DISSERTATION REPORT

ON

RISK EVALUATION AND MANAGEMENT INVOLVING IN SUPPLY CHAIN MANAGEMENT: A CASE STUDY ON ANWAR LANDMARK LTD.

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Letter of Transmittal

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Amir Husen
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Subject: Submission of dissertation report.

Dear Sir,

I am here by submitting my dissertation report entitled Risk evaluation and management involving in Supply Chain Management: A Case Study on Anwar Landmark Ltd, which was assigned to me as a requirement for the completion of the EMBA Program. I have discovered this study very interesting, beneficial and insightful.

The entire report is based on my practical experience in Anwar Landmark ltd. I expect this paper to be informative as well as comprehensive. This report will help me a lot in my future career.

Thank you very much for your guidance and cooperation during the course without which this dissertation report cannot be completed. Moreover, if you have any further enquiry concerning any additional information, I would be very pleased to clarify that.

Yours sincerely

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ABSTRACT

In this dissertation I try to find out the actual condition of risk evaluation and management involving in Supply Chain Management in Anwar landmark ltd. Also, to determine the difference between actual condition and SCM rules and regulation, Cause, Management thinking a significant impact on SCM and Risk evaluation. From this study it can be said that there is an urgent need for raising awareness and education on mentioned point. Proper management strategy is needed to ensure proper and risk free SCM operation. For further study, it is needed to collect more information on impacts, disposal and management to draw a clear conclusion. Need to collect information and examples from developed country or the country, which has sound in SCM risk management & management involving. Find alternatives and appropriate technologies for developing SCM strategy. Need extensive study on this Risk evaluation and management involving in Supply Chain Management aspects as well.

LIST OF ACRONYMS

SCM	Supply Chain Management
REI	Real Estate Industry
REHAB	Real Estate and Housing Association of Bangladesh
SCRM	Supply Chain Risk Management
TQM	Total Quality Management
GDP	Gross domestic product
LC	Letter of Credit
GPRS	General Packet Radio Service
ERP	Enterprise Recourse Planning
RFI	Radio-frequency identification
CTPAT	Customs Trade Partnership Against Terrorism
OSC	Operation Safe Commerce
SCRM	Supply Chain Risk Management

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CHAPTER 1

INTRODUCTION

1.1 Background of the study:

For performance improvement as well as to stay competitive in the market risk, the most important and valuable way is to have efficient supply chain management. In this way, the organizations remain competitive in the market since there is great competition for SCM among organizations. In the era of the early 1990s, the global market came under great competition in order to provide the right products or services at the right time and right place considering risk factors.

The Real Estate industry worldwide has become competitive now in the local market and the work tasks should be accomplished to increase the overall effectiveness of the Real Estate industry and its supply chain. Thus, for this purpose, now the Real Estate industry must understand the concepts and practices of supply chain management to increase competitiveness and overall profit.

At the same time, Risk evaluation and management involvement in Supply Chain Management should be identified and solutions should be sought.

The management of the supply chain involves culture, vision, strategy, and process to manage the best possible flow of money value, quality, and other components from innovative and reliable resources and suppliers and then delivering to customers the products of high quality that they produce at a very competitive price. The importance of supply chain management in the real estate industry has increased since it is now known as an essential tool to gain success in high competition.

Further, along with the development in communication and information technologies, it has also become a challenge to provide and share information in real-time as this element has a great effect on the overall supply chain performance in these industries.

The system also provides universal information that helps achieve the industry's goals.

1.2 Risk evaluation and management involvement Statement:

The continuous variations also entail that the organizations work with the increased volume and great information diversity. Thus, the organizational managers have great concerns about the Risk evaluation and management involvement in the information that they have for making decisions and planning purposes. The majority of the companies also have to target the changing needs of customers and the instabilities of the environment but many disturbances can damage production and its process, just like the changes in demand patterns, breakdowns of machines, fluctuations in finances, and many others. Thus, the variable of uncertainty should also be focused on.

Many firms are increasingly adopting the strategic supplier partnership in order to develop inter-organizational collaboration in their supply chain. There occur some main challenges and also some successes that all are connected with the way they handle and control the inventory level. It also depends on how it affects the satisfaction of customers since it remains unknown how the collaboration of partners and companies with different marketers and suppliers affects organizational performance and the supply chain risk.

Organizations are encouraged to share information but due to management involvement in the match of demand and supply, and also due to the benefits and costs of the firms, there might be changes in information sharing.

However, it has become an urgent issue for organizations to select a suitable strategy of postponement in order to conduct some of their main risks related to information uncertainty. Under this condition, the decision makers call only those workers who are experienced and have expertise in the evaluation of the belief degree.

So far, an in-depth investigation has not been conducted on the degree of support given by online platforms to the risk management & management involvement relationships. This is so because it is really problematic to assess the assessing the real contributions of these elements. Although the current scenario has been studied previously around the world it has not been studied in depth or few studies in Dhaka, Bangladesh, especially in the context of the Real Estate industry of Anwar landmark ltd.

1.3 Significance of the study:

This study aims to investigate a model describing an association between organizational performance and supply chain management practices. SCM practices are known as the activities performed by organizations to manage their risk evaluation & management involvement in their supply chain and practices effectively. This study focuses on different and diversified supply chain management aspects.

However, due to the lacking of a formal model, the inclusion of these activities at the downstream as well as the upstream level and connecting these activities to the organizational performance as well as the competitive advantage was not possible in previous studies. In this study, it is assumed that studying practices of supply chain management from the downstream and upstream sides, will help practitioners as well as the researchers to understand in a better way the extent and actions related the supply chain management, and also it would enable the researchers to study the supply chain management's consequences.

By providing a valid model to study the supply chain management practices and by developing empirical findings on the effects of risk management on the competitive advantage and performance of organizations, it is assumed that this study would provide some beneficial guidance to study and apply SCM practices in firms and to assist further to have research in this area.

Adding to this, by providing a measure with multi-dimensions of building SCM practices and by defining its overall efficiency to improve organizational performance and attain competitive advantage, this study has given SCM managers some important tools for the evaluation of comprehensiveness of current practices of supply chain management.

1.4 Scope of the Study:

The SCM practices provide many different concepts that include upstream as well as downstream segments of the supply chain. This study includes the variables of the customer relationship, strategic supplier partnership, quality information sharing, level of information sharing, organizational performance, and postponement. Operational measures for the variables were empirically designed and analysed by utilizing data that was collected from the respondents of a survey.

The study's anticipated size of the sample was collected from the Real Estate industry of Anwar landmark ltd. The hypothesized relationship was studied through Structural equation modelling.

CHAPTER 2

ORGANISATIONAL PROFILE

2.1 Organizational profile

Supply Chain Management for Real estate companies is co-ordination of people, properties, processes, vendors, information and resources to deliver products or services to the end customer. The SCM involves managing complete activities for buying, selling or renting land, buildings or housing.

Supply Chain Management can be done effectively with technology. The software solutions are well equipped with advanced analytics tools that analyze data from all departments of business. SCM can be used to create a more agile enterprise that can take decisions proactively to maximize business results. Here we look at how Real Estate Industry can use Supply Chain Management Solutions:

2.2 Managing Properties & Assets:

The real estate companies can use the SCM solution to manage their properties, plants, equipment's, land and buildings etc. All Fixed Assets including properties and other investments can be tracked using SCM Solution. The categorization of properties like commercial, residential, industrial, agricultural, sales, rental properties etc can be done an automated system.

2.3 Forecasting & Planning:

The real estate business requires thorough analysis of supply & demand for properties. The estate companies can use the software to manage the various property listings for rentals & sales etc. The active listings, enquiries on properties, ownership, tenant and lease details etc can be maintained using SCM system. The software can be used to analyze the demand for properties in various locations, their pricing, investment information etc.

