Dissertation report on

LOGISTIC & SUPPLY CHAIN MANAGEMENT

By

Eqbal Ahmed Khan
Sap ID: 500065051

UPES
Centre for Continuing Education

Submission date- May 16th 2020

A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

MBA LOGISTIC & SUPPLY CHAIN MANAGEMENT

OF

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I also place on record my appreciation of the support provided by Mr. Pradeep Kumar Patnaik and other staff of Qatar Steel Company.

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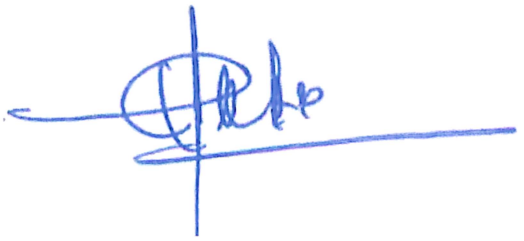
Declaration by the Guide

This is to certify that Mr. EQBAL AHMED KHAN a student of MBA LOGISTIC & SUPPLY CHAIN MANAGEMENT, SAP ID- 500065051 of UPES has successfully completed this dissertation report on 10" October 2019 under my supervision.

Further, I certify that the work is based on the investigation made, data collected and analyzed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfillment for the award of degree of MBA.

Signature :



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Abstract

The dissertation is submitted in partial fulfillment of the requirements of the MBA Logistic & Supply Chain Management of the Center for Continuing Education University of Petroleum & Energy Studies, Dehradun.

This paper reviews and discusses the current state of business continuity planning as it applies to the supply chain and points to the efforts undertaken by business and government to mitigate the risks of supply chain disruptions.
A part of the project was to understand the operation and management of the Supply Chain and Logistics department of Qatar Steel Company and to work on the Business Continuity Management project of the department.

This paper reviews and discusses the current state of business continuity planning as it applies to the supply chain and points to the efforts undertaken by business and government to mitigate the risks of supply chain disruptions. To achieve this, the primary task was to visit the sections under the SCL and PWH department to know how various task has been carried via the ERP software. The training in each section gave an insight into how ERP and PMMS used help in the integration of business processes through information sharing across the SCL department. The management training comprised of visits to Shipping, Port Operation and Logistics and warehouse sections where the primary data was obtained from series of interviews conducted with technicians, supervisors, and senior supervisors along with careful observation of day to day activities carried out by the staff.

Organizations are increasingly subject to hazardous events and threats, which can be critical for their business operations and performance. Any natural, accidental, or deliberate incidents that happen to the organization can cause major disruptions to it. The present paper aims to examine the prerequisites for a sound business impact analysis necessary to build the organization's business continuity management capability and ensure business resilience.

The secondary data was obtained through standard operating procedures (SOP), Qatar Steel annual reports, logs, and internet pages. The cost optimization methods adopted by the SCL department were observed and recorded through interviews with the supervisor. The data gathered by the methodology was used in Business Continuity Management, which comprised of Business Impact Analysis.

After understanding the business process of Supply Chain and Logistics, the Business Continuity Management study was carried out where the risk assessment was carried out using Inherent Risk Assessment charts and Residual Risk rating chart which was followed by Business Impact assessment where the impact parameters were classified as The training in supply chain section helped to understand the truck reporting system, Product dispatch chain, supplier registration, warehouse management, Procurement operation and inventorization via ERP.

Chapter 1. Introduction

Supply chains have expanded rapidly over the decades, intending to increase productivity, lower costs, and fulfill demands in emerging markets. This study examines the planning firms engage in to manage supply chain risk to maintain or improve the stable flow of goods, services, information, and funds through the supply chain for enhanced firm performance.

There has been limited empirical research on the topic of continuity planning and risk management occurring specifically within the area of supply chain management.

Supply chain management faces a pressing need to maintain the expected yields of the system in risk situations. Thus, to achieve that, we need to both identify potential risks and evaluate their impacts and analyze business impacts to locate and relocate resources to deal with risk events.

This dissertation aims to analyze how supply chain risks could be effectively managed. The research will be focusing on Business Continuity Planning (BCP). We will be observing the functioning and management of the supply chain of an organization, and the steps we can take to minimize the risk impact on the finance and logistics of the company. This is going to lead us to ask the right questions to companies and what solutions should be recommended to withstand any calamity to disrupt the functioning of a business.

BCP is defined in the literature as an integrated set of formalized procedures used by an organization or an industry to recover from events that disrupt business operations.
It provides managers insight into the creation and content of business continuity plans that are used better to manage supply chain disruptions for enhanced firm performance.

1.1 Project objective

Companies would be in a better state of readiness by managing their business impact analyses (BIA) in terms of the predictable outcomes occurring from disruption scenarios.

There is clearly strong evidence that effective supply chain management, specifically including the improvement of supply chain continuity, can help an organization to avoid unfavorable financial implications and market perceptions that may result from publicly known disturbances in the flow or timing of goods or service availability.

There is a need for both academics and practitioners to understand better the role risk management plays in business performance, which may be driven by the prevalence of a multitude of events that can disrupt the supply chain. Rigorous research is needed to understand better the role of supply chain continuity planning on firm performance and for theory building to provide more insight into this critical business area.

1.2 Project Motivation

The focus of specific topics within the general area of Supply Chain Management (SCM) research is constantly changing. The quality interest from a decade ago developed into extensive total quality management (TQM) research. The original focus on material price reduction evolved into a concern for the total cost of ownership (TCO). More recently, interest in the role of supply chain risk and business continuity management has increased (Hutchins, 2003).

Increased visibility and awareness of the vulnerability of supply chains has caught the attention of senior management, who are now more likely to recognize the strategic importance of managing disruptions (Kleindorfer & Van Wassenhove, 2004). The need for increased planning on risk to reduce and manage disruptive events is driven by a few critical factors.

1.3 Project Methodology

Members of a professional organization for supply management are utilized as the sample in this study. The data used for the study had the primary and secondary character to it. The primary data will be collected through the questionnaire method and also through visits to various sections under the department.

The secondary data will be composed through the reference of Standard Operating Procedures (SOP) concerning various sections of SCL and also through the reference of books, websites, and interviews with executives. The procured data will be analyzed using the risk assessment/impact analysis method, and the results will be used to quantify the financial impact of a particular risk.

1.4 Project Limitation

The study is limited due to time constraints. Most of the data have been collected through interviews, so there are chances of a discrepancy. The reluctance of personnel to provide complete information due to their busy schedule can affect the validity of the data. The information regarding cost and budgeting was not shared as they were confidential.

Chapter 2. Literature Review

The purpose of this research is to better understand the processes and techniques firms utilize in the planning stage of supply chain continuity management before an event occurs. In order to focus and bound this research project, ex-post activities used to manage potentially negative consequences after an event has occurred to return to a steady-state are excluded from explicit examination.

Within this study, there is no focus on any particular type of disruption. The intention here is to examine the general planning activities used by firms to improve the potential for business continuity regardless of the source of the disruptive event.

Several streams of literature and research form the basis of this study. A general examination of risk in business is followed by a discussion of the specific role it plays within the context of a supply chain. Risk is a multidimensional concept, specific aspects of which have been extensively explored in areas such as insurance, finance, psychology, and organizational behavior.

2.1 Risk

The intention here is not to fully explore risk as it relates to all business and behavioral areas, but to provide a general working definition of risk and the specific role of risk in supply chain continuity planning.

After a discussion of the relevant risk literature, implementation of Business Continuity Planning is conducted. Under which, risk register plays a significant role in analyzing the impacts of risk. It represents a balance that businesses should consider when undertaking risk management in order to create appropriate continuity plans. A risk register records both the likelihood and impact of the threats identified, as this will help to prioritize actions. Each risk for each task is determined first. The identified risk is documented, and risk assessment is done where its impact and likelihood is determined based on experience and records using Control Design Assessment, which helps us to know if the existing design for controlling the risk is viable or not, Control Operation Assessment, which evaluates the control measures adopted by the department to reduce the risk impact and lastly, Control Effectiveness Assessment which measures the overall control over the risk.

'Significant risk' represents a probable hazard that would require the expenditure of capital (rather than budget) to cushion against the resulting impact of an event or which would produce considerable loss to the firm (e.g., reputation) and must also be part of the financial planning process.

Therefore firms must create financial plans to account for the variety of events that could occur.

