistic service provider and highlighted in an article titled "Sharing economy in logistics and supply chain management." This project involved several food manufacturers sharing FM transport and warehousing capacities to mix their products and conduct joint deliveries to the super markets in European retail distribution network. These food manufacturers, which includes Master Blenders, Kellogg's and Heinz, engaged in close collaboration with the 3PL provider to shared physical assets and information, which is essential for forecasting, planning and replenishment. As a result of this project, the companies realized significant positive impacts to the Triple Bottom Line philosophy, which includes economic (i.e. significant reduction of transportation and distribution costs and shorter lead time), social (i.e. development of supplier competences in CPFR and enhancement of standards) and environmental (i.e. discarbonisation and reduced road congestion) benefits (Ocicka and Wieteska 2017).

As illustrated by this example, the sharing economy, which is a form of horizontal collaboration, brings advantages in logistics and supply chain management by enabling companies to share cost-intensive physical assets like warehouses or vehicles as well as

information flows. This project's innovative vehicle-sharing platform allows companies to share information on assets, routes and filling rates. According to the 2016 World Economic Forum, it appears that this sharing of assets will grow in the future because they estimated that 15% of the trucking market would be using shared transport platforms and 20% of the warehouse market move into shared agreements by 2025 (Ocicka and Wieteska 2017).

Ideas for the Future State of Collaboration in Supply Chains?

I certainly think that horizontal collaboration (i.e. sharing) and use of 3PLs is the future for supply chains because there is lot of potential efficiency and benefit that could materialize from this collaborative arrangements. Certainly the use of shared warehousing, logistics, information and other resources could provide a wind-fall of benefits for supply chains, which would eventually be passed down to their customers. However, I believe the idea of "hubs and spokes" and "control towers" will be the next opportunity of benefit from collaboration because it expands the coordination of collaboration, which is the key. If supply chain collaboration had a larger network of partners, then all firms would realize more efficiency and therefore lower costs, possibility increase their sustainable practices.

For this reason, I believe firms and industry organizations need to take a look at the developments in power markets for some guidance of how collaboration amongst utilities led to reduce cost, increased reliability and smaller carbon footprints. Many electric utilities in the United States are participating in a Regional Transmission Organization (RTO) or Independent System Operator (ISO) markets. These markets require all utilities to provide a bid one day in advance of their expect load requirements (supply) and for all potential supplier (generators) to submit their minimal cost for providing electricity at certainly nodal locations. The system operators receive this information and their massive computers solve for the most optimal supply

plan. This plan takes into consideration known congestion and supply needs at various nodal points on the electric grid. This collaborative market also has a real time market that determines where additional or reduction of supply (i.e. electricity) is needed to serve changes in the real time load and new congestion constraints. I could see a similar but modified market being developed for supply chain to capture the efficiency of coordination.

In my hypothetical scenario, large retailers and wholesalers can acquire their needed supply chain services (i.e. shipment of goods) and various logistic providers (e.g. 3PL firms) could bid in their services. In addition, you could have large retailers, such as Wal-Mart, that also have owned logistical assets participate in both sides of the market, similarly to large public utilities. The pooling of resources into a market and allocating the logistics based on economics, congestion constraints and reliability would be a big cost saving for the entire market. Also, this type of pooling market would require companies to have less overall capacity (e.g. smaller backup fleet of delivery vehicles or contracted logistics) because they would be able to utilize 3PL or other competitors' logistics in the event of increased supply demand or abnormal maintenance to their owned logistical services. This new supply chain market would also solve real time congestion issues in a last mile challenge, increase sustainability and better manage the globalization of the supply chain.

All that being said, supplying and servicing electricity needs is much easier because electricity is a homogeneous commodity, where typical supply chains provide millions of variation of goods and services. However, a different scale version of this idea is certainly possible. You only have to look at what Uber has done to the shared ride economy. They implement a similar market for drivers and passengers without actually owning any assets. Although this hypothetical example would be more complicated than Uber's business, Saenz,

Gupta and Makowski (2017) discuss a more relatable example in an article in Supply Chain Management Review. In this articles the present an example of collaboration that is not only at the vertical or horizontal levels, but also at a multidimensional or "diagonal" level. In this example, Walmart, Uber, Lyft and Deliv teamed up to implement a pilot for a last mile grocery delivery service that integrates the strengths of each participant. Walmart customers place online orders that are filled in one of the retailer's warehouses. Delivery drivers from Uber, Lyft, Deliv are equipped with GPS technology and mobile devices that enable them to access information on appointments. In addition to synchronizing the itineraries, the drivers also optimize route schedules using a suite of integrated applications (Saenz, Gupta and Makowski 2017).