2.4 Documentation & File Management:

The documents associated with the properties can be managed using the SCM System. All property listings can have associated documents for title or lease deeds, associated tenants, and ownership or investor data on the system. The documentation related to properties can be managed effectively using the SCM system. It effectively reduces the time for creating agreements and managing leases, especially for large properties. Real estate companies and organizations use document management and digitization for meeting compliance needs without hassles.

2.5 Sourcing & Procurement:

One of the most pressing needs for organizations is to keep their inventory optimized. The SCM solution minimizes the gap between demand and supply for items. The optimized procurement is in line with the planned goals and milestones. The SCM system helps companies to operate with optimal inventory to reduce capital expenditure. At the same time, it ensures that all ongoing projects smooth effectively.

2.6 Purchase Orders & Vendor management:

The SCM System can automate purchase order creation, approvals, payments, performance management for vendors. Once the purchase orders are created, the payments for vendors can be done against milestones. The contracts, vendor payments and performance can be managed using SCM software. With the SCM System, companies are in a better position to negotiation with vendors; leverage bulk discounts and also manage vendor payments transparently.

2.7 Managing Partners, Locations and franchises:

The real estate businesses typically span across locations and cities. It also involves multiple stakeholders. Managing a multi-location business can be quite complex. With the SCM system, information gets centralized. The management can track the various locations and franchise data from any place. The location wise data, performance metrics and all information can be tracked using the SCM system.

2.8 Projects & Property Development:

Real estate companies typically manage multiple properties and sites. Many a times, they also have to look at ongoing property developments and construction. The ongoing projects can be managed through the SCM system. Even when these projects are outsourced to other developers, the execution can be tracked using the SCM System. All property development & maintenance work can be managed using SCM system.

2.9 Streamlining Logistics & Warehouse :

The real estate companies need a state-of-the-art solution for managing their logistics and warehousing. The space utilization, consumption trends and availability of raw material for ongoing projects etc. can be automated using SCM system. A centralized system can track multiple warehouse locations, transportation channels and streamline logistics for companies.

2.10 Managing Compliance :

The regulatory compliance and adherence to law of the land is pivotal for real estate companies. The SCM system provides an effective workflow system for getting these approvals in order. When projects are planned, the tax implications on sourcing, developments and services need to be analyzed carefully. An SCM system analyses this data and provides predictive suggestions to companies for achieving the project outcomes in compliance with regulations.

2.11 Real Estate Solution :

SCM offers a complete real estate solution from planning to delivery. It can be used for planning & pricing of properties, suggestive sales figures, rentals and agreements etc. The system also makes use of data to provide predictive insights for real estate companies. The investments made, project delivery milestones, quality control, service costs, property maintenance & pricing analysis can all be managed through the SCM system.

The leading real estate companies of the world rely on supply chain management solutions to deliver cutting edge offerings for their customers. Improving the supply chain can lead to minimized delays, Cost Optimization, Utilization of resources, faster response time, improved agility, better planning and co-ordination for Real estate Industry.

Kreyon offers integrated, turnkey, customer centric Supply Chain Management software solutions for real estate companies. We are a leading real estate software development company helping clients with complete solutions. If you need any assistance or have any queries, please get in touch.

CHAPTER 3

LITERATURE REVIEW

3.1 Abstract:

Supply Chain Management is a network of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system. The management of the supply chain and the roles of various actors involved differ from industry to industry and company to company. As a result, Supply Chain Management (SCM) has become a vital issue for manufacturers, professionals and researchers. It is felt that to manage the supply chain effectively entire structure of supply chain must be understood properly.

This paper attempts to provide the reader a complete picture of supply chain management through a systematic literature review. It presents main activities of supply chain and the step-by-step approach for understanding a complete picture of supply chain.

3.2 Review of Literature:

Supply Chain Management is a network of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system. It spans procurement, manufacturing and distribution (Lee & Bollington 1995) the basic objective of supply chain management is to “optimize performance of the chain to add as much value as possible for the least cost possible”. In other words, it aims to link all the supply chain agents to jointly cooperate within the firm as a way to maximize productivity in the supply chain and deliver the most benefits to all related parties (Finch 2006).

Adoption of Supply chain management practices in industries has steadily increased since the 1980s. A number of definitions are proposed and the concept is discussed from many perspectives. However, Cousins et al. (2006); Sachin and Datta (2005); Story et al. (2006) provided excellent review on supply chain management literature. These papers define the concept, principals, nature, and development of SCM and indicate that there is intense research being conducted around the world in this field they critically assessed developments in the theory and practice of supply management.

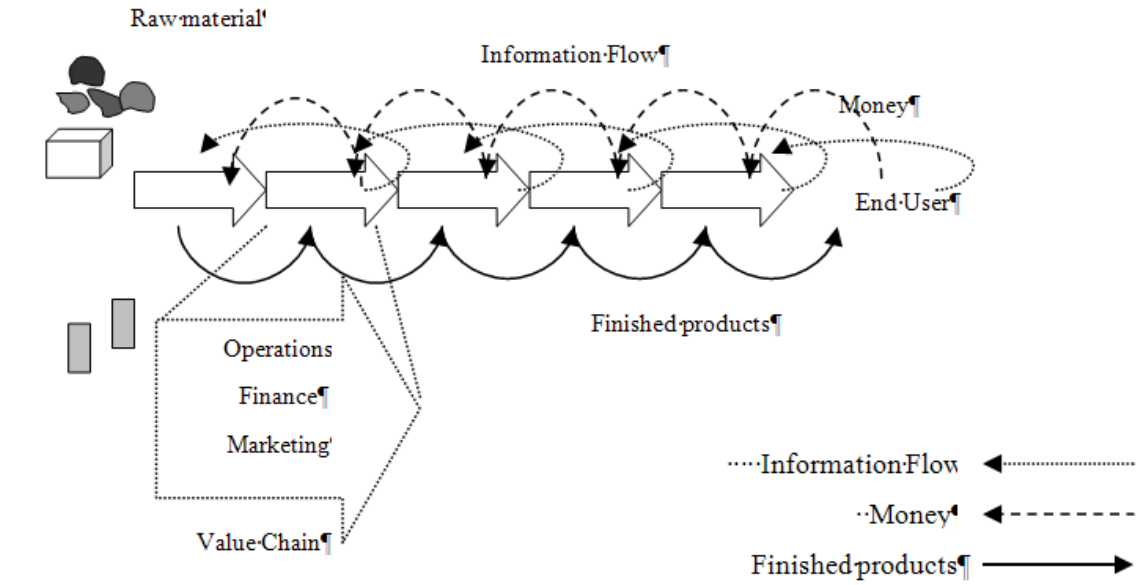
Gunasekaran and McGaughey (2003) extended the scope of SCM beyond material management, partnership, information technology to the Total Quality Management areas like management commitment, organizational structure, training and behavioural issues. As firms' survival lies on integration, a good understanding of the integration process is a key aspect in SCM. Mortise et al. (2003) discussed that basic hypothesis “the more integration (wider the scope) – the better the management of the chain" is not always true and proved that it depends very much on the “environment" of the supply chain and the power relations between the participants in the supply chain. Authors proposed a set of management techniques and tools to analyse successful SCM strategies.

It is also observed that research is not limited to hypothesis testing and data analysis, but more advanced techniques like simulation, Artificial Neural Network, and Fuzzy logic are also used for optimization and decision making in SCM. Koh and Tan (2006) used the principles of fuzzy logic for analysing and monitoring performance of suppliers based on the criteria of product quality and delivery time whereas Chiu and Lin (2004) showed how the concepts of collaborative agents and artificial neural networks (ANNs) can work together to enable collaborative supply chain planning (SCP).