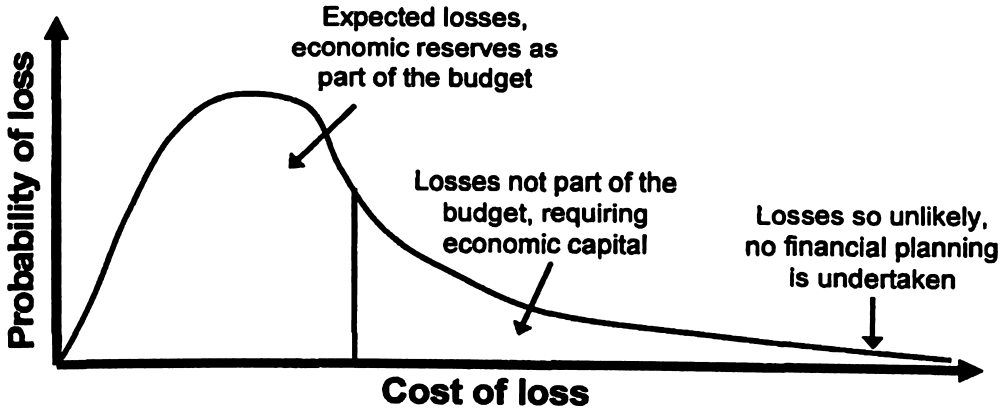


Fig. 2.1 Adapted from Manning and Gurney (2005)

2.1.1 Risk in the Supply Chain

As firms continue to try to 'do more with less' in efforts to reduce costs and increase efficiency, fewer resources are available for proactive environmental scanning. In general, employees need to have time available to identify and consider possible events to make proactive plans, with the implication that they are therefore freed from spending all of their working hours on direct, tactical daily tasks. Another problem is that investments for the improvement of a process (in this case, improving supply chain continuity) often do not yield immediate, directly linked, or easily visible results.

It may not be possible to know and analyze the quantitative or qualitative impact of an event that could have happened but didn't. This lack of a direct, easily traceable link between efforts and results, combined with an inability to capture the savings achieved by avoiding an event, may reduce the desire and likelihood of firms to make efforts or investments in supply chain risk management (Repenning & Sterman, 2001).

A reduced level of available attention for, and investment in, managing nonrecurring events and activities may reduce the costs of daily or routine transactions, but incurs a trade-off cost by leaving fewer resources available to plan for unexpected events. This may increase the potential for damage from surprise events that disrupt the supply chain (Lampel & Shapira, 2001; Weick & Sutcliffe, 2001).

Catastrophic events on a larger scale resulting in major losses (and often considerable negative publicity coverage), such as the Tylenol tampering in 1982 or the 1989 Exxon Valdez spill, have also been shown to have an immediate negative impact on stock prices of 5-11 %, and long term impact of up to 15% for firms that are less effective in managing the recovery process (Knight & Pretty, 1998).

Conversely, it has been shown that announcements of the implementation of supply chain management tools, technologies, or processes that are viewed as effective or 'best' practices can have

a positive impact on financial performance and stock values (Filbeck, Gorman, Greenlee, & Speh, 2005).

Take, for example, Nokia and Ericsson; both experienced a massive supply-side disruption when the facility of a key supplier to both firms had a sizable fire in a manufacturing facility. Nokia, working closely with the supplier, was able it implement plans that allowed for a more rapid recovery than Ericsson. Within a year of the incident, Ericsson's market share had dropped to the point that it withdrew from the market, and Nokia's market share grew substantially when Ericsson, its major competitor, left (Norrman & Jansson, 2004; Sheffi, 2005).

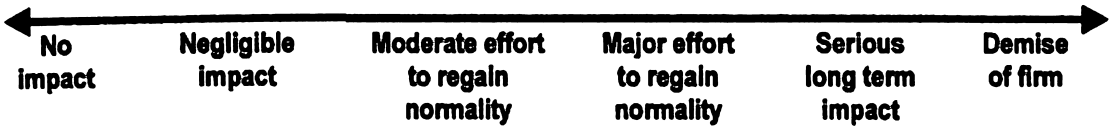


Fig 2.2 Possible Impact on the Firm

Given the demonstrated impact of even a small disruption, the potential of a large unscheduled event such as a disruptive disaster that completely shuts down a facility, or which severs a link in the supply chain in which the firm is embedded, creates a strong motivation for firms to create plans to better deal with such events.

Proper continuity planning may be able to help firms to avoid undesirable events that, in turn, may lead to financial repercussions. Planning well may even allow the firm to emerge stronger following an incident than it was before (Norrman & Jansson, 2004).

2.1.2 Risk Planning

The effective management of disruptions is a multi-step process that should begin long before an event actually occurs (Helferich & Cook, 2002). The common first step is mapping the supply chain to better understand the network of linkages in which the firm is embedded. This is followed by the identification of the types of events that could occur and their possible ramifications (Chopra & Sodhi, 2004), which may vary with the business environment and structure of a specific supply chain.
Once possible sources and impacts of events have been analyzed, the firm should create plans that allow for possible avoidance of events. When avoidance is not possible, plans must be put in place that reduces the impact when events do occur (Lewis, 2003; Kleindorfer & Saad, 2005). The project management literature (Pich et al., 2002) adds still further to this with a final element of learning for continuous improvement in all of the steps to mitigate and manage an event (Figure 2.3).

The purpose of continuity planning for ongoing supply chain functionality is first to try to prevent events from happening with early detection and action, and secondly to reduce the severity of the event, allowing the firm to recover to a level of supply chain performance that is, at a minimum, no

less than before the event occurred.

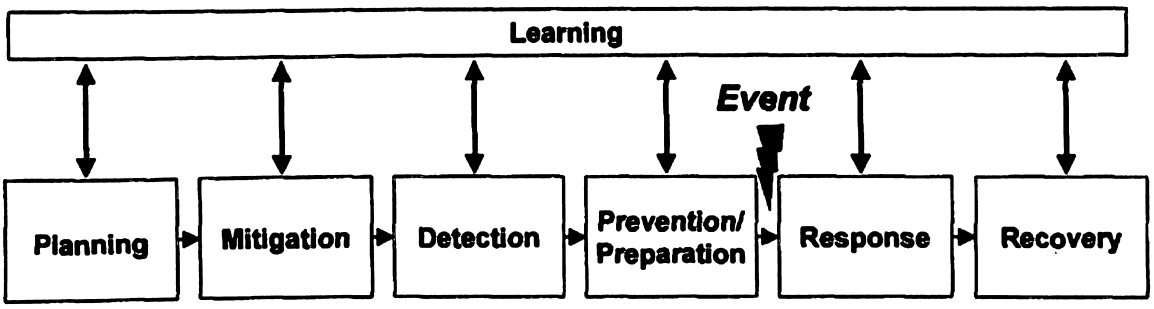


Fig. 2.3 The Iterative Cycle of Learning in Disruption Management

The impact of disruptive events on a supply chain can manifest in multiple forms. The first and perhaps the most obvious form is a disturbance in the availability of physical goods or materials. This can be either a deficiency, as in a stock-out or shortage, or it can be an overabundance of inventory that is not immediately needed, is unwanted, or is obsolete (Cavinato, 2004; Christopher & Lee, 2004; Spekman & Davis, 2004).

The issues associated with a lack of material may lead to missing scheduled customer shipments, expedited processing, and shipping, or the need to purchase materials from non-usual sources - often at a higher price. Having more inventory than desired leads to an increase in carrying costs, driven primarily by the opportunity cost of capital and the possibility of obsolescence, which impacts the cash flow and investment capacity of the firm.

The second manifestation of supply chain risk deals with the flow of information (Spekman & Davis, 2004) including a lack of material or product visibility within the pipeline, especially when the supply chain is physically elongated due to off-shore sourcing and/or servicing a global customer market (Christopher & Lee, 2004). There could also be the distortion of demand information as it flows through the supply chain (Forrester, 1961; Lee, Padmanabhan, & Whang, 1997).

Information on market intelligence of events that are occurring in the business environment (e.g., competitor actions, changes in regulatory requirements, etc.) is also important for effective management of the supply chain (Cavinato, 2004), and can be used to detect possible precursor signals that an event may be impending or beginning to unfold.
The third dimension encompasses hazards to physical assets such as substantial damage or destruction of a facility from causes such as a flood, fire, or severe weather. It may also take the form of product or process failure that may cause harm to individuals or to the environment, which creates significant liability and undesirable press for the firm (Sheffi, 2005).

Although disruptions can manifest in multiple forms, it is the dependencies between firms that may allow disruptions to propagate across entities, making them susceptible to disruptions in the flow of

goods and services when an event occurs at some point in the supply chain. There are three types of dependencies within a supply chain.

The first relates to time, where there are time lags between processes to move goods or funds, to provide services, or to share and utilize information. These time lags are further exacerbated by global supply chains that have longer physical paths for goods to travel, and conversely by the shortened 'clock speed' of many product life cycles (Kleindorfer & Van Wassenhove, 2004). The second dependency relates to functionality.

