CHAPTER-1

INTRODUCTION

1. INTRODUCTION

In recent times, competition is no longer confined between firms; it is between their supply chains. Managing a supply chain has become all the more complex with reduced product lifecycle, increased globalization and increased dynamicity in customer tastes and preferences. Thus firms are facing a tough time to satisfy their customers’ requirements in such a complex and turbulent business environment. Hence the focus is more on managing supply chain operations efficiently and effectively. Supply chain management as a phenomenon crosses organizational boundaries and includes multiple entities and business domains. Frankel et al. (2008) underscored supply chain management as the planning and managing of different business processes like procurement of raw materials, converting them into final products and all logistics activities that involve coordination and cooperation with other business partners participating in the supply chain. All these business processes and related activities have inherent risks and associated vulnerabilities. This coupled with expanding markets, reduced product life cycles and outsourcing issues add to the growing complexity of supply chain operations. With global supply chains, there is additional burden of increased vulnerability due to transportation risks, cultural risks and exchange rate risks (Berry, 2004). Such risks result in greater exposure of global supply chains to disruptions, as these supply chains by virtue of their complexity are slow to respond to changes. According to a study conducted by Computer Sciences Corporation in 2004, 60% of the firms reported that their supply chains were vulnerable to disruptions (Tang and Tomlin, 2008). These risks and disruptions make managing the
different business processes in a supply chain quite challenging; hence investigating these risks and devising effective mitigation strategies are of paramount importance.

A supply chain disruption is an unexpected situation that can result in a negative outcome for a firm and its supply chain performance. Recent firms are facing an increase in the number of supply chain disruptions (Wagner and Bode, 2008; Gligor and Holcomb, 2012). For e.g. Dole suffered a large revenue decline after their banana plantations were destroyed after Hurricane Mitch hit South America in 1998; Ericsson lost 400 million Euros after their supplier’s semiconductor plant caught fire in 2000; in 2001, Land Rover had to lay off 1400 workers after their supplier became insolvent and Ford had to close 5 plants for several days after all air traffic was suspended following 11 September, 2001 incidents; Tsunami in the Indian ocean affected severely the tourism and the fishing industry in 2004; Dell had to recall 4 million laptop computer batteries made by Sony due to a fire hazard in 2006; floods in Thailand disrupted both auto (e.g. Toyota, Honda) and electronics (e.g. Samsung, Apple) supply chain operations leading to huge losses in 2011; the same year also witnessed the earthquake in Japan that halted production of General Motors and Apple (Martha and Subbakrishna, 2002; Chopra and Sodhi, 2004; Banham, 2009; Kate and Kim, 2011; Brennan, 2011). This earthquake severely affected semiconductor and automotive companies like HP, Honda, Toyota and Nissan that lost millions of dollars.

However, these instances also resulted in learning for the affected firms. For example in the year 1998, Dole suffered huge blow to its banana exports as 70 percent of the crop was destroyed. But, the company undertook replanting campaigns and within three years in 2002 were able to
match the export figures prior to 1998 (Fao, 2002). Similarly, following the 2000 disaster of fire outbreak at a supplier’s plant; Ericsson learnt a lesson of not having a business continuity plan. While both Nokia and Ericsson were dependent on this supplier for supply of a chip; Nokia has a contingency plan that helped it to restore operations when it caught fire. However, Ericsson was late to react and did not have a plan B and hence suffered a huge loss (Schoemaker, 2002). In 2001, Land rover was forced to lay off its workers as its key supplier became bankrupt and production could not continue without parts. With this, Land rover realized the need of an alternate supplier. Ford was forced to close down its 5 plants as air traffic was suspended (Sodhi and Tang, 2012) and realized the importance of alternate supply from local sources. Dell recalled laptop batteries anticipating overheating and catching fire. This was due to a manufacturing defect in those laptop batteries that made dell realized to monitor supplier’s manufacturing process (Sodhi and Tang, 2009). The Thai floods and the Japan earthquake in 2011 made the automobile and electronic manufacturers realize that they should not locate their facilities solely based on economic reasons; rather they should check the susceptibility of those areas to environmental disasters as well. Further they should have certain back up facilities in nearby locations.