It appears from literature review that researchers have studied supply chain management from a system perspective, or the systemic natures of interactions between the participants of supply chain are observed. Although numerous studies views SCM from different perspectives, this paper gives the better understanding of supply chain activities.

3.3 Supply Chain Management:

Supply Chain Management is management of material, money, men, and information within and across the supply chain to maximize customer satisfaction and to get an edge over competitors.



3.4 Evolution of SCM:

In the 1950s and 1960s, most manufacturers emphasized mass production to minimize unit production cost as the primary operations strategy, with little product or process flexibility. In the 1970s, material requirements planning (MRP) was developed and managers realized the impact of huge WIP inventories on manufacturing cost, quality, product development, and delivery lead-time. The intense global competition of the 1980s forced world-class organizations to offer low-cost, high-quality, and reliable products with greater design flexibility.

Manufacturers utilized Just-In-Time (JIT) and other management programs to improve manufacturing efficiency and cycle time. The evolution of SCM continued into the 1990s as organizations further extended best practices in managing corporate resources to include strategic suppliers and the logistics function. Many manufacturers and retailers are embracing the concept of SCM to improve efficiency and effectiveness across the supply chain. The following table explain the evolution of supply chain management.

3.5 Supply Chain Management - Issues and Challenges

Successful implementation of SCM is seen as closely dependent upon the need for breaking down barriers not only between internal departments and business processes, but also across companies within the whole supply chain (Vollman et al., 1997). Its success is also associated with the challenging development of a new culture based on empowerment and on-going and shared learning and continuous improvement. Another challenging and difficult feature of SCM is linked with the emergence of the network organization, which can lead to a complex web of linkages to be coordinated and managed. This can imply difficulties which include lack of common purpose, multiple and hidden goals, power imbalances, culture and procedures, conflict over autonomy and accountability, over-dependence and a continuing lack of openness and opportunistic behaviour (Cox and Townsend, 1998).

3.6 Need for Managing Supply Chain:

The next important issue is why the firms should consciously manage the supply chain. Supply chain involves the cost to convey the information, produce components, store them, transport them, and transfer funds and so on. The total cost of supply chain tends to increase due to many parameters like huge capital cost required for running global businesses, mounting real estate costs and fright charges (Koch, 2006). However, the perfect planning in SCM regarding material arrival, production schedule and distribution not only reduces the inventory and inventory cost but also reduces the wasted time and energy (Verma et al., 2006). Supply chain management drastically alters inventory investment across a range of industries, and helps to tackle economic fluctuations (Heng et al., 2005).

3.7 Issues in Supply Chain:

It is found that SCM encompasses planning, manufacturing and operations management necessary to bring a product to the market place, from the sourcing of materials to the delivery of the completed product. This section would provide insights on the aspects and the issues that are to be managed in supply chain.

3.8 Customers - Supplier Relationship Issues:

Customer satisfaction is absolute for staying abreast in competitive environment that can be achieved only by quickly responding to customer needs. Efficient consumer response (ECR) is a supply chain management strategy that attempts to address the inefficiencies in the supply chain. Hoffman and Mehra (2000); Harries et al. (1999); Sparks and Wagner (2003) discussed efficient consumer response (ECR) as a supply chain strategy by analyzing the adoption of ECR strategy in some industries. Jonsson and Zinedine (2003) proposed conceptual model including behavioral dimensions of supplier-dealer relationships and presented hypotheses about how to achieve satisfactory inter-organizational relationships. Lambert and Pohlen (2001) provided a framework for developing supply chain metrics that translates performance into shareholder value. The framework emphasized on managing the interface between customer relationship management and supplier relationship management at each link in the supply chain. It is concluded that long-term relationships between customer and supplier can lead to higher satisfaction.

3.9 Customer relations Issue:

A company's customer relations practices can affect its success in managing the supply base as well as its performance (Scott and Westbrook, 1991; Ellram, 1991; Turner, 1993). A key element of successful supply base management involves downstream integration of customers as well as the management of upstream suppliers. Each entity in the supply chain is a supplier as well as a customer. When a customer driven corporate vision is implemented simultaneously with effective TQM and supply base management practices, it can produce a competitive edge in a number of different ways. These include increases in productivity, reductions in inventory and cycle time, increased customer satisfaction, market share and profits. However, there is little empirical evidence in the literature linking customer relations practices and performance to support the conceptual foundation of customer driven corporate policy.

3.10 Issue of Supply chain Design:

Manufacturing firm's supply chain design is based on effective integration. Braganza (2002) and Power (2005) examined different perspectives on integration and suggested that integration of several functions at different organizational levels achieve above average financial and performance results. It is observed that current static approaches and theoretical models are ineffective in considering all variables and constraints for designing supply chain. Manson-Jones et al. (2000) demonstrated how the "lean" and "agile" paradigms might be integrated. They designed a total performance metric and developed a route map for integration of lean production and agile supply in the total chain. Lalwani et al. (2006) suggested that one of the reasons for this might be the difficulty of grasping the full dynamic complexity of the processes and systems encountered. Authors proposed that current developments in systems thinking and continuous system simulation, when applied within the context of an operations management framework, may offer the good design of SC and improve in supply chain performance.

3.11 Logistics management*:*

Many years practitioners and professionals were confused between "logistics" and "supply chain management", the usage of each term varied according to the industry. Lummus et al. (2001) examined the historical definitions of both terms, and proposed a hierarchy for the relationship between logistics and supply chain management. Srivastava and Srivastava (2006); Meade and Sarkis (2002) presented a framework to manage product returns in reverse logistics by focusing on product ownership data, average life cycle of products, past sales, forecasted demand and likely impact of environmental policy measures .It is observed that reverse logistics is one of the toughest supply chain challenges. Once the product has been manufactured it is very important that there should be an adequate structure to distribute it to the customers. Neves et al. (2001); Ma and Devarajan (2005) proposed distribution channels planning model. Authors explored the use of an iterative approach for designing distribution chain in an agile virtual environment; and proved that quick adaptation to changing market situation and automation of supply chain management processes are essential.

3.12 Global Issues:

Shortened product life cycles and increasing global competition has tempted traditional manufacturers to contemplate on their competencies, such as product design and development, and a decision to outsource. Jennings (2002) and Zeng (2003) projected strategic benefits and problems relating to the outsourcing decision. These include issues of cost, quality, flexibility, strategic focus, and diversification, the potential loss of critical skills and knowledge, and appropriation of final product value. A model was developed, structuring the contextual factors: capability, cost, technology, supply and product market conditions, to enable a consideration of the outsourcing decision.

Buxey (2005) and Svensson (2001) explored the linkage between firms' outsourcing activities and the occurrence of supply chain disruptions. Blow field (2005) discussed the experience of employing global social and environmental standards, in terms of a global ethic. It was concluded that strategic development of SCM capabilities such as efficient inbound and outbound transportation, warehousing, inventory control, production support, packaging, purchasing, order processing, and information dissemination enables a manufacturing firm to identify key performance measures.

3.13 Partnership Issues:

As global markets grow increasingly efficient, competition no longer takes place between individual businesses, but between entire value chains. Therefore, executives are developing supply chain partnerships/collaboration in an attempt to reduce costs, improve service and to gain competitive advantage. Horvath (2001) proposed that Collaboration through intelligent e-business networks would provide the competitive edge to all the participants in a value chain to prevail and grow. It is found that collaborative partnerships can be achieved both via trust and through electronically mediated exchange. Frankel et al. (2002) showed that one of the most common usages of partnerships is in the provision of transport and distribution services. Authors recommended that rather than devoting effort and resources to build an in-house supply chain it can often be much more cost- effective to form a partnership with a shipping company, and allow them to perform the job of distribution at a lower cost than the enterprise could manage itself.