The third dependency is relationships, where business activities rely on the interaction of processes within the supply chain (Wilding, 1998; Svensson, 2004). These three dependencies put supply chain members at risk if an event occurs, which impacts the ability of one member to continue to engage in normal business activities to maintain the flow of goods and services through the supply chain.

No organization is entirely immune from experiencing a disruptive event. There is a compounded probability that an event will occur at some individual node in a supply chain due to the increasing number of entities that each have their own distinctive vulnerabilities and the corresponding chance of an incident.

Therefore, firm's must take steps to build a supply chain that is both secure (reduced likelihood or lower impact of events) and resilient (able to adapt, respond and recover when events do occur) to minimize the total impact of disruptive events on the supply chain (Rice Jr. & Caniato, 2003; Sheffi, 2005).

However, recent research suggests that, surprisingly, only 5%-25% of firms listed on the Fortune 500 are formally prepared to handle a crisis event or major disruption (Mitroff & Alpaslan, 2003) and less than 20% of firms examine their supply network at least annually (Hillman, 2006). This lack of planning occurs despite industry statistics that reveal the number of natural and human-induced disruptive incidents has been increasing (Rodetis, 1999).

2.2 Organizational Sponsorship

After much explanation of the study and several rejections for participation, Qatar Steel agreed to participate in the study. This works well for us because I have worked at Qatar Steel for several years. This will make it easier for us to conduct the experiment knowing the ins and outs of the Company.

Qatar Steel is a recognized and established leader in the steel industry within the GCC region. It was established in 1974 as the first integrated steel plant in the Arabian Gulf. Commercial production commenced in 1978. The Company has operated as a wholly-owned subsidiary of Industries Qatar since 2003.

Qatar Steel is recognized as a regional leader in the steel industry. Production operations are based in Messaieed Industrial City, 45 kilometers south of Qatar's capital, Doha, where Qatar Steel's corporate headquarters are based. The Company also operates a UAE based subsidiary – Qatar Steel Company FZE. Inspired to meet the growing demand for steel in Qatar as well as the region in general, Qatar

Steel has embarked upon a series of initiatives to modernize and expand its operations. These projects will elevate the Company's production capacity and further enhance the Company's role in the global steel industry. (Qatar Steel Company, 2017)

Plant facilities now include a Midrex process-based DRI/HBI combo mega module, electric arc furnaces with a ladle refining furnace, a continuous casting plant, and rolling mills with the latest automated features. Additional facilities include jetty facilities, the main power substation, quality control center, maintenance shops, storage, and processing facilities for sea/freshwater, compressed air, and natural gas, and a medical clinic. Today the plant occupies an area of 707,000 sq. Meters, adjacent to which is a further 375,000 sq. Meters plot reserved for future developments.

Qatar Steel has a committed and skilled workforce of over 2,000 individuals in both operational and administrative roles. Their tasks range from research, engineering, and manufacturing to marketing, selling, and distributing the Company's products throughout the Gulf Cooperation Council (GCC) region and the world.

The large database of individuals and reports provided by Qatar Steel provides sufficient and appropriate information to adequately gather information on the constructs to be examined and to provide adequate power for data analysis.

A contact sample of supply management professionals is considered appropriate because these managers are often involved in supply chain risk management and continuity planning. In addition, supply chain disruptions impact the flow of goods through the firm, and procurement professionals are in a position to quickly see evidence of either a shortage or a build-up of material that would be the result of disrupted flows.

The Supply Chain and Logistics department of Qatar Steel is headed by Manager and has divided into three sections, namely Logistics Section, Port Operations Sections, and the Shipping (Product Delivery) section. The Logistic section headed is subdivided into three, namely EF supply and slag handling, Supporting and Slag preparation plant and brig. Plant. The Jetty and DR supply come under the port operation department. Finally, the shipping section deals with product delivery, planning, and coordination, which is now outsourced.

The department's responsibility is to move the right material to the right place at the right time, in the right amount, in sequence, and in the right direction. The other functions are to maintain or improve product quality, reduce the damage of materials, promote productivity, increased the use of facilities, and promote the increased use of facilities. Qatar Steel has signed a five-year contract for a light range of cape size vessels for iron ore consignment is engaged in dry bulk shipping and logistics.

On learning about the daily operations of the organization's supply chain management, we found that the department was looking into improving their risk management strategy. The steel company has its highs and lows due to the economy rise and downfall of the country. This leads them to plan an effective strategy in order to lower the impact of the downfall on its finance and core of the organization. This is where this study helped them in implementing BCP.

We will now be focusing on the research design and implementation part of the SCL.

Chapter 3. Research Design, Methodology And Plan

Research is an iterative process grounded in theory and existing knowledge that extends our understanding through the use of data to test and modify existing theories and to create new theories (Handfield & Melnyk, 1998; Meredith, 1993).

This chapter outlines the scientific research design and methodology used in this study. Research that is conducted in a rigorous manner provides a strong foundation for study replication and generalizability of findings. The remainder of this chapter outlines the research design employed. A description is provided of the organizational sponsorship, the process used to gather data from survey respondents, and the data analysis techniques utilized.

3.1 Research Design

The first step is to establish a theoretical foundation described in Chapter 2 Literature Review. Next, an appropriate research methodology should be selected based on theory and the research questions. Flynn et al. (1990) and Handfield and Melnyk (1998) provide guidelines for a systematic process to conduct empirical research in operations management. These theories have not been well researched within a supply chain, and therefore provide an opportunity to expand our understanding of these theories and their application in more diverse contexts.

Given the exploratory nature of the research, a survey is an appropriate method for gathering data from a broad range of individuals for increased generalizability. The use of data from actual practitioners in a supply chain reflects the applied nature of operations and supply chain management and can help to close the gap between theory and practice (Flynn et al., 1990). The survey used here gathered data from a broad range of individuals since there was no a priori intention to specifically examine particular types of disruptions, risk management planning practices, or firm responses to disruptions. Therefore, study participants did not consist of a pre-selected group of firms or individuals, but from a heterogeneous sample that has likely experienced a wide range of disruptive events and that engage in varying levels of supply chain risk management planning.

The intention is to formalize research in the area of supply chain risk management with a strong theoretical base and to better understand the current state of planning that firms are engaged in to reduce the likelihood and impact of disruptive events. Individuals will be asked relevant questions about the activities and performance of their own department, and about activities between their sections and their customers and suppliers; therefore, the unit of analysis in this study is the corporation as it manages risk both within its supply chain consisting of its own operations and between its suppliers and customers, and from sources external to the supply chain. The process of selecting and obtaining a data source is detailed in section 2.2 Organizational Sponsorship, and the

survey implementation process is detailed in section 3.2 Data Collection.

To have a better understanding of risk management, we will be surveying the Business Continuity Planning of Qatar Steel Co. We will be exploring how the Supply Chain and Logistics department conduct their risk assessment for a structural flow of the business. We are going to experiment with the efficiency of their day to day process through the *Business Continuity Management* (BCM) Planning Cycle.

The proposed conceptual model served as the starting point of the iterative process undertaken in this study. It represents a recursive, cross-sectional model using reflective constructs. The original model was tentative, and it was expected to undergo revision based upon findings from the data. A discussion of the literature reviewed and applied to create the specific constructs in the proposed model.

3.2 Data Collection

The sample selected for data collection represents supply chain professionals who match the a priori objective of querying individuals working in heterogeneous supply chains. As such, there was a concerted effort to eliminate members from the full database that identified themselves as consultants or managers, individuals from organizations categorized as service, and other potential respondents that are undesirable for inclusion in this study. An email was sent to the managers of the Supply Chain and Logistics Department and Planning Department to discuss the importance of risk assessments and their permission to survey the department's efficiency.

Data collection from appropriate data sources is necessary to obtain information to adequately test hypotheses and increase the generalizability of the findings. The data source identified for this study was individuals involved in the management of a portion of the supply chain of their organization. This is an appropriate choice because professionals involved in the management of a firm's supply chain are quickly impacted by disruptions to supply and demand when they must adjust operational plans to accommodate changes to supply and demand plans. Because of their immediate and important role in responding to disruptions, they may frequently be involved in supply chain risk management and continuity planning.

One approach for contacting such individuals is through the use of one of the professional organizations that serve a variety of individuals working in different functional fields. Under the umbrella of supply chain management, such organizations include those serving individuals in supply management (purchasing or procurement), logistics (transportation or warehousing), or operations management (production planning, manufacturing engineering, etc.)