Quite clearly, there are tremendous losses which businesses suffer due to these disruptions and even the best supply chains (Dell, Toyota, Honda, GM etc.) are not immune to it. However, these disruptions can provide valuable insights and learning which can help businesses not only to recover but also to prepare well for future. Hence this business context led firms to devise different supply chain capabilities that can help them to minimize the negative effects of the supply chain disruptions. Such capabilities are supply chain flexibility (Skipper and Hanna,
Supply chain flexibility aims to devise alternate configurations so that a supply chain can quickly shift to one of these during a supply chain disruption (Skipper and Hanna, 2009). Supply chain agility helps a supply chain to speedily respond to its customer’s demands in the market (Gligor and Holcomb, 2012). Supply chain robustness aims to provide stability to supply chain operations during a disruption (Wieland and Wallenburg, 2013). Supply chain resilience enables the supply chain to restore its operations once faced with a disruption or move to an improved state of performance (Ponomarov and Holcomb, 2009). While flexibility aims to have adequate room to absorb negative effects of a disruption; agility aims to provide a quicker response to customer requirements. Again, while robustness in supply chains is aimed to maintain infrastructural stability; agility is all about reacting in a proactive manner. Hence while agility is concerned more with responding in a speedy manner to customer requirements alone; resilience is a more important supply chain capability as it is aimed to restore supply chain operations in the face of any kind of disruption (Carvalho et al., 2012).

Existing literature on supply chain management suggests (on a conceptual note) that in order to develop resilience in supply chain one needs to have certain supply chain capabilities like supply chain flexibility, supply chain collaboration, supply chain visibility and supply chain velocity (Juttner and Maklan, 2011). The literature also suggests that in order to develop the supply chain capabilities it is essential to develop logistics capabilities (Gligor and Holcomb, 2012). However, the current literature has not investigated empirically the relationship of these supply chain capabilities.
capabilities and supply chain resilience (Juttner and Maklan, 2011). Further, the inter-relationship among these supply chain capabilities in developing supply chain resilience has not been explored. Again, there is no definite empirical evidence in the contribution of logistics capabilities in developing supply chain capabilities (Gligor and Holcomb, 2012). Lastly, the inter-relationship among the dominant logistics capabilities (viz. demand management interface capability, supply management interface capability, information management capability, coordination capability and cooperation capability) are yet to be explored (Gligor and Holcomb, 2012). Finally, the impact of supply chain resilience on supply chain performance is yet to be addressed. The current research aims to fulfill these literature gaps and contributes to the domain of supply chain management.

2. MOTIVATION

An increased competition in the marketplace coupled with growing environmental uncertainties (e.g. floods, earthquake, terrorism etc.) has urged the firms to concentrate their efforts on safeguarding their supply chain performance (Wagner and Bode, 2008). The 5th Supply Chain Resilience Survey (2013) underscored the growing nature of disruptions and associated consequences. This survey was undertaken by the Business Continuity Institute (established in 1994 in United Kingdom for educating individual members about business continuity practices) on an international level. The associated field work commenced on the 16th April 2013 and closed on 16th August, 2013 with 519 responses from 71 countries. All members of the Business Continuity Institute received an individual email invitation to complete the online survey. The Members of Chartered Institute of Purchasing and Supply (UK based organization connecting purchasing and supply chain professionals worldwide) also participated in the survey.
The survey found that 75% of the respondents have experienced at least one disruption (a finding consistent with those in each of the previous four years of surveys). The survey also found that 15% of respondents had encountered disruptions costing in excess of €1M and 9% of the respondents had experienced a single disruption costing in excess of €1M. The dominant reasons of disruptions were identified as unplanned IT or telecom outages (55%), adverse weather (40%) and outsourcer service provision failure (37%). The data collected from the survey showed that the loss of productivity (55%) followed by customer complaints (41%) is the immediate consequence of disruptions. The other strategic consequences of disruption were experienced through damage to brand and reputation (24%), stakeholder/shareholder concern (26%) and a fall in share price (3%).

The aforementioned data shows that in order to survive in a competitive marketplace, a firm’s supply chain performance must be safeguarded from disruptions. This can be achieved through creating resilient supply chains (Ponomarov and Holcomb, 2009). The extant literature suggests that in order to develop supply chain resilience there is a need to develop and integrate the logistics and supply chain capabilities of a firm (Juttner and Maklan, 2011; Gligor and Holcomb, 2012). Therefore, the current investigation aims to empirically investigate the relationship between various logistics capabilities (viz. demand management capability, supply management capability, information management capability and coordination capability) and supply chain capabilities (viz. supply chain collaboration, supply chain visibility, supply chain flexibility and supply chain velocity) and their contribution towards developing supply chain resilience. Finally, the study explores the influence of supply chain resilience on supply chain performance.