3.14 Environmental issues:

Power (2005) presented a conceptual framework to investigate supplier relations, lean manufacturing, environmental management practices; and their relationship to one another. It is found that efforts to improve a supplier's environmental management practice raise critical issues of transaction costs and efficacy of approach for the buyer. It is recommended that an environmental bias is to be introduced into the decision making process which would allows more environmentally conscious decisions to be made.

3.15 Trust & Commitment:

The two fundamentals components of improving the relationship are trust & commitment (De Ruyter *et al.* 2001). The cooperation arises directly from both relationship trust & commitment (Morgan & Hunt 1994). According to past research, trust has two dimensions: "honesty" & "benevolence" (Kumar *et al.* 1995). There are several dimensions of trust in fresh produce supply chain performance such as confidence in preferred trading partner, always keeps promises, always honest, good reputation, trust in preferred trading partner,

believe information provided, close personal friendship, trading partner always consider best interests (Batt 2003). Trust is the belief that the partners will act in ways that will bring positive outcomes for the firms & does not want to take unexpected actions that may bring a negative outcome (Anderson & Narus 1990). Trust (Moorman *et al.* 1993) is the willingness to rely on an exchange partner in whom one has confidence. Or trust as a belief, a sentiment or an expectation about an exchange partner and results from the partner's expertise, reliability & intentionality. Trust is the extent to which the buyer believes that the supplier has the necessary expertise to perform the activity effectively & reliably (Ganeshan 1994)

3.16 Performance Measurement in Supply Chain:

Performance measurement is very important as a strategic tool and also provides means to achieve the objectives required, fulfilling a firm's mission/strategy statement. Many firms have been observed to evaluate performance, primarily on the basis of cost and efficiency (Skinner, 1971). This has resulted in most measures focusing on financial data such as return on investment, return on sales, price variances, sales per employee, productivity and profit per unit production etc. As a result of globalization and competition the organizations have started adopting innovative business practices and performance improvement initiatives such as TQM, JIT and SCM. Following are the various supply chain performance evaluation criteria.

CHAPTER 4

Supply Chain Management System of the Real Estate Industry: A Study from Bangladesh Perspectives

4.1 Introduction:

The world, in this new millennium, is getting highly populated due to immigration in the developed countries while migrants from rural to urban areas and the unchecked birth rate in this part of developing nations. The factors such as globalization, labour mobilization, increased flow of cross boarder business, cultural diversity, etc., have substantially contributed behind this very trend of overpopulation. The vacant, agricultural and forest lands are gradually being occupied. In this trend, being one of the densely populated countries of the world, Bangladesh is in a challenging position in ensuring healthy habitation for all. The migration from rural to urban and city areas for occupational engagement is an additional pressure over the current challenge of population. In Bangladesh, the rate of urbanization is very high, aggravated by the high population growth rate and rapid rural-urban migration. The trend of urban growth in this country is about 3.25% per annum. So, providing housing facilities to these people will be a great challenge in the upcoming days if an effective supply chin cannot be ensured for the REI of the country. The current study focuses on the SCM system of the Real Estate Industry in Bangladesh. This is because the current study acted as the motivation to examine whether SCM system of the Real Estate Industry (REI) can effectively manage the housing requirement of the population of Bangladesh or not.

Realizing the important role of SCM in the REI, secondary data have been collected. The current paper is unique because this paper not only focuses on the important factors of REI but also examines their role in mitigating the habitation challenges of the country. However, the current study is not free from limitations. For example, the major limitation of the present study is that the secondary data in the literature review section did not solely focus on the role of SCM of the REI in Bangladesh. Again, some studies only focused on technical aspects of building construction, design and materials related issues other than the complete subject matter of the current study. Moreover, the findings of the earlier research mostly exhibit the SCM scenario of the other countries rather than Bangladesh. Relatively few studies have focused on this sector of Bangladesh. So, it is yet to get a concrete idea about the true situation of SCM factors of the REI in Bangladesh. Again, some studies focused only on the few aspects of the subject matter of the current study. It is because some of the previous studies adopted various qualitative frameworks or models while others focused on individual variables relating to the SCM system of the REI.

However, none of them completely focused on this very aspect of the subject matter in effectively managing the housing requirement of the population of Bangladesh. So, it is clearly evident that there is a research gap and to mitigate this gap rigorous research is yet to be attempted. Since the previous researches have not drawn the actual scenario of the SCM in effectively managing the housing requirement of the population of Bangladesh, more researches are required in this field and in this respect the findings of this study are different than those of previous researches. To fill up the knowledge gap left out by the previous researches, the present study investigates the research question: “Is the SCM system of the Real Estate Industry (REI) effective in managing the housing requirement of the population of Bangladesh?”. Here, with relation to the appropriate answer to the set research question, the current paper is found as unique and different from the previous studies because by using the correlation and mean analysis on the individual variables, the current study identified positive

relation between SCM and management of the housing requirement of the population of Bangladesh. The significance of the identified variables was verified and proved through various statistical tests including reliability, validity, correlation and mean analysis.

From the light of the above research question, the principal objective of this study is to examine whether SCM system of the Real Estate Industry (REI) is effective in managing the housing requirement of the population of Bangladesh or not so that the respective Real estate companies can take appropriate measures to further improve their quality. This paper is organized with the various sections. Section 1 deals with introduction, Section 2 focuses on the background of the study, Section 3 contains the theoretical framework; Section 4 portrays the literature review, Section 5 portrays an conceptual model, Section 6 goes with the methodology of the study, Section 7 exhibits the analysis and findings, and Section 8 draws a constructive conclusion including uniqueness of the study, new findings, significance and implications and limitations.

4.2 Background of Real Estate Industry in Bangladesh:

The real estate industry is the fastest growing sector of the country's economy with huge prospect in near future. The two main reasons which acted as the driving forces behind the phenomenal growth of Real Estate Industry in Bangladesh are particularly population growth and migration from rural to urban areas. Urban population in Bangladesh is growing more rapidly than the population as a whole. In 1970, the urban population was only 7.6% whereas in 2010 it was 27.1%. In 2030, it is projected to reach 39.3% (World Population Prospects: The 2008 Revision, UN Population Division). That means that in near future (by 2040), half of the total population will live in cities. Providing housing facilities to these people will be a great challenge. It can also be noted that with the increasing trends of population, people are directed to cities. In 1974, the number of migrants was 2.43 million which accounted for 3.44 percent of the total population of Bangladesh. Latest Sample Vital Registration System (SVRS) 2008 of Bangladesh Bureau of Statistics reports that currently in-migration rate in Bangladesh is 30.62 per 1000 population where urban and rural in-migrants are 51.69 and 16.64 respectively. Higher migration occurred in urban areas than in rural areas. All these together have made housing as an acute problem resulting into the growth and development of REI in Bangladesh. In this regard, to ensure safe and quality housing against the value for money criteria, the Real Estate and Housing Association of Bangladesh (REHAB) was formed with only 11 members on 12 December, 1991. The objective of REHAB was to promote the Real Estate development in the private sector in Bangladesh. Currently, REHAB has 1189 formally enlisted developing companies (www.rehab-bd.org/member_list.php). With such gradually increased number of companies, various problems and difficulties concerning the housing sector also cropped up requiring proper attention. To solve these problems and protect the interests of all developers, it was necessary to form an association for the unhindered evolution of the Real Estate Sector. This institution plays very important role by protecting the customers of apartments from the fraudulent activities of the unregistered flat businessmen and giving safeguard to its listed real estate developing companies against any arbitrary decision by the government officials. With inauguration of REHAB Vision Fair 2010 by Sheikh Hasina, Honourable Prime Minister of Bangladesh, Government attachment and encouragement to activities of REHAB had been proved. As Honourable prime Minister promised, it is expected that in the future days Government will take necessary measures for the growth of real estate sector. The real estate

has been emerging as one of the growing industries of Bangladesh contributing handsomely to the GDP.

