Supply Risk Structural Equation Model of Trust, Dependence, Concentration, and Information Sharing Strategies

Santanu Mandal, IBS Hyderabad, Andhra Pradesh, India
Sourabh Bhattacharya, Institute of Management Technology, Hyderabad, Andhra Pradesh, India

ABSTRACT

The purpose of the paper was to formulate a framework for supply side risk and empirically validate the same in the Indian context. A framework was developed for supply side risk by starting with a structured literature review complemented with theoretical underpinnings from the principles of Resource Based Value, Transaction Cost Economies and the Relational Capital Theory. The study validated the framework through a survey of 164 purchasing and supply chain managers in India. The study used confirmatory factor analysis to develop the measurement model. Structural equation modeling was deployed for testing the proposed structural relationships and hypotheses. The findings clearly indicated that factors such as supplier concentration, supplier dependence, sourcing strategies and trust towards customers enhanced the supply side risk situation for the organization. In contrast to this, trust towards suppliers and high level of information sharing among the supply chain partners created undesired risk.

Keywords: Confirmatory Factor Analysis, Sourcing Strategies, Structural Equation Modeling, Supplier Concentration, Supplier Dependence, Supply Chain Management, Supply Risk, Trust Towards Customers

INTRODUCTION

In the early 1980s and 1990s, many US manufacturers reduced the number of direct suppliers to decrease the hassles and cost of managing multiple suppliers and to develop better supplier relationships. Some of the firms even pushed for sole sourcing. While managing a smaller number of suppliers is more efficient, it can increase supply risks (Tang & Tomlin, 2008).

The literature on supply chain risk management shows that the term supplier concentration denotes a situation when the buying firm has only a small number of suppliers (Wagner & Bode, 2006). Various benefits of supply base reduction efforts are cited in the literature such as improved product (Kekre et al., 1995) and relationship quality (Ellram, 1991). Nonetheless, established sources recommend implementing a reduction in the supply
base only after considering the consequences in terms of risk exposure (Christopher & Peck, 2004; Elkins et al., 2005; Giunipero & Eltantawy, 2004).

Improved supplier practices and relationships provide enormous opportunities for cutting costs and improving supply chain performance. To achieve their competitive potential, organizations are increasingly developing long-term partnerships with fewer reliable suppliers. The presence of a better buyer-supplier partnership quality enhances supply chain performance in the presence of supply risk (Srinivasan et al., 2011). Moreover, in the current make-to-order environment firms are faced with the challenge of choosing the appropriate supplier for its different component parts from the supply portfolio (Strang, 2012).

The importance of supply risks have gained momentum in the last decade when both natural and man-made events like earthquake, tsunami, flood, strikes, fire and terrorist attacks have disrupted inter-dependent supply chain resulting in huge economic losses. Examples of such incidents and losses include: in 2006, due to a fire hazard, Dell recalled 4 million laptop computer batteries made by Sony, Ericsson lost 400 million Euros after their supplier’s semiconductor plant caught on fire in 2000, Land Rover laid off 1400 workers after their supplier became insolvent in 2001, Dole suffered a large revenue decline after their banana plantations were destroyed after Hurricane Mitch hit South America in 1998, and Ford closed 5 plants for several days after all air traffic was suspended after 11 September incidents in 2001. The reader is referred to Christopher (1992), Martha and Subbakrishna (2002) and Chopra and Sodhi (2004) for more details.

The recent floods in Thailand disrupted the supply of component parts for carmakers like Toyota, Honda, as well as electronic firms like Seagate, Western Digital etc. The importance of such disruptions cannot be undermined in that they led the firms to a grave supply side risk, which in turn affects their capability to properly execute their downstream operations. Consequently, firms are in a situation where they must reformulate their operational strategies to allow minimal shock to the corresponding schedules in times of such contingencies. Hence, a firm has to execute its upstream operations accurately for timely execution of its downstream activities.

This backdrop therefore necessitates the study of supply side risk in detail. In this paper, we therefore attempt to investigate factors that could be used to predict the supply side risk from a supply chain perspective. These will be of high relevance to the concerned decision making members involved in the supply chain management for the focal firm so that the firm would take appropriate steps giving due consideration to the above factors while formulating operational, tactical and long term strategies.

Earlier studies (Wagner & Bode, 2006) empirically tested for the significant predictors of supply side risk (amongst others) and obtained supplier dependence, single sourcing and global sourcing as significant predictors. However, the model could not explain a significant portion of the variation in the supply side risk. Their study also considered supplier concentration as a predictor but that was not a significant one in the German context. The present study therefore adds to this by considering trustworthiness as an important relational resource along with dependence on supplier and customer, supplier concentration and sourcing strategies to conceptualize a model for supply side risk. In doing so, the present study also answers to the research call made by Wagner and Bode (2006).

The paper has been organized as in the following order. The first section deals with the theoretical underpinnings from Resource Based View (RBV), relational capital theory and Transaction Cost Economies (TCE) literature and how they relate to the variables modeled as predictors of supply side risk. Following section throws light on the literature on risk and discusses several important definitions of supply chain risk as cited in literature. The next section deals with the discussion of each of the predictor followed by the formulation of hypotheses. The subsequent section deals with the theoretical model followed by methodology, data analysis and results. The final section
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