The data used for the study had the primary and secondary character to it. The primary data will be collected through the questionnaire method and also through visits to various sections under the

department. The secondary data will be composed through the reference of Standard Operating Procedures (SOP) concerning various sections of SCL and also through the reference of books, websites, and interviews with executives. The procured data will be analyzed using the risk assessment/impact analysis method, and the results will be used to quantify the financial impact of a particular risk.

The first contact with the targeted sections was indirect when Qatar Steel posted a notice in their monthly newsletter that a research project was being undertaken to study risk management.

The first direct communication with the department for which email contact information was available as an electronic pre-notice message sent to the respondents a short time before the study was conducted, to provide a brief explanation of the importance of the study, the value of the individual's response, and indicating the support of the Company. The use of pre-notification has been found to be even more important when the email is being used due to the amount of 'junk mail' and 'spam' that many people receive.

In summary, the data collection was carried out utilizing contact information of the supply management professional provided by Qatar Steel. Initial contact regarding the study with the Qatar Steel began in August 2019. Because of the approaching holiday season and the perception that many business professionals would be exceptionally busy at the end of the calendar year, the start of the actual data collection was held until the end of 2019.

Qatar Steel provided notification of the impending study in its January 2020 newsletter. An email pre-notice of the survey was sent to all the individuals for whom the Qatar Steel had provided contact information.

3.3 Survey Implementation

The letter asking the survey contacts to complete the survey contained instructions for completing the survey, including information that completing the survey should take no longer than 20 minutes. The survey asked questions related to the management and logistics of the operations.

Few of the questions included:

1) Do you think the supply chain can create more value?
2) Can you think of any changes that could increase revenue or lower costs?
3) What challenges does the department face regarding day to day operations?

The survey questions gave us a deeper understanding of the study based on the organization. It is important to note that in the section of the survey that allowed respondents to provide open-ended

feedback on the survey, a very small number of individuals (six, representing only 1.6%) commented that the survey was long or had too many questions. The survey length may have deterred some individuals from undertaking or completing the survey, especially for the paper survey, when it was possible to see the length of the entire questionnaire (the electronic survey only displayed a single page or grouping of questions as a time).

However, it is very important to note that nine (2.9%) commented that they liked the survey and thought the topic important and 10 (3.3%) individuals specifically asked to receive a summary copy of the study even though such a report was promised to the respondents as an incentive for completing the study; this enthusiasm would seem to indicate that the topic is of interest to supply management professionals.

This supports other empirical research, which found that two of the most important factors positively influencing survey response was the saliency of the topic to the target sample members and the sponsoring organization, both of which are achieved in this survey. The frequency and type of contact (email, phone, traditional mail, etc.) with the target sample is the second area of interest in designing a sampling plan.

Having constructed a base for the study and with the response received, we were able to move forward to examine the risk assessment of their supply chain. After learning about the daily operations of the SCL department, we had an idea to assess the efficiency of the operations with the data received. We wanted to implement the Risk Register assessment in order to experiment.

Chapter 4. Analysis

Examination of the sample data is necessary to confirm that the basic underlying assumptions required for multivariate statistical testing are met before more advanced data analysis can begin. These include assessing the demographics of the respondents is an appropriate representation of the target sample and allows for the generalizability of the results.

Some missing data is to be expected, but the levels of missing data by item and case should below and with a random pattern. In addition, the collection process should not introduce nonresponse bias and should control for common method bias. The data should exhibit a normal distribution, or data transformation may be necessary to carry out the required analysis.

The final response rate was 15.7% (188 responses from a qualified sample of 1,199). Response rates of approximately 10% are considered acceptable when using similar professional organizations as the target sample (Melnyk et al., 2003), although lower response rates are often used in supply chain research (Griffis et al., 2003). A summary of the response rates is shown in Table 4.1.

Table 4.1 Responses Rates

	Qatar Steel Members
Complete Database	1,674
Qualified Sample	1,199
Qualified Responses	188
Qualified Response Rate	15.7%

This would seem to indicate that managers should, in fact, be concerned about disruptive events, since they seem to be experiencing them. In addition, given the market intolerance for disruptions to the supply chain, it is imperative that managers learn to better manage their supply chain risk for increased supply chain continuity. Although correlation can be determined, causality can't with the

cross-sectional data used here. Future research utilizing longitudinal data may allow for more definitive conclusions regarding the relationship between the occurrence of, and concern for, disruptive events.

The proposed models used in this study achieve marginal fit statistics, but are still useful given the level of research on risk management planning within a supply chain setting.

Therefore, this research makes several contributions to the field:

1. starting the process of construct creation and validation,
2. providing insights that could be used to examine and refine the role of complexity, uncertainty, and dependency, and
3. examining the role of continuity planning and other effective practices in reducing events that disrupt supply chain functionality and that likely impact overall firm performance.

The findings here provide support for the utility of BCP in explaining factors that influence firms to undertake planning efforts to reduce supply chain risk. In addition, the data provide insight into the impact of planning efforts on the occurrence of disruptions and firm performance.

Consistent with Risk Register, firms with higher perceptions of supply chain complexity and dependency engage in higher levels of continuity planning. Within this study, supply chain complexity includes structural elements (number of internal divisions and facilities, production facilities and warehouse, and external links of suppliers and customers), geographic dispersion, and multiple tiers of nodes.

Supply chain dependency includes elements of time-based synchronization, knowledge of partner activities, awareness of partner strengths and weaknesses, alignment of activities, the exchange of knowledge, and investment in information exchange. Interestingly, the uncertainty of supply availability and demand variation does not have a significant impact on planning. It is possible that uncertainty is accepted as a 'normal' state with a perception that supply chain managers have little ability to take action to influence a reduction in uncertainty.

As expected, the use of a wide variety of effective business practices is positively and strongly associated with higher levels of firm performance, although not with a reduction in disruptive events from either supply or demand sources. An important finding is that the anticipated negative relationship between concern for disruptions and the occurrence of disruptions was shown instead to be significantly positive.

This raises questions about the link between these constructs. Using BCP, it is expected that firms that are more concerned about reliability would undertake activities to reduce the occurrence of events that would negatively impact continuous supply chain operation. However, it appears that more frequent and larger magnitude of supply chain disruptions is associated with elevated levels of concern.

Learning about the daily functions of the department gives us a clear picture of the management.

4.1 SCL Operation and Management

4.1.1 Shipping (Product Delivery)

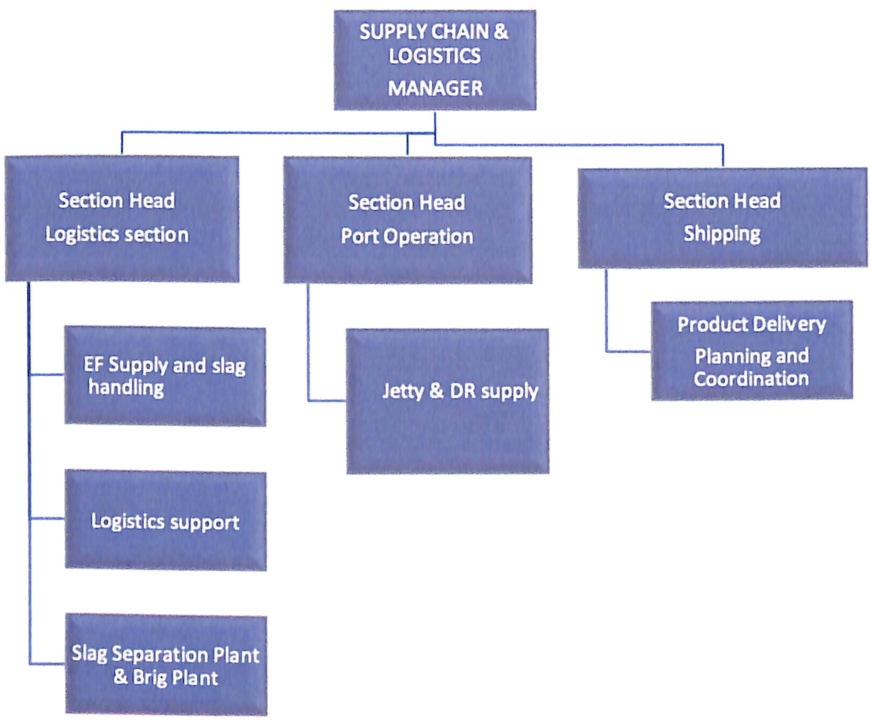


Figure 4.1 SCL Organization Chart

The shipping section had two subsections, namely Planning and Coordination, who managed the sales purchase order and Product Delivery. From May 2018 onwards, the Planning and Coordination activity was outsourced to a company for boosting the sale of Qatar Steel products to its customers. The main activities of the shipping department are production receiving, stacking of rebar steel, billets and coils, delivery of products, and handling the mode of dispatch.