4.3 Theoretical Framework:

A supply consists of all stages involved, directly or indirectly, in fulfilling a customer request. But to achieve this very purpose a supply chain needs to be well managed. Supply Chain Management is the "strategic and systematic coordination of the traditional business functions and the tactics across these business functions within a particular firm and across businesses within a supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole. extended the scope of SCM beyond material management, partnership, information technology to the Total Quality Management areas like management commitment, organizational structure, training and behavioural issues. Supply chain management drastically alters inventory investment across a range of industries, and helps to tackle economic fluctuations.

presented a model of an integrated business process, which highlights the importance of communication between processes and between partners in the supply chain. Supply chain involves the cost to convey the information, produce components, store them, transport them, and transfer funds and so on. The total cost of supply chain tends to increase due to many parameters like huge capital cost required for running global businesses, mounting real estate costs and freight charges. However, the perfect planning in SCM regarding material arrival, production schedule and distribution not only reduces the inventory and inventory cost but also reduces the wasted time and energy.

4.4 Literature Review:

Raw land as a key feature of the real estate cycle is the focal point of construction and expansion of business and the most characteristic feature of a real estate boom is the speculation of large under-developed land and the sale of lots in subdivisions to small investors. In his study found that being an agriculture-based country Bangladesh suffers from a scarcity of land where the urbanization level of 28% is substantially lower than in developed countries. Found that scarcity of land is the main constraints of real estate business and building construction, and the price of raw land becomes very uncompetitive. However, it is a trend in the real estate development industry of Bangladesh that there is often a contract between the land owner and developer company. The general terms and conditions often are that the developer company bears all expenditures of constructing the building with all modern facilities necessary for apartment handover readiness. While in exchange the land owner shares his/her land proportionately with the developer. In most of the cases, the developer companies sell the apartments of their share through the own sales, marketing and business development teams. Again, some real estate companies develop modern apartment projects with their own land instead of shared business with the land owners. The names of Anwar Landmark Ltd., are noteworthy in this case. One new characteristic feature in this industry is that some real estate companies now prefer land development to building construction.

4.5 Building Material and Products Supply:

Building material is any material which is used for a construction purpose. Such material includes raw materials like mud and clay, wood, rock, ice, sand, foam, steel rods or reinforced bars, cement composites, concrete (i.e., composite of aggregate generally gravel and sand and a binder such as cement to eventually harden a stone-like material). The metal, glass, plastic, thatch, brush, etc., are also included into the categories of building materials. This kind of material includes both forms namely natural and man-made that together enables real estate apartment building project developers to provide the make-up of habitats and structures including homes. While building products often refer to the ready-made particles/sections, made from various materials, which are used to construct the building architecture and supporting fixtures like windows, doors, cabinets, etc. The list of building products does not include the building materials rather they are fitted in architectural hardware and decorative hardware parts of a building. It also can refer to items used to put such hardware together like glues, caulking, paint, and anything else bought for the purpose of constructing a building. Housing and Building Research Institute of the housing and public works ministry has been working on the production of environment-friendly building materials for the past three years. Highlighted in his write up in the daily Prothom Alo that HBRI has recently invented a new type of brick made of a river mud composite and cement that is portable and cost effective. The institute said the newly invented bricks will bring down the cost to half of what bricks cost now. HBRI has also invented specialized floor, roof and wall materials. The authorities also said the specialized wall, which is made of jute fibre and cement is sturdy and less prone to erode. As a result, there is handsome availability of environment friendly and earthquake-resistant materials for building multi-storey structures in Bangladesh. Experts say use of these environment-friendly materials will help reduce environmental pollution as well as cut construction costs. According to HBRI the kind of building materials invented by the institute will cost 30 per cent less than conventional ones". The major building materials used for real estate construction are as i) structural materials: concrete, reinforcement bars, steel, bricks & mortar, ii) finishing materials: floor tiles or stone, cladding, paint, aluminium sections, glass, wooden doors & cabinets, etc., iii) utility service: electrical conduits & cables, circuit breakers, control switches, light fittings, pumps, plumbing, faucets, etc.

4.6 Construction Material Supply:

The real estate industry with special reference to building construction sector includes plumbing, bath rooms and air conditioning; electrical works, provision of power and wiring; painting, coating and treatment of surfaces; landscaping and gardening; roofing and waterproofing; road works and paving; architecture and civil engineering; manufacturing of building materials. The people who possess specialized engineering, managerial and administrative skills and expertise ensure the success of a real estate project by getting the customer requirements, designing a building solution, developing a project plan, managing suppliers and subcontractors and supervising the execution of the projects. With the joint efforts of the people engaged at different phases of the execution of the project, the building and construction work gets done. This is mainly done in two phases: in the first place, there are designs from the architects and civil engineers and in the second phase, there are building

materials and those materials must be processed to become structures and buildings including: preparation of site, installation of basic infrastructure, rough construction work, plumbing, electrical and accessories, painting and finishing. Classified building materials into different categories depending on their fabrication and in the way that they can handled on site. The categories include a) bulk materials that are delivered in mass and are deposited in a container, b) bagged materials delivered in bags for ease of handling and controlled use c) palleted material that are placed in pallets for delivery, d) packaged material that are packaged together to prevent damage during transportation and deterioration when they are stored and e) loose materials that are partially fabricated and that should be handled individually.

CHAPTER 5

Supply Chain Risk Management

5.1 Abstract of Supply Chain Risk Management:

The risks associated with global supply chain management has created a discourse among practitioners and academics. This is evident by the business uncertainties growing in supply chain management, which pose threats to the entire network flow and economy. This paper aims to review the existing literature on risk factors in supply chain management in an uncertain and competitive business environment. Papers that contained the word "risk" in their titles, keywords, or abstracts were selected for conducting the theoretical analyses. Supply chain risk management is an integral function of the supply network. It faces unpredictable challenges due to nations' economic policies and globalization, which have raised uncertainty and challenges for supply chain organizations. These significantly affect the financial performance of the organizations and the economy of a nation. Debate on supply chain risk management may promote competitiveness in business. Risk mitigation strategies will reduce the impact caused due to natural and human-made disasters.

5.2Literature Review and Research Design:

The supply chain network consists of trade-offs interrelated by monetary, information, and material flows. Many disruptions in supply chains have been seen since the year 2000. These disruptions include the fear of weapons of mass destruction, terrorist attacks, fuel protests, and disease outbreaks. The risk is the prob- ability of differences in expected outcomes. One can assign probabilities to various outcomes and calculate risk. However, uncertainty cannot be quantified. Risk means that there is uncertainty about an outcome. Hence, uncertainty refers to a risk that may not be eliminated. However, these uncertainties can be minimized with proper assessment and planning.

SCRM can be divided into two broad categories of approaches. The first is the strategy for comprehensive risk management approach, and the second is a focused approach to a specific disruption. These specific disruptions could be security or terrorism. Although these methods provided enormous value and insights, the events causing disruption were presumed to be unintentional. The lack of risk managing strategies to understand the cause of disruption leaves a gap from a theoretical perspective, exposing firms to unavoidable risks in the environment. Children's toys contained lead-based paint in 2007 without the knowledge of Mattel. This caused disruptions in Mattel's supply chains. Mattel ended up setting quality assurance centers at the suppliers' factories to avoid the repetition of the lead paint crisis. The supplier used lead-based paint to save small operational costs. The cost of disruption to Mattel was much more significant and could have been avoided.