IX CONCLUSION

As the speed of change continually escalates with the rapid advancement of technology, increase urban congestion in mega cities, the social consciousness of customers expand and the vastness of the world continues to appear to shrink, firms will need to keep pace to in order to survive and thrive. Supply chain is certainly one area of improvement that most businesses will focus on in the future. I believe the best and most fruitful method to improvement in the supply chain is through collaboration. As stated by Wiengarten et al. (2010), "in an era when supply chains are under extreme pressure to cut costs, proactive and collaborative supply chains, which exhibit behaviors of information sharing and join cost reduction programs, outperforming adversarial supply chain (Wiengarten et al., 2010). This is why firms need to seek collaborative opportunities to identify win-win situations with their supply chain partners. As stated by Russo et al. (2015) "in order to maximize customer value and minimize system-wide costs, businesses must now compete as an integral part of a supply chain and no longer as individual firms (Russo, Confente and Borghesi 2015)." These collaborative arrangements upstream and downstream the

supply chain should lead to improvement knowledge, economies of scale, data analytics and sharing of resources should drive optimization to meet the needs and challenges of the future.

Although firms face numerous challenges in today's business climate and many of the future challenges are not conceptualized until they are realized, I focused my research on identifying how collaboration could mitigate the negative effects of the challenges of the last-mile logistics, supply chain sustainability and the rise of globalization. With each of these challenges, the literature review discussed how the use of collaboration strategies, such as horizontal collaboration or 3PL shared resources, could lead to efficiently navigating the last-mile, optimizing capacity of the supply chain, reducing the impact of the supply chain on the world's resources and creating more dynamic alignment and agility in the globalized marketplace. Although there are many ways collaboration have achieved benefits for supply chains, I believe the sharing of resources (i.e. horizontal collaboration), which sometimes occurs with competitors, is the key. As stated by Allen (2017), asset sharing, which includes warehouses, trucks and drivers, is emerging as an opportunity to help companies meet the demands of today's customers by facilitating collaboration with peers and competitors to drive efficiencies, improve service and manage costs. This practice, which centers on sharing space, translates into shared costs, which will ultimately lower overall supply chain cost and improve cash-to-cash cycles (Allen 2017). In addition to lowering cost, Blanco and Cottrill (2014) provided real-world example of how collaboration, including with competitors in the case of Ocean Spray and Tropicana, could also deliver reductions in the supply chain's carbon footprint and by extension improve the environmental performance of participating organizations (Blanco and Cottrill 2014).

So if collaboration in the supply chain such as win-win proposition for firms, why would any firms hesitate to enter into these collaborative partnerships? Although it's clear that they're inherent benefits from collaborative supply chains, these relationships with supply chain counterparties, third-parties firms and competitors does materialize into additional risk and complications. As indicated by Fawcett et al (2008), human behavior is the root of nearly all the barriers to collaboration in the supply chain due to the lack of trust and the adverse reaction to change that is typically instigated by collaborative supply chains. As Ocick and Wietesk (2017) noted there are interdependencies of the various aspects of sharing resources in logistics and supply chain management and sharing of assets required sharing of information and coordination of activities. Many individuals are concerned with the lack of comfort and interdependence required through collaboration.

Ultimately, firms have to understand the challenges with their supply chain and anticipate their future challenges and determine how to utilize collaborative partnerships to optimize their supply chain. Although barriers to collaborative supply chains are well documented, supply chain managers need to mitigate these barriers and implement collaboration and coordination in common and innovative ways. Whether it's through horizontal collaboration, 3PL services or strategy alliances/partnerships, it's imperative for firms to eliminate waste, share assets, increase capacity, enhance the sustainability and increase the speed and reliability of logistics throughout the supply chain. Firms that hesitate and resist the opportunity to work in concert with others would have trouble competing in the marketplace. Companies have realized that the real competition is not company against company but rather supply chain against supply chain, in sum up the supply chain need to be more competitive as a whole through the value it adds and the costs that it reduces when relevant information is made available to decision makers. In order

to maximize customer value and minimize system-wide costs, businesses must now compete as an integral part of a supply chain and no longer as individual firms (Russo, Confente and Borghesi 2015)."

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