Further, the documentation process such as delivery or the dispatch documentation, allocation of cargo, selection of transportation companies, stock verification of rebar and billet, and health safety

environment (H.S.E.). Qatar Steel consists of two product delivery yards.

The loading of the products from the product delivery yard is carried out after the prior approval from the Quality Control department in the ERP system. Depending upon the customer specification, the product is transferred to a trailer via crane with proper safety measures.

The delivery schedule for domestic and international supply (export) are inputted in ERP by Planning and Coordination, and Shipping P.D. subsection receives the Purchase Order (P.O.) in Oracle Discover for allotting cargo, A monthly production plan prepared by Technical department based on sales order inputs copy is forwarded to Product Delivery subsections. Every charge of products (Bars, Billets) received by P.D. is inputted in the ERP system based on receiving sheets.

Following cargo, loading memos are printed via Oracle Discover, and delivery documentation and identification tags are prepared. The other important documents for cargo movement include Cargo Readiness by Q.C., Site Invoices, and Gate Pass for the outgoing cargo.

4.1.2 Truck Reporting System for Product Delivery

The shipping section manages the trailer reporting for the dispatching of Q.S. products by roads through Truck Reporting System in the ERP, as shown in Figure. The functions of the Truck Reporting System are to

1) retrieve delivery information,
2) create a queue,
3) Record reporting time,
4) Create and Print loading memos,
5) Record Call Truck times
6) Check-in time of trucks
7) Check out time of trucks.

All records collected through Truck Record System are viewable in real-time with the ORACLE DISCOVER system. The Company, which is responsible for generating sales, creates P.O. for customers in the i-supplier portal.

The P.O. created by the Company is retrieved by the Transporter (customer) from the i-supplier portal of Qatar Steel, who makes a loading request to Qatar Steel.

Further, a queue is created in the ERP where the loading memo is oriented, and the "Call Truck" option is selected in the ERP to bring a trailer for loading purposes. After the loading activity, the P.D. section receives the loading memos, which is then used to prepare the dispatch documents for the checkout.

The notification is sent freight contractors by shipping section via ERP, the freight carrier checks. Q.S.C. requests for loading. The freight carrier confirms its readiness and available number of transporters via ERP. The shipping issue a P.O. based on monthly quota and trailer availability.

This is viewed by the freight carrier in the transporter portal, where they acknowledge the P.O. The shipping section hands over the shipping document and a site invoice for obtaining proof of delivery of cargo to the customer.
The customer signs the site invoice after getting goods. The freight carrier then submits the Site invoice within 15 days from the date of loading cargo. Once accepted, the shipping staff creates the G.R.N. in ERP against P.O. in order for the finance department to pay freight payment. The status of P.O. is checked periodically through oracle discover to ensure if the site invoice is submitted on time.

4.2 Port Operations

The jetty of Q.S.C. is broadly divided into three berths. Berth-1 and Berth-2 are used for import facilities of raw material required for manufacturing steel. Berth-3 is for the export of finished / semi-finished steel products.

The port operation section handles the vessel arrival and berthing, nominated vessel acceptance, receiving Bill of loading document, custom clearance, Draught Survey, Cargo Inspection, Operation of ship unloader and harbor crane, raw material receiving inspection and storage and inventory, oxide pellet yard management, raw material stacking and supply, exporting cargo loading by ship loader and conveyor system.

The material control department also monitors the flow of raw materials and its supply to DR1 by maintaining the day bin level through Honeywell D.C.S.

The container vessel decked at the Berth 3 consist of a quay crane to load the billets from the trailer to the container vessel. On Berth-1 and Berth-2, the unloading of import material such as Dolomite or Iron ore is done using a newly purchased crane of Hitachi, having a loading capacity of 1500 tons/ hour.

This improved the port operation efficiency as the older cranes were able to handle 400 to 500 tons/ hour, and two cranes had to operate simultaneously, making the labor cost high and productivity low causing in increase in Supply Chain and Logistics cost. (Al-Nuaimi, 2018)

The other activity of Port Operation is to carry the Port Risk Management. The taxonomy of risks in port containers consists of 5 risk categories, such as human machinery, Environment, Security, and Natural, with each having its subcategories.

A risk matrix is prepared by which risk can be quantitatively, and qualitatively assessed is done. The Risk Control Option is done following four principal stages:

1. Focus on risk areas
2. Identify potential risk control mechanism
3. Evaluate Risk Reduction Potential
4. Grouping R.C.M.

4.3 Logistics

The Logistics section under the S.C.L. is divided into Logistics- E.F. Supply & Slag Handling and Logistics- Supporting and Logistic Briquetting plant. Electric Arc Furnace produces the molten steel where the scrap is loaded into large buckets called baskets, with "clamshell" doors for a base.

The E.F. supply and slag handling section are responsible for Electric Arc furnace basket charging i.e., the supply of raw materials such as Heavy Local scrap, Dololime, Rod bar (local), Lump Coke, DR1 yard and Briquette through activities such as scrap yard management, radiation detection of scraps, Truck scale weighing via PMMS, Basket preparation/quality check, Alloy/additives storage and supply, carbon pneumatic conveyor operation and Lime storage and silos operation.

An important part of steelmaking is the formation of slag, which floats on the surface of the molten steel. Slag usually consists of metal oxides, and acts as a thermal blanket (stopping excessive heat loss) and helping to reduce erosion of the refractory lining.

The slag handling is handled through cold slag storage yard management, slag pot, and molten slag management by the section operators. (Farag, 2018) .The Logistics Supporting section is responsible for managing and supervising contracts worth Qatar Riyal 158 million with 135 plus outsources staff and 69 units.

This is done through safe contract services by dealing with the H.S.E. related matters and continuous monitoring of contractor's performance using performance calculation method by quantifying parameters such as Sustainability / Quality, Timeliness, Communication (Documents), H.S.E. and others. Based on this, a rating is given for each parameter, which is necessary for paying back the dues.

Logistic support is also responsible for providing logistic services such as the provision of Dump trucks, Forklifts, and trailers through sub-contractor like Al-Fowriya to the D.R. operation, Steel Making, Rolling Mill and Shipping departments of Q.S.C. as per request or during an emergency.

The scrap receiving, inspection, and inventory of local, imported, and Ferroalloys are managed by the section via PMMS. The scrap processing is managed through Saab Engineering contractors, where they process the received heavy scrap to measurable sizes for E.F. supply.

The other functions include the operation of high vacuum truck for dust removal and ensuring operation sustainability. Provision of mobile diesel supply, out pass arrangement for trailer and in-plant return scrap and by-products.
The Logistic Briquetting plant recycles by-products such as Oxide fines, Mill Scale, Direct Reduction (D.R.) Slurry, DR Dust, D.R.I. Fines, by means of agglomeration as a charge material to E.A.F., which reduces dust and CO2 emissions.

The section co-ordinates briquette plant operation, supervises carbon butts crushing and slag crushing activities.

4.4 SCL Cost Optimization Method

The objective of S.C.L. is to reduce operating unit cost, and this is by a number of methods, and one such method is by managing Bulk Handling Cost (BHC), the other operating cost optimization is done by improving the efficiency of iron oxide pellet discharging rate which is enhanced by dual vessel discharge with start time and the completion time is the same unlike before.

The efficiency has been further enhanced with the commissioning of the new Hitachi crane, which can handle a capacity of about 1500 tons/hr.

The material handling cost of Electrical Arc Furnace per ton of molten steel is reduced by improving the equipment maintenance, slag handling cost, shipping cost of rebar's, shipping cost of billets, Briquetted Iron production.

The Supply chain is enhanced by monitoring and control of the stock of unprocessed scrap of processing yard via PMMS and ERP, which is calculated by adding the opening balance with quantity received and then subtracted with quantity processed. The other way to enhance supply chain management is by reducing vehicle in and vehicle out time (VIVO).

Transportation delay is one factor that makes the Company a reliable risk-sharing partner. The cost of operating billet loading i.e., the quantity of billet loaded divided by the number of days it takes to load the material, and rebar loading is reduced by maximizing the efficiency of loading operation and lowering the number of days as minimum as possible to avoid penalty charges as per contract.

The cost optimization of port operation and shipping is also done through 3PL (Third-party logistics) by contracting the work to companies like "Milaha."

Most of the procurement contract for raw material is made on F.O.B. basis as the Company has got full cost control and the suppliers are responsible for clearing goods through customs at export, including export clearance documents at the port or terminal under F.O.B., which could save an importer considerable hassle and further complications.

This could also save money and time for the buyer. F.O.B. is a good solution for bulk transporting goods from a supplier, and the supplier is responsible for clearing the goods and export duties, which is one of the most complex and frequent mistakes the first time importers make.