The remainder of the section is divided into four subsections. The first subsection reviews the past literature for various definitions of risk. The second subsection discusses risk disruption in SCM caused by natural disasters or events which are beyond human control. Risk

disruption can occur due to weak supply chain strategies. The third subsection discusses risk management methods and strategies. The fourth subsection illustrates risk detection and risk mitigation in the supply chain network for a contingency plan and supplier evaluation to be carried for reducing risk impact and achieving supply chain resilience (Figure1).

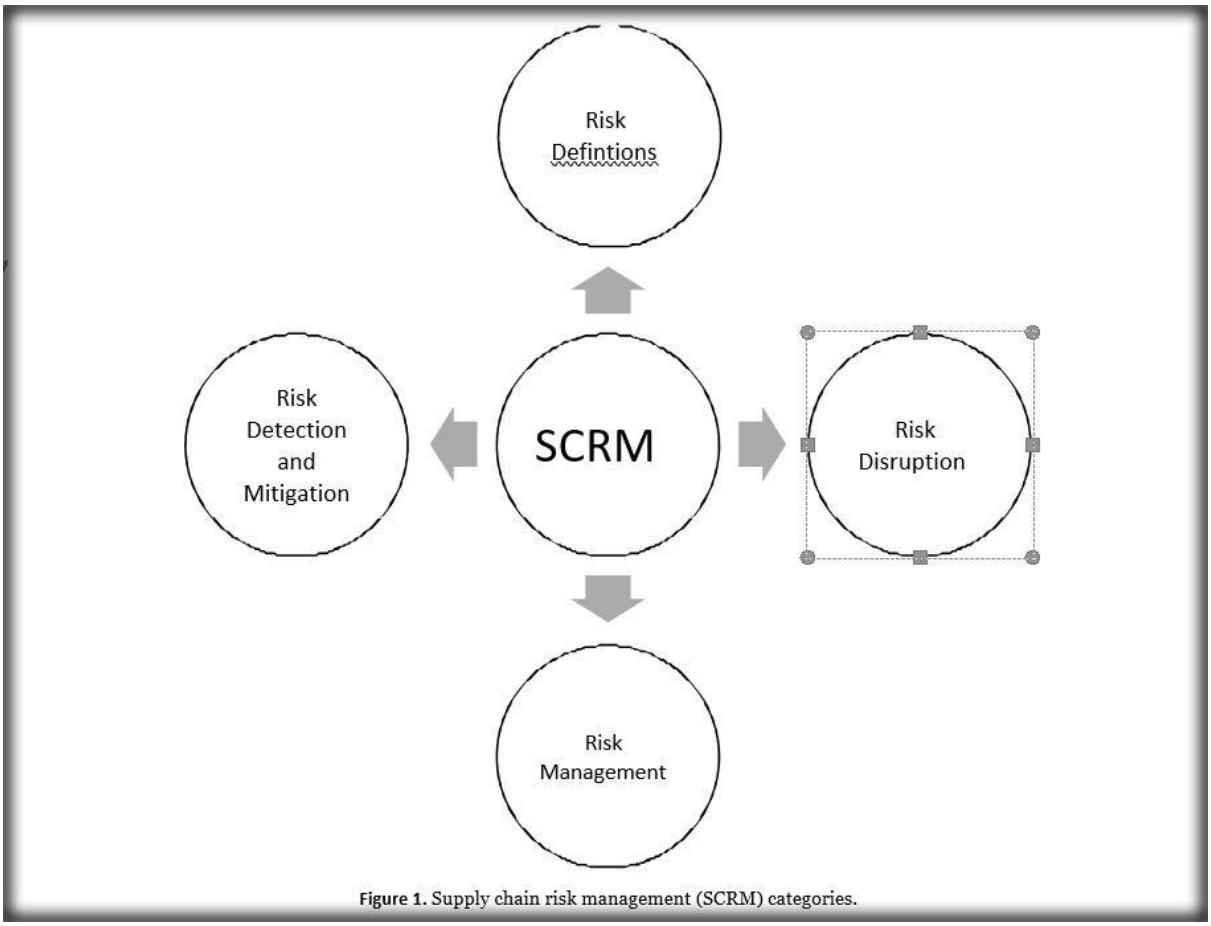


Figure 1. Supply chain risk management (SCRM) categories.

5.3 SCRM Definitions

The definitions of "supply chain risk" and SCRM are evolving. A universally acceptable definition helps to identify, measure the chances of risk and its effect on the supply chains. This helps in adopting the most effective SCRM strategies. Therefore, standard definitions are vital. Table1summarizes a few definitions of risk and SCRM.

Table 2 summarizes the findings and contributions of past literature reviews on SCRM. The authors have used various forms of literature review analysis, and each paper is unique in itself, which leaves the gap for further literature research in the field of SCRM.

Table 1. Definitions of Risk and SCRM.

Authors	Definitions
Bogataj and Bogataj (2007)	"The potential variation of outcomes that influence the decrease [in] value added at any activity cell in a chain."
Wagner and Bode (2006)	"The negative deviation from the expected value of a certain performance measure, resulting in negative consequences for the focal firm."
Norrman and Jansson(2004)	"To collaborate with partners in a supply chain apply risk management process tools to deal with risks and uncertainties caused by, or impacting on, logistics related activities or resources."
Tang(2007)	"The management of supply chain risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity."
Jüttner(2005), Jüttner et al.(2010)	"The identification and management of risks for the supply chain, through a coordinated approach amongst supply chain members, to reduce supply chain vulnerability as a whole."
Goh et al.(2007)	"The identification and management of risks within the supply network and externally through a coordinated approach amongst supply chain members to reduce supply chain vulnerability as a whole."
Thun et al.(2011)	"Characterized by a cross-company orientation aiming at the identification and reduction [in] risks not only at the company level, but rather focusing on the entire supply chain."
Jüttner et al.(2010)	"Any risks for the information, material and product flows from original suppliers to the delivery of the final product for the end user."
Ellis et al.(2010)	"An individual's perception of that total potential loss associated with the disruption of supply chain of a particular item from a particular supplier."
	"The probability of an incident associated with inbound supply from individual supplier failures or the

Table 2. Literature reviews on SCRM.

Authors	Research Methodology	Key Findings/Contributions
Jüttner et al.(2010)	Focus group discussions, interviews, and statistical analyses.	Developed four basic conceptual constructs around risks
Khan and Burnes(2007)	Literature review	There is a need for analytical models
Natarajarathinam et al. (2009)	Literature review	Management of disruptions for rapid recovery needs improvements.
Rao and Goldsby(2009)	Literature review	Classification of risks into environmental, industry, and organizational risks
Tang and Musa(2011)	Literature survey and bibliographic analysis	There is a need for quantitative modeling in SCRM
Vanany et al.(2009)	Literature review from 2000 to 2007	Entreprise Resource Planning (ERP) will become a vital tool in SCRM. There is a need for collaborative strategies in SCM.
		The authors built theories by working on the different

5.4 Risk Management:

"Risk management refers to strategies, methods, and supporting tools to identify and control risk to an acceptable level". Additionally, risk management can also be referred to as a synchronized set of actions and approaches to direct an organization to minimize the risk for achieving the organizational goals. Managing risks allows the decision-maker to understand and assess the impact of risk in a supply chain network. Controlling complexity leads to higher cost efficiency and reduces risks. Early oil tankers had two interconnected storage compartments causing instability. This design made oil tankers susceptible to overturning. The design of oil tankers was modified to have more independent compartments to provide deep water stability, although it was expensive to build such ships.

