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Using ICT in Developing a Resilient Supply Chain Strategy

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Abstract

Supply chains in today's globalization are very vulnerable to risks such as natural disasters, terrorism, cyber attacks and credit crunch etc that could easily disrupt the flow of raw materials, finished products and information. Furthermore, these disruptions could yield to a drastic loss in productivity, competitive advantage and profitability that would most probably lead to bankruptcy if not managed appropriately. In fact, supply chain vulnerability is now a major concern in many organizations as some research programs have started to illustrate that modern supply chains are at greater risks than their supply chain managers could even recognise. The aim of this article is to analyse these risks and discuss how they could be prevented and/or managed. In addition, by implementing ICT in collaboration with certain strategies, a resilient supply chain could be developed. Moreover, in case any of these risks occur, the possibility for an organization to be able to bounce back and start operations in the shortest possible time is also considered.

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Keywords: Supply chain risks; Resilient strategy; ICT; Six Sigma; Simulation

1. Introduction

In today's competitive world where globalization now plays an important role in organizations, it is necessary to adopt a resilient strategy to overcome or prevent any form of disruption that may occur after an incident.

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In fact, according to the report of the Business Continuity Institute(BCI) where 519 organizations from 71 countries were surveyed, '75% of respondents still do not have full visibility of their supply chain disruption levels'[1]. The disruption includes mainly unplanned IT or telecom outages, adverse weather disruption, outsourcer service provision failure etc. This is just the top of the iceberg as other disruptions, discussed later on in the article, are of equal importance.

The aforementioned has motivated the authors to investigate this area further in order to build up resilient strategies of the supply chain. This article therefore exploits a theoretical approach to investigate the supply chain risks and their impacts, and recommends resilient strategies, with ICT as a platform enhancing the resilient strategy that may help organizations to resume operations in the shortest possible time after disruptions in any part of the supply chain.

The research methods are mainly qualitative involving various scientific publications, relevant literatures, journals as well as the authors' professional lecturing experiences in the field of management and modelling and simulation. Quantitative secondary resources are also exploited to illustrate the causes of disruption.

The objective of the research is to develop a supply chain resilient strategy in collaboration with ICT as a platform that would help organizations to resume normal operations in the shortest possible time after disruptions. The article is divided into four chapters namely, supply chain risks, developing a resilient strategy, the role of ICT and the role of simulation. The Supply Chain Risk chapter discusses different types of risks and their impacts on organizations with reference to various studies like that of the Business Continuity Institute, Grossman studies etc. The next chapter, which is Developing a Supply Chain Resilient Strategy, introduces strategies and tools that may help an organization to avoid these risks and or be able to bounce back into normal operations after disruptions. The Role of ICT and the Role of simulation are discussed next, and they portray how the resilient strategy developed could be more effective and efficient by integrating it into an ICT platform. Furthermore, it emphasizes that simulation can also be used to develop a resilient strategy by exploiting the Six Sigma methodology.

2. The supply chain risks

The supply chain in today's globalization, where the activities of many organizations could be linked to nearly all the continents of the world, faces a lot of risks that could have a negative impact on the productivity, competitive advantages and profitability etc if not managed accordingly. In fact, Christopher and Peck highlighted that 'in today's uncertain and turbulent markets, supply chain vulnerability has become an issue of significance for many companies'[2]. However, currently, it seems as if most of these organizations have fallen short of taking supply chain vulnerability into consideration. Moreover, according to the studies of the Business Continuity Institute (BCI) where 519 organizations from 71 countries were surveyed, '75% of respondents still do not have full visibility of their supply chain disruption levels'[1].

With reference to Figure 1, the result of the studies shows that 55% of the respondents experienced unplanned IT or telecom outages as their primary source of disruption, whilst 40 % of the respondents experienced adverse weather disruption, and 37% with outsourcer service provision failure[1].

Although the aforementioned are the most significant risks, the other risks according to the order of importance as loss of talent, skills, transport network disruption, new laws or regulations and cyber attack etc are of equal importance and should not be left out during a business continuity planning.

From another perspective, Tang[3], stresses that risks could be categorized as high profile and common. The high profile risks includes disasters like earthquake, terrorism, tsunami, SARS etc, whilst that of the common risks are mainly operational taking into account demand, supply, materials and information flow.

Referring back to the BCI studies, although it covered most of the possible risks that organizations may be vulnerable to, the risks of miscommunication was not considered. This is what, Mensah and Merkuryev[4] point out, in another development, that 'one area which can also have a significant impact on the supply chain is the risk of miscommunication'. It is also evident in the Holmes Report where miscommunication cost some 400 organizations in the UK and the US approximately US$37 billion[5]. Furthermore, in a recent incident, the French train operator SNCF purchased 2,000 new trains at a cost of €15 billion only to find out that they were too wide for the regional platform and they now have an additional cost of €50 million to widen the platforms[6]. Many other incidents have occurred recently with giant companies like Toyota and Ford Motors recalling thousands of newly manufactured