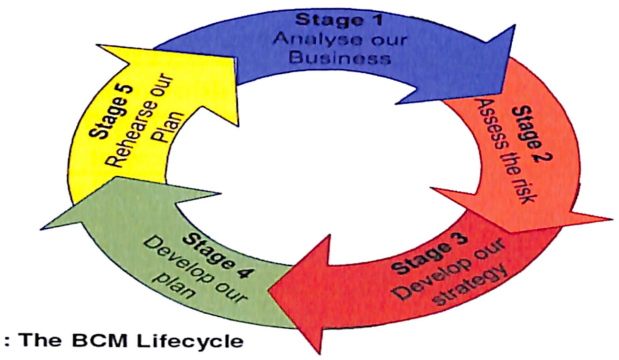
4.5 Business continuity planning (BCP)

Business continuity planning (BCP) is the creation of a strategy through the recognition of threats and risks facing a company, with an eye to ensuring that personnel and assets are protected and able to function in the event of a disaster. (www.manchester.gov.uk/, 2017).

Business continuity planning involves defining potential risks, determining how those risks will affect operations, implementing safeguards and procedures designed to mitigate those risks, testing

those procedures to ensure that they work, and periodically reviewing the process to make sure that it is up to date.

The BCM Planning Cycle consist of five stages:



: The BCM Lifecycle

Figure 4.2 The BCM Cycle

Stage 1 – Analyze Your Business

In this stage, the key process, activities and resources identified. So for this purpose we need to develop a Business Process table as shown in Table 4.1. Now to begin with Risk Assessment we need to first analyze the Business process of Supply Chain and Logistic department, SCL has got four business process namely Port Operations, Shipping, Logistics and Safety. For example, the port operation section does receiving, unloading and loading of raw material, Inventory of raw material and also handles the exports.

The shipping does the transport arrangement via ERP and good dispatch and the logistics deals with the supply of raw material to EF and provides logistic service to other department. The definition of process is important as it helps to know the activities carried out in each business process. The definition of business process helps to determine the peak hours, min or max lead time for process recovery, dependency and to know the responsible person in charge of the section.

Based on the business process, the impact parameters are determined which are classified into financial and non financial impact parameters and then the financial loss is measured against the delay in operation of a particular activity, the longer the delay, the higher the financial losses which are again classified as catastrophic, high, medium, low based the impact. (KPMG Risk Assessment , 2018).

Table 4.2 Business Process

Process	Activities	Max Lead Time	Min Lead time	Priority of recovery (1=High, 2=Medium, 3=Low)
PORT OPERATIONS	Receiving of Raw materials and inspection	1 hour	1 hour	1
	Inventorization of raw material	4 hour	5 hour	1
	Stacking bulk material in yards	1 hour	1 hour	1
	Supply of raw materials	8 hour	12 hour	1
	Export of DR1,HB1 By products	1 hour	1 hour	1
LOGISTICS	Accounting,Inspection,grading and segregation of scrap	1 hour	4 hour	1
	Supply to EF baskets	4 hour	6 hour	1
	Truck scale & Radiation checks	4 hour	1 day	1
	Slag Handling	1 hour	2 hour	1
SHIPPING	Inventory & warehousing	4 hour	8 hour	1
	Yard Management and storage	8 hour	8 hour	1
	Preparation of delivery doc	2 hour	2 hour	1
	Preparation of dispatch on the bases of order and LC clearance	2 hour	2 hour	1
	Arrangement of transport	2 hour	2 hour	1
	Preparation of doc for bulk materials and loading supervision	4 hour	4 hour	1
	supervision of stevedoring during loading	2 hour	2 hour	1
	Preparing allotment doc daily basis	2 hour	2 hour	1
	Prep custom clearance doc	8 hour	8 hour	1
	Checking of submitted invoices	8 hour	8 hour	1
	Shipment of cargo-road transport	1 hour	1 hour	1
SAFETY	Embed safety in all activities performed in production plants	1 hour	4 hour	1

Stage 2 – Assess the Risk

A risk register records both the likelihood and impact of the threats identified, as this will help to prioritize actions. The SCL department of Q.S.C first determines the risk concerning each business as shown in Table 4.1. The identified risk are documented and risk assessment is done where its impact and likelihood is determined based on past experience and records.

For this purpose we use Control Design Assessment (as shown in Table 4.2) which helps us to know if the existing design for controlling the risk is viable or not , Control Operation Assessment (as shown in Table 4.3) which evaluates the control measures adopted by the department to reduce the risk impact, Control Effectiveness Assessment (as shown in Table 4.4) measures the overall control over the risk.

Table 4.3 Risk Register: Control Design Assessment

Rating	Rating Description	Control Design
1.00	Poor	Control is poorly designed and leaves high level of Residual Risk
2.00	Unsatisfactory	Control is operating with limited effectiveness leaving considerable level residual risk
3.00	Satisfactory	Control is designed properly and leaves a low level of RR but opportunities for improvement exist
4.00	Effective	Control is designed to mitigate most aspects of risk but some RR still exist
5.00	Highly Effective	Control is designed to substantially or completely help in mitigate risk

Table 4.4 Risk Register: Control Operation Assessment

Rating	Rating Description	Control Operation (Performance)
1.00	Poor	Control is NA
2.00	Unsatisfactory	Control is operating with limited effectiveness leaving high level residual risk
3.00	Satisfactory	Control is normally operational and is acceptable
4.00	Effective	Control is operating properly
5.00	Highly Effective	Control is operating properly in the way intended in design

Table 4.5 Risk Register: Residual Risk Assessment Scale

			Control Effectiveness Rating				
			5.00	4.00	3.00	2.00	1.00
Inherent Risk Rating 1	5.00	Very High	Very High	High	Medium High	Medium Low	Low
	4.00	High	Medium Low	Medium High	Medium High	High	Very High
	3.00	Medium High	Low	Medium Low	Medium High	Medium High	Medium High
	2.00	Medium Low	Low	Medium Low	Medium Low	Medium Low	Medium High
	1.00	Low	Low	Low	Low	Medium Low	Medium Low

Table 4.6 SCL Risk Register

Strategic Objective	Risk Description	Risk Impact	Inherent Risk		Residual Risk				
			L	I	IRA	Control Design	Control Operation	Over all Rating	
1.Max Plant Production	Risk due to unavailability of material that could disrupt quality/continuity of production (due to blockade)	Unavailability of material could disrupt the feed mix ultimately leading to production loss	3	2	Med - Low	4	4	Very High	Low
2. Reduce Cost	Availability of existing unloading facilities	Causing demurrage's, hindrance in DR plant production	1	4	Med - Low	5	4	Very High	Low
3. Max Plant Production	Risk regards to critical equipment like dump trucks, wheel loaders, forklift, cranes that disrupt continuity of production	Delay of providing services interruption in operation	3	2	Med - Low	4	4	Very High	Low
4.Max Plant Production	Scrap Processing	Accumulation, unprocessed scrap	2	2	Med - Low	4	4	Very High	Low

Stage 3 – Develop Your Strategy

Develop a Business Continuity Strategy to cover what you would do if an event (risk) occurred. The present control system are documented and the control design and operation is rated based on its efficiency on basis of which the residual risk rating is. The present control design and its efficiency helps us to strategize if the contingency plan were supposed to be modified or not. If the residual rating is low, the design should be modified.

For instance, the risk assessment helped the company to determine that the cranes doing the unloading operations were old, so it was decided to modify the control design by commissioning a new crane having a higher capacity.

The control design and operation for each risk is documented and updated from time to time depending on the residual risk rating. So you develop contingency plan until the ratings are improved. This is the advantage of BCM.

Stage 4 – Develop your plan

For Qatar Steel, the *Business Continuity Management* (BCM) planning comprises of each section head with a Risk Champion leading the team who is the focal point. This helps the BCM plan to cover management of the incident across the organization. Each department has a standard BCP owned by the Departmental Manager. This individual and their section head should be familiar with the plan and understand how it will be deployed and how it links to the overall plan. This plan is known as the business continuity procedure to be adopted in case of emergency situations.

The SCL department plan outlines business priorities, roles and responsibilities, communication procedures, contact details (staff, suppliers and key customers), useful information such as processes, key business dates, recovery site location (if one is available) and equipment requirements.

Step 5: Rehearse the plan

Rehearsing the plan is extremely important for any BCM. This is because at times the contingency plan do not bring the same results as it is expected when implemented at the ground level. It is essential to rehearse to ensure familiarization and to obtain assurance that the plan actually works.