Supply chains evolve based on the market's requirements or manufacturing plants in different product development stages. Furthermore, to re- duce the global supply network's risk caused by increased economic engagements between nations, regional supply chains can replace global supply chains. For example, the world's largest distiller (Diageo PLC, London, UK) is shifting its supplier and distribution strategy from a global supply chain towards a more regional supply chain network. They minimize risks by sourcing locally and increase market share and profits by focusing on local markets.
A manufacturing company (Li & Fung Limited., Hong Kong, China) ties up sub-contracts with various vendors spread mostly across southern Asia, which reduces the dependency on one supplier in times of crisis, focusing on improving efficiency and reducing the risks in supply chains. Such regional transitions were envisaged due to various risks in global supply chains. The estimation of risk can lead to better risk management, reduce the extent of damage, and improve supply chain resilience. Long term investment in a robust supply chain network in an organization will reduce operational costs and be flexible enough to the changing and competitive business environment. Contingency plans to disruptions make companies resilient and provide a competitive advantage.

5.5 Risk Detection and Mitigation Strategies:

Risk detection plays a pivotal role before disruption occurs. Force majeure disruptions are challenging to manage but can be estimated through conscious risk assessment strategies identifying risk indicators, and applying the principles of Total Quality Management (TQM) in sharing information among SCM partners. Corporations should have contingency plans in the case of the occurrence of a disruptive event. Performance failures of a supply chain can be monitored through audits in an organization. Toyota have applied these principles in their supply chains and minimized the disruptions due to product recalls.
Strategies to control risk may be divided into seven categories: prevention, rescheduling, conjecture, numerical and economic, vertical integration, risk-sharing, and technology and security. The prevention strategy is used when risks are linked with each product or its terrestrial markets, or close engagement with suppliers/customers is not possible. Divestiture of resources, delay of entry, or contributing to less ambiguous markets is prevention. Ensuring

flexibility and delay in spending refers to rescheduling. Market demand, customization of products or services, input costs, product life cycle, and product modularity affects rescheduling. The conjecture is the opposite of rescheduling and decisions are influenced by projected demand. Supply chain resources are leveraged to maximize the competitive advantage in serving the customers. Financial risks are addressed through numerical and economic approaches. The numerical approach is for a large population, e.g., insurance. The occurrence of an event for many people at the same time requires an economic approach. A few risks incentivize vertical integration because vertical integration reduces the risks due to better supply and demand control. Opportunism and asset specificity, capacity constraints, and improved supplier–buyer power balance are such incentives. Contracts with flexibility for possible changes in the environment reduces risks. Designing flexible contracts acts as a control mechanism. Outsourcing or offshoring transfers risks in SCM. Technology to detect nuclear, chemical, or biological elements exists and reduces the risk of carrying such shipments.

Organizations such as Container Security Initiative, Customs Trade Partnership Against Terrorism (CTPAT), and Operation Safe Commerce (OSC) act as instruments for global supply chain security. The detection of a likely disruption from an unforeseen event is vital to risk mitigation. Therefore, SCRM facilitates a reduction in uncertainties and disruption while improving operational performance.

"A literature review is a systematic, explicit, and reproducible design for identifying, evaluating and interpreting the existing body of recorded documents". Literature reviews consist of two purposes: firstly, they summarize the present research findings by classifying patterns, themes, and issues. Secondly, they help to identify the conceptual content of the field and contribute to theory development.

5.6 Analysis and Discussions:

The total number of documents published in peer-reviewed journals in the English language that used "risk" in their titles, keywords, or abstracts in the EBSCO premium database between 2010 and 2019 was 455. This number includes papers published in ABDC and non-ABDC journals (Table3). The papers published in non-ABDC journals were 143 (455/143 = 31.43%).

Table 3. Document type for ABDC and non-ABDC journals.

Document Type	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Non-ABDC Journals											
Article	6	11	12	8	17	15	15	11	22	22	**139**
Case Study				1		1					**2**
Opinion							1				**1**
Interview									1		**1**
Non-ABDC Total	6	11	12	9	17	16	16	11	23	22	**143**
ABDC Journals											
Article	14	14	26	21	36	26	32	35	45	52	**303**
Case Study		1	1	1	1	1	2	2			**9**
ABDC Total	14	15	27	22	37	27	34	37	45	52	**312**
Overall Total	**20**	**26**	**39**	**31**	**54**	**43**	**50**	**48**	**68**	**74**	**455**

There were a total of 143 research papers published between 2010 and 2019 in non- ABDC journals. The papers were in the form of articles, case studies, opinions, and interviews. There were 139 articles, followed by one case study, and the rest were opinions and interviews. Forty-four articles on SCRM were published in the last two years of the study period, which were the highest in any two years between 2010 and 2019 and accounted for more than 31% of the publications.

There were 312 (312/455 = 68.57%) papers published in ABDC listed journals as an article or a case study (Table3). The number of research publications showed several research papers published on SCRM and the importance of risk management in the competitive and unpredictable business environment.

There were 303 research articles published in ABDC journals with nine case studies on the supply chain risks. However, no literature reviews were published. As stated earlier, the number of publications on risk factors in supply chains increased between 2010 and 2019 due to uncertainty and risk exposure. Economic engagements between nations due to globalization have sparked the need for efficient SCRM strategies to minimize the risk uncertainties.

Moreover, the papers were further analyzed into different ABDC ranking journal publications. Appendix A illustrates a detailed classification of journals listed in the ABDC category. There were 48 A* category article publications between 2010 and 2019, compared to 200 A category research publications on SCRM. The remaining B and C category journals had 48 and 16 research publications, respectively. Therefore, research publications in the A category have received the highest number of publications. The analyses were classified into the number of papers published in top journals since 2010. Seven journals topped the list in the maximum publications related to risk management in the supply chain. The *International Journal of Production Economics* (*IJPE*) had the most publications in the studied period (Table4).

The top journals can be further analysed based on the publication of more than ten research papers. Table5 illustrates the combination of the number of papers published in the number of journals. The International Journal of Production Economics published by Elsevier has 41, followed by the International Journal of Production Research with 31 publications. This is provided in with the names of publishers.

Table 4. Top journal publications.

Journal Name	No. of Publications
International Journal of Production Economics	41
International Journal of Production Research	31
Journal of Cleaner Production	19
Computers and Industrial Engineering	19
European Journal of Operational Research	13
Benchmarking: An International Journal	11
Industrial Management and Data Systems	10

Table 5. Information on the number of journals and papers published.

Number of Papers Published	Number of Journals	Number of Papers in These Journals
More than 10	6	134
10	1	10
9	1	9
8	2	16
7	1	7
6	3	18
5	3	15
4	3	12
3	11	33
2	7	14
1	44	44
Total	**82**	**312**

5.7 Research Implications in SCRM:

Global supply chains require a retrieval plan to ease the effects of disasters. There needs to be a strategic plan, because uncertainties and risks sur- round the supply chain environment. Therefore, quick recovery is the prime objective after a risk incident has occurred. The formation of suitable risk recovery models also needs planning and a combination of information and human intervention. There are a few authors who have suggested empirically grounded research tools in SCM, such as mathematical programming models and simulation models, analytical hierarchy processes. complexity and graph theories, and the development of models considering interdisciplinary re- search for further research in SCRM.

There are different payment processes in the imports and exports of goods. The two methods are prominent, namely, direct payment between the parties, and through a third party such as

a bank. In the case of advance payment, the financial risk in a supply chain is high, particularly for making payments to new vendors in different countries. Direct payment requires trust and relationships and is avoided where trust between the two parties is not strong. In such cases, parties choose a financial mediatory, such as a bank, to make the payment through a letter of credit. Banks play a significant role, but this increases the cost of supply chains. The process involves considerable documentation, which delays the process and increases the risk due to currency fluctuations or trade embargoes.