The plan can be rehearsed in many ways using simulated serious incident exercises, Desktop exercises (talking through how the plan would be used) , colleague awareness training , work Area Recovery tests at recovery sites, IT recovery trials, call cascade to confirm staff can be contacted outside core working hours.

Chapter 5. Interpretation Of Results

The Business Continuity Management for S.C.L. is an ongoing process where the procedures are continuously updated online with the help of staff and supervisor of Q.S.C., which is then approved by the S.C.L. Manager and the Risk champion after discussing it with the Strategic planning department. The B.C.M. team appoints a Risk Champion who is the focal point for communication and responsibility to prepare the draft for the B.C.M. study.

The B.C.M. helped to identify the risk pertaining to each business process and the present control designs and the issues facing with each process with the help of Inherent Risk and Residual Risk analysis charts as part of Risk Assessment procedure of B.C.M. The B.I.A. helped to quantify the monetary loss faced by each business operation of S.C.L. against the delay of recovery. The B.I.A. process concludes that the financial impact amounts to greater than 25 million Qatar riyals for a non-financial parameter like operation loss of production for greater than 16 days resulting in catastrophic loss is rated as 5 for all the business processes.

The other important non-financial parameter affecting the shipping and logistics to be considered product defects which also affects the company goodwill and result in loss of customers causing financial loss. The data loss for shipping and logistic has significant implications on the Company's revenue costing to about QAR 5-25 million when it exceeds 6 days of lead time. So there is a requirement of a backup option which is handled by the I.T. department.

The Safety process, if not handled carefully, can cause catastrophic losses, too, so, therefore, the S.C.L. department works in conjunction with the Health, Safety, and Environment department to mitigate the safety risk of the S.C.L. operations which helps to build a conducive working environment thereby boosting the employee morale.

The contingency plan is documented in the Business Process sheet one excels by the department head and supervisor. After analyzing the B.I.A. results, the department frames alternative plans.

The creation and initial testing of constructs in this research can serve as the basis for further definition and refinement of relevant constructs.

Little previous examination of the role of complexity, uncertainty, and dependency on supply chain risk. Supply chains exhibit these attributes and are, therefore, prone to failure. However, it is unclear the degree to which these attributes are related and the impact on disruptive events. It is recommended to refine and test definitions of complexity, uncertainty, and dependency within a supply chain context. In addition, a deeper understanding of the role of complexity, uncertainty, and dependency within a supply chain context is needed.

Previously, a little examination of the use of specific risk management practices utilized by firms to improve supply chain performance continuity. There is a wide variety in the practices firms can choose to use specifically to manage risk, but little research to determine which are most effective in reducing risk based upon the business environment and types of risk faced.

Further examination of risk management practices in a variety of business settings is needed, perhaps utilizing BCP. Testing of these theories is needed to better understand their usefulness in explaining risk management in supply chains; or to develop a unifying theory.

Disruptions from multiple sources and across industries can lead to sizable market penalties for firms that don't manage this important business area well. The reason for or cause of a supply chain disruption is not a critical factor; the market expects an uninterrupted flow of goods and services. In addition to the market and financial consequences that a firm may incur, there can also be a detrimental impact on employees, suppliers, customers, and other supply chain stakeholders.

Unfortunately, it is also possible that the efforts undertaken by firms to create leaner supply chains, increase efficiency, and reduce costs may have unintended consequences of creating supply chains that are more vulnerable to disruptions because of the elimination of safety buffers. Although the management of the unexpected can be a difficult challenge for a business to contend with, supply management professionals do not perceive that they must accept supply chain disruptions as part of doing business. There is a clear perception that they can positively affect both the frequency and impact of interruptions to their supply chains through proactive risk management, even if they are in supply chains that are complex and have the uncertainty of supply or demand.

This study examines the risk management planning activities that firms may undertake in an effort to reduce vulnerability to supply chain disruptions and to create supply chains that have greater reliability in the flow of goods, services, information, and funds through the supply chain for improved firm performance.

Building upon limited previously published theory-driven empirical research within this topic area creates both challenges and opportunities. Most notably, the need to examine multiple literature streams related to complexity, uncertainty, dependency, operational practices, and risk management.

The advantage of searching outside traditional literature streams is the ability to incorporate ideas from a broader span of thought. In addition, it allows for the creation of constructs that incorporate a more holistic view of concepts. Notably, this study has synthesized several streams of literature to create a framework for supply chain risk planning.

Chapter 6. Conclusion And Scope For Future Work

Future research in the area of supply chain risk management has several opportunities for further development. These areas include the continued refinement of constructs that examine the supply chain structure and environment in areas that may impact the vulnerability of the supply chain to disruptive events.

Specifically, constructs to capture the structural complexity of the supply, the dependency that exists between nodes, and the uncertainty in supply and demand need to be advanced and validated through multiple studies. Conceptual work has begun in these areas, but theory building and subsequent testing will require robust constructs.

A key first step in the process of supply chain risk management is having an up-to-date and comprehensive profile (or map) of the supply chain. Having an accurate profile of the supply chain is correlated with knowledge of the unique vulnerabilities of suppliers, important transit lanes, a firm's own facilities, and customers. It could be that the very process of explicitly identifying a firm's supply chain and the relationships between the nodes and the transit lane linkages illuminates the vulnerabilities and potential sources of risk.

The explicit examination and mapping of the supply chain for sources of risk has a high correlation to the ability of the firm to also assess the probability and potential magnitude of disruption, from both a quantitative and qualitative impact. An additional potential advantage of examining the supply chain and the node linkages is the ability to identify and utilize multiple sources of information that could provide 'signals' of impending or unfolding interruption to normal supply chain functionality.

Firms need to fully understand their processes and sources of risk, including:

- Material flows
- Process and entity dependencies
- Judicious use of buffers

They should invest in the process of creating, sharing, and maintaining formal plans, rather than relying on informal plans. Firms should not discount the impact of risk management as a subset of effective business performance management. Firms appear to have a clear picture of the locations of their suppliers, customers, and their own facilities, but less so of their transit lanes. They also believe they have a good understanding of the vulnerabilities of suppliers and their own facilities, and consider vulnerabilities in selecting new or evaluating current suppliers; again, there is a lack of understanding of transit lane vulnerabilities. Although the vulnerabilities are fairly well identified, firms do not perceive there is adequate knowledge of the probability or impact of different types of potential supply chain disruptions.

Firms are more likely to engage in informal planning, although formal plans are more highly correlated to a reduction in disruptions. In general, firms feel they are able to manage their supply chain risk well and use the practices of cross-training and supplier agreements most often.

There is little conclusive evidence that planning directly affects the frequency or impact of disruptive events, a disappointing result. There is, however, significant support for the significant positive relationship between higher levels of planning and firm performance. Given the strong positive relationship between planning and firm performance and the use of effective practices and firm performance, there may be an interaction effect between planning and effective practices that impact firm performance.

This inability to provide support for causality is a limitation of cross-sectional research and an area for future study. It is also possible that similar to the Sand Cone Model of capabilities (Ferdows & Demeyer, 1990), these create a stronger influence when combined.

Higher levels of supply chain complexity and uncertainty are associated with higher levels of supply and demand disruptions, and there is no significant association from dependency. However, the strong positive relationship between planning and firm performance indicates there is potential for planning to mitigate the impact of the supply chain environment.

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Questionnaire Script

Dear respondent a warm wishes. This is a questionnaire for studying Supply Chain Management and Logistics practices in various organizations. The data will be used only for research work for MBA program. I request you to respond and cooperate.