Suggest that a system can be projected for innovative ideas to the ambiguous business environment. A cohesive approach to SCRM needs to incorporate risk issues from industry practice. Industry 4.0 is expected to significantly impact the visibility of the SC. Modern technologies such as Radio-frequency identification (RFID), ERP, and General Packet Radio Service (GPRS) will become important tools for SCRM. However, almost all shipping transactions involve many documents such as seller contracts, charter party agreements, bills of lading, certificates of origin, port documents, letter of credit (LC), and many other documents related to a vessel's consignment.

Identifying and harmonizing strategies for different types of risk is an essential factor for success in risk management. There needs to be a corrective approach for recurrent risks for evaluating the costs of increasing or decreasing inventories, capacity, flexibility, responsiveness, and capability. Managing disruptive risks will require designing supply chains where the resource in question (parts inventory or the number of suppliers) is never completely centralized. For instance, Samsung Electronics Co. Ltd. has two vendors to supply necessary electronic parts, even though the second vendor contributes only about 20% of the volume. The implications of these principles are simple to understand. The benefit of having multiple fulfillment centers at various locations reduces the supply chain risk network without increasing the cost and minimizing the risk.

CHAPTER 6

Methodology

7.1 Purpose

Supply chain risk management (SCRM) has recently gained increasing attention in the supply chain context, both from the practitioners' perspective and as a research area. Given the relevance of the topic, the aim of the present paper is to present a focused literature review, investigating the process of knowledge creation, transfer and development from a dynamic perspective within the context of SCRM.

7.2 Design/methodology/approach

A review of the literature on SCRM was undertaken. The new proposed methodology combines the systematic literature review approach to identify the most relevant articles to be included in the study with the citation network analysis in order to unfold the dynamics of the field under study. The authors define this new methodology as systematic literature network analysis.

7.3 Findings

The paper demonstrates that there are a number of key themes in the field of SCRM. The contributions that influenced the field were identified and, by analysing the evolution over time of key concepts, a number of research directions were identified and discussed.

7.4 Research limitations/implications

The dynamic nature of current literature review allows the identification of the directions in which research is moving and thus the recognition of streams of research that appear most promising. However, the application of the research methodology, and in particular of the citation network analysis, requires the support of specific computer programs. Moreover, the underlying assumption of the citation network analysis is that, by analysing the network of citations made to and from articles, it is possible to explain the flows of knowledge used to generate new results. This is only partially true since the spread of measures based on impact assessment led many researchers to an excessive use of citations, even if their content is not always decisive for the outcome of their work.

7.5 Practical implications

The present paper outlines a research agenda that may facilitate the development of models for managing supply chain risk. Furthermore from the evidence of the performed literature review some managerial insights can be derived on how to manage supply chain risk: by considering uncertainty in the design of supply chains, by understanding the impact of risks arising from network collaboration and interactions between supply chain partners, by developing proactive mitigation capabilities to hedge the increasing level of risk.

7.6 Originality/value

The novelty of this research lies in the combination of two existing methodologies for reviewing the literature and in the adoption of a dynamic perspective in order to analyse theory development.

CHAPTER 7

Recommendations & Conclusions

6.1 Research gaps and recommendations

Opportunities for further research in the area of SCRM are abundant. We find that the supply risk holds a very large proportion of all risk types, while other risk types received limited consideration, especially the infrastructural risk. There is clearly a research gap in the domain of infrastructural risks such as transportation, information, and financial risk as well as macro risks. Since infrastructure plays a critical role in managing supply chain effectively, the emphasis on managing and mitigating these types of risks is important as we move forward. Also, in comparison to demand and supply risks, the area of manufacturing or process risk has not received much attention, which is another key avenue for future research.

Every organization may face all the five suggested risk types. While focusing on a particular risk type has its advantages, interdependencies and interrelationships among various risk types is certainly an issue that needs to be further explored. Investigating the joint impact of such risks can lead to better management of supply chains than treating each risk type in isolation. This is an area that we recommend scholars in this domain to consider as we move forward.

As discussed, risk mitigation has been extensively studied with a wide range of mitigation strategies proposed. However, there is lack of research in benchmarking these strategies. Researchers and practitioners have not comprehensively addressed the selection of the most appropriate strategies in particular scenarios. In most cases, the efficacy of a specific strategy is investigated in extant research. Although Talluri et al. (2013) attempted to evaluate seven individual risk mitigation strategies under different scenarios, they did not consider the joint impact of these strategies. To fill this research gap, scholars could evaluate and select the best mitigation strategies among various individual and integrated strategies with respect to both efficiency and effectiveness.

There exist a number of conceptual frameworks and approaches covering all four SCRM processes. Besides risk identification, risk assessment, risk mitigation, and risk monitoring, risk recovery should also be studied and incorporated into the SCRM approaches so as to enable the supply chain to quickly return to its original state during the occurrence of a disruption. Although Hishammuddin et al. (2013) studied the recovery aspect, their focus was on recovery schedule instead of recovery strategies/methods for a simple two-tier supply chain with one supplier and one retailer. In view of its importance, but scarce studies on risk recovery, scholars could expand the existing SCRM approaches by incorporating a risk recovery phase.

Finally, it would be worthwhile to quantify the benefits and costs of SCRM. For example, scholars could measure the value added to the organizations after implementing SCRM methods/strategies. Besides, scholars could apply a multiple case study approach to analyse and benchmark the payoffs or losses between those companies incorporating SCRM and non-SCRM adopters in the same sector while exposing to similar risk types. These studies would attract more organizations focusing on SCRM, and also shed light on effective practices for implementing SCRM to receive the maximum payoff.

6.2 Conclusions:

In this paper, we reviewed 224 international journal articles appearing between 2003 and 2013 targeting the area of SCRM. We categorized all these articles according to definitions, types, factors, and SCRM methods. This paper made several contributions to the field of SCRM. First, we provided a new definition to supply chain risk and SCRM. The new definitions are clearer and more specific than the existing ones, and enable a common understanding between researchers and practitioners. This will not only help researchers communicate with practitioners and gain access to industry to conduct empirical studies, but also help researchers identify and measure the likelihood and impact of the entire supply chain risks, and evaluate the effectiveness of supply chain risk management methodologies. Second, we proposed five common risks arising across various types of supply chains, including macro risk, demand risk, manufacturing risk, supply risk, and infrastructural risk (information risk, transportation risk, and financial risk). This comprehensive classification could help researchers and practitioners identify various risk types with differing degrees of impact that are both external and internal to supply chains. Third, combining various points of views of scholars, we created a holistic list of potential factors affecting the five common risk types. This will not only help researchers and practitioners identify and classify the potential risk factors, but also provide a starting point for creating a supply chain risk index model. Fourth, we classified both quantitative and qualitative SCRM methods according to four major SCRM processes, including risk identification, risk assessment, risk mitigation, and risk monitoring. This will provide useful insights to researchers and practitioners for SCRM, such as which methods (qualitative vs. quantitative; individual and integrated) are applicable in particular SCRM processes. Fifth, we revealed ten research gaps and proposed corresponding potential research directions in the area of SCRM. We hope our recommendations for further research directions would aid academics conduct more impactful studies in SCRM, which in turn assists practitioners in managing supply chain risks more effectively and efficiently via knowledge transfer.

While we have considered a comprehensive evaluation of SCRM work, our research is not devoid of limitations. There are three main limitations of this paper. First, we only reviewed international journal articles, while excluding the conference papers, master and doctoral dissertations, textbooks, book chapters, unpublished articles, and notes. Second, this paper is solely based on the analyses from the point of view of academics while failing to incorporate the views of practitioners. Third, the goal of this study was to present and categorize recent SCRM research and explore potential research gaps. With that in mind, an overarching question is not posed as usually done in more specific literature reviews. Using the categorization and summary results of this paper, further studies can delve into specific areas that have been under-researched and extend studies that have focused on mature areas of SCRM.

CHAPTER 8

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