Name of the respondent :
Gender :
Designation of the respondent :
Years of experience :
Knowledge in supply chain management practices :

Q1.Who is / are involved in developing Supply Chain Management practices in the company?

a} Top Level Management
b} middle Level Management
c} lower Level Management
d} customers
e} Supplier

Q2. Does your company evaluates the performance of the Supply Chain Management practices?

a}yes b} no c}not particular

if yes how often it evaluates

a}daily b} weekly c}fortnight d}monthly e} quarterly f}half yearly g}annually

Q3. Which attributes is / are given more significance in the evaluation of the performance of the Supply Chain Management practices?

a}growth attributes of company
b}only trust worthy relationship between company vs supplier
c} only trust worthy relationship between company vs customer
d}trust worthy relationship with company, supplier & customer

Q4. What type of trust worthy relationship the company tries to inculcate in Supply Chain Management Practices?

a}to prevail positive relationship
b} to prevail partially positive relationship
c} to prevail negative relationship
d} to prevail partially negative relationship

Q5. Are the customers satisfied with Supply Chain Management Practices that the company offering?

a}not satisfied
b}partially not satisfied
c}somewhat satisfied and somewhat not satisfied
d}totally satisfied
e}partially satisfied

Q6. Are the suppliers satisfied with Supply Chain Management Practices that the company offering?

a}not satisfied
b}partially not satisfied
c}somewhat satisfied and somewhat not satisfied
d}totally satisfied
e}partially satisfied

Q7. According to your opinion do you think that your company is pursuing best Supply Chain Management Practices

a}Totally Disagree
b}Partially Disagree
c}Disagree
d}Agree
e}Partially Agree
f}Totally Agree

Q8. According to your opinion do you think that the company under Environmental Uncertainties will supplier and competition factor affect Supply Chain Management Practices?

a}Totally Disagree
b}Partially Disagree
c}Disagree
d}Agree
e}Partially Agree
f}Totally Agree

Q9. According to your opinion do you think that the company under Environmental Uncertainties will uncertainty aspect from State / Central government policies factor affect Supply Chain Management Practices?

a}Totally Disagree
b}Partially Disagree
c}Disagree
d}Agree
e}Partially Agree
f}Totally Agree

Q10. According to your opinion do you think that the company under Supply Chain Management Practices will logistic issues factor affect Supply Chain Management Practices?

a}Totally Disagree
b}Partially Disagree
c}Disagree
d}Agree
e}Partially Agree
f}Totally Agree

Q11. According to your opinion do you think that under Environmental Challenges which of the following factors may hinder supply chain management practices

a}technology cost including
b}Technology infrastructure
c}Logistics Infrastructure

Q12. According to your opinion do you think that under Organisational Challenges which of the following factors may hinder supply chain management practices?

a}Organisational Cultural of Operating supply chain management practices
b}Customer – Orientation Factors
c}Lack of Top – Management Support (in making the function profit centre)

Q13. According to your opinion do you think that under Resource related issues of company which of the following factors may hinder supply chain management practices?

a}Inadequate Working Capital
b}Desired Input Quality

*****_____*****

CURRICULUM VITAE

NAME : **AJAY KUMAR BEHERA**

JOB TITLE: **SR. SPARE PARTS ENGINEER**

REPORTS TO: **HEAD OF WAREHOUSE**

DEPT.: **MATERIALS & WAREHOSING OPERATIONS DEPARTMENT.**

Role Purpose: ***Responsible for managing and maintaining the Inventory Item Master Data Technical Specification (Mechanical/Electrical Equipment/Spares) and to lead the Inspection team to ensure all Incoming Mechanical/Electrical Equipment/Spares are received in accordance with Qatar Steel Quality Standard as per Ordering Specification, Drawing having safety as the Highest Priority. To Provide Technical Support to Inventory Control & Planning for Consumables/Tools Procurement and to warehouse Operation team for other Technical Assistance related to Mechanical/Electrical Spares in co-ordination with various internal departments to achieve Corporate Production Objective.***

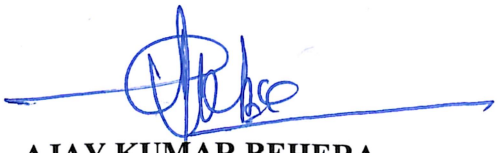
1. Ensuring Safety of self and other team members at all times. To Ensure Company HSE Policy & Procedures are adhered to by all.	▪ Ensure all members are work in safe and consistent manner ▪ Ensure all Near misses, Incidents, Hazrads, Unsafe act, Un safe Conditions are reported in accordance with HSE management system requirements. ▪ Ensure all members observe organizational general House Keeping Practice.
2. Develop, Manage & Maintain Item Master Data Technical Specification (Mechanical/Electrical Equipment/ Spares) as per Company Policy & Standard procedure to ensure the Technical Data, Parameters are reliable, adequate in line with Plant requirement.	▪ Vendor Satisfaction Level ▪ Timely Receipt of Offers from Vendors before Closing Date without Validity Extension ▪ Minimises Vendor Technical Queries
3. Ensure the effective implementation of IMG/Inspection policies and procedures through proper training, guidance and motivating employees in order to ensure the highest levels of performance are achieved.	▪ Individual objectives, training and development plans in place for all employees ▪ Ongoing management of performance through provision of formal and informal feedback and appraisal
4. Ensure all item master data's (Mechanical/Electrical Equipment/Spares) are accurate and updated time to time as per present scenario enabling planning and materials & services department to ensure timely plant requirement are met	▪ Correct & Updated Data Base record ▪ Less Non-Conformity / Discrepancy

5. To Maintain Standardized Inventory Catalogue for Mechanical/Electrical Spares & Consumables Inventory Item Master Data	▪ Uniformity in Item Descriptions ▪ Better descriptions for effective and efficient procurement / standardized purchasing
6. To carryout Item Master Data Enhancement periodically to increase the value of the Technical Specification and to fill the data gaps of existing Mechanical/Electrical Equipment/Spares Master Item Specification as and when required to fine tune master data base.	▪ Minimizes Internal procurement lead-time ▪ Facilitates right and prompt purchase ▪ Facilitates quick search of Items

7. To Carryout Duplicate Analysis periodically on category basis/commodity wise to remove potential duplicate Items from the Item Master Data	▪ Eliminate duplicate Items/Data Cleansing ▪ Minimize over stocking of Inventory
8. Optimization of Mechanical/Electrical inventory Spares by diversification of OEM Spares & Interchangeability and Equivalent Study	▪ Inventory Optimization ▪ Inventory Cost Reduction
9. To Provide Technical Support to Inventory Planning & Control Group during Techno Commercial evaluation of Mechanical/Electrical Consumables/Tools	▪ To ensure correct Technical Specification as per Requirement.
10. To lead the Technical Inspection team to ensure Inspection of Mechanical/Electrical Equipment/Spares are received as per Company Quality & Standard in accordance with Ordering Specification and drawing.	▪ To maintain Company Quality Standard ▪ To Enhance Plant Reliability ▪
11. Co-ordination with various Internal Department for Quality Issues with the received Mechanical/Electrical Equipment/Spares and to deal with the Suppliers for the discrepancy and to sort out the issue by providing necessary technical inputs in concerned with Procurement & Warehouse Divn.	▪ To ensure Quality Products ▪ Internal Customer Satisfaction level
12. Develop and implement feedback mechanisms to determine end user satisfaction levels; respond to issues and concerns; lead supplier business review meetings and collaborate with teams in managing alliance supplier efforts. Present reports of findings and recommendations for improvements	▪ Enhance End User Satisfaction level ▪ To build good business relationship
13. Coordination with Project Team for Mechanical/Electrical Equipment/Spares Inventory related Parts of any new project of the company for the Commissioning Spares/Two years Operational Spares etc.,	▪ Technical Review & Inventorisation of Spares as per Company Policy
14. To Ensure that all member work in accordance with Company Quality Management System requirements and contribute to continuous improvement initiatives	▪ To Achieve Zero Internal Customer complain ▪ To enhance Quality Inspection Standards

QUALIFICATIONS, EXPERIENCE & SKILLS

- Bachelor's Degree in Mechanical Engineering.
- Previous10 years' experience in Steel Industry with Supply Chain /Materials Management /Procurement & Warehousing section before joining Qatar Steel Company.
- Additional Professional Certification in Supply Chain/Materials/Warehouse Management
- Previous exposure and knowledge of Steel Industrial production, quality assurance, inventory planning and purchasing process.
- Experience in related Steel industrial data maintenance role with Oracle ERP system.
- Knowledge of Standardization & Cataloguing System of Inventory Spares (Mechanical/Electrical)
- Proficient in computer applications and hands on the Oracle ERP systems is preferred
- Field experience / work experience on Mechanical/Electrical Equipment/Spares of Steel Industry
- Well conversant with Industrial Standards like JIS,ANSI,BIS,DIN,EN,ASTM etc.,
- Exposure to Various Standards of different Industrial Products like Valves, Pipes, Steels etc
- Exposure to Various Inspection Standards of Materials
- Exposure to ISO 9001,ISO 14001,ISO 45001,Quality Circle & Six Sigma
- Communication Skills to deal with local & Overseas Suppliers as and when required
- Collaborate in cross-functional efforts to reduce costs, standardize equipment's/Spares/materials/components/commodities, and adapt new supplier technologies
- Excellent communication, learning and interpersonal Skills.
- Strong problem solving and analytical skills with a proven ability to make effective technical decisions promptly and accurately.
- Strong systems/PC aptitude, interpersonal leadership, organizational, analytical and problem solving skills.
- Strong work ethic with ability to work well under pressure, high initiative, and ability to handle multiple tasks
- Commercial awareness of Mechanical/Electrical Equipment/Spares
- Report writing & Presentation skills
- Good English language skills both spoken & Written
- Open to new & Innovative Ideas



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