DEGREE PROJECT, IN PROJECT MANAGEMENT AND OPERATIONAL DEVELOPMENT, SECOND LEVEL

STOCKHOLM, SWEDEN 2017

Impact of Natural, Man-made Risks and Stakeholders Relationship on effectiveness of Supply Chain Management in Developing Countries

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Acknowledgement

This research has been supported by contractors in the construction sector of Pakistan.

I want to present my sincere thanks to my supervisor Håkan Carlqvist and course and all other who have supported me during my thesis. I am thankful to him guiding, telling and sharing his true expertise and knowledge with me and giving me inspiring encouragement during the courses and Thesis of my Master degree.

Abstract

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Construction sector plays a vital role in developing the economy of the country and supply chain management is an important element of it. This research has pointed out the Natural, Man-made risks and relationship between stakeholders in order to establish and develop supply chains. The sample consisted of 33 contractors which were divided into 3 separate groups on the basis of revenue size of the companies in order to analyze and compare their prospect of risk in the construction sector in Pakistan. The contractors were asked about their opinions for the natural and man-made risks and the factors affecting the relationship between stakeholders.

The study was composed of questionnaire as a mean of survey and was applied to construction industry of Pakistan. The researcher findings have been discussed as a proposal for solution on the way to effectiveness of the supply chain. The results could be a potential help on the way to achieve the optimum performance of supply chain in the construction industry for the developing countries that will increase the productivity of the country and help them to make their economy better in the future.

Keywords:
Natural and Man-made Risks, Stakeholders, Supply Chain Management, Pakistan.

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1. Introduction

The main task of this study will be in analyzing and providing knowledge of Supply chain management in the construction sector of Pakistan regarding the Natural and Man-made disaster as well as the characteristics of relationship between important stakeholders (contractor, supplier and user) in a way to reveal implications to get maximum output and to increase performance within the sector. Organizations supplying products and services at distant places perform best by using geographical plans and programs for managing the risks involved. Severe things can happen to complex supply chains under pressure while delivering products expediently and cheaply. Supply chain risk management is a flourishing and

progressively formalized practice for treating the various supply chain risks. It focuses to prevent costly disturbances from happening or decreasing the impact of the disturbances that inevitably come about to global supply chains. This dissertation is made on a solid basis of academic, professional research and literature and it uses a certain methodology for evaluating supply chain risks in the emerging economy of Pakistan.

Pakistan's economic system is growing slowly. Its trade aspect has been experiencing a yearly growth of about ''5%'' for the last couple of years as per World Bank statistics, as more organizations do sourcing and manufacturing there. It is foreseen that Pakistan will become a more practical and fascinating option for numerous categories of products and services. The third world countries are still cheap, with quantity of labor and a very bright statistical profile. However, the country represents a mixture of serious supply chain risks for companies trying to source or manufacture there. This dissertation will sum-up Pakistan's supply chain managers on what specific risks they face, what effect these risks had on their organizations, what mitigation path may have worked, and what specific risks they anticipate to experience in the future. It comes out to be that Pakistan is not necessarily more risky than other countries in Asia when it comes to supply chain exposures. Overall risk consists of mixed operational and environmental disturbances. The third world or developing country like Pakistan has a different set of risks than for example China, or even India and Bangladesh next door. Every particular supply chain is also different, meaning that the interaction between this and the country's environmental factors has an influence on the relevant risk topography and conditions for a company. The risk exposure, experience and impact will count on a given company's industry and product categories.

1.1 Research Question and sub questions

In this research the scientist has attempted to analyze Natural, Man-made risks and stakeholders (contractors, suppliers and end-users) relationship in the light of contractor's point of view and opinion in terms of revenue size of contractor companies. The researcher has checked that whether they have same prospect or different or if it is different then what or what is the reason behind that. How could it possibly be affected as per their view point?

In order to address above main question, the following sub questions have been asked to come to the above point.

1. Which natural and man-made disasters and risks give significant effect on supply chain.

2. Which factor do you think have less or strong impact on your supply chain.

3. Which of the factors have less or strong impact to build relationship between the parties within supply chain for your company.

4. Which of the factors have less or strong impact on constructing and progressing relationship with supplier within supply chain.

5. Which of the factors have less or strong impact on relationship with the end-users within supply chain for your company.

6. Which of the factors are hurdles (less or strong problems) towards the growth of supply chain for your company.

1.2 Research Objectives:

The most important direction of the study was to identify Natural, Man-made risks and the major and most important stakeholder like contractors, supplier and end-user's relationship in the construction sector for the developing countries and Pakistan was chosen for conducting the research. The analysis was conducted by the help of Mann-Whitney and Kruskal Wallis test; the results are interpreted on the basis of statistical analysis.

1.3 Research scope and limitations

The basic purpose and the goal that is kept in mind for the study is analysis, calculation and differentiation of the risk level among important stakeholder of the construction in Pakistan. Simply, explaining the scope of the study in order to make decisions which will be upon quantified approach and estimation rather than assuming or guessing and subjectivity. As for this study it will be tried to give possible recommendations that could be used to increase the effectiveness of the construction sector.

In this study the researcher will also use calculations which are based upon techniques of statistics and expert knowledge as well as previous knowledge regarding the use of valid test for the analysis and finding the difference of view point between different sizes of contractors companies in the construction sector of Pakistan.

The calculation of data and analysis via the chosen SPSS software to run the test is limitation because of limitation of availability and for that the choice for selection should be a constraint. For the chosen Mann-Whitney and Kruskal Wallis test methods, the analysis can be fruitful towards the possible situations that might help the project managers and stakeholders in the future to make important decisions but the interpretation of test or data results is one of the basic limitations in the analysis stage.

Mann-Whitney and Kruskal-Wallis test use the median and mean approach in the data and interdependencies of variables can be a cause by which the actual estimates of data in the optimal direction can't be calculated and is considered constraint in the analysis and conclusion of the data.

As in the research model, there is no existence of the term 'Checking' the change within the data because the researcher in general and not some specific for ongoing part of the project and is just specific construction industry of Pakistan. So the data could have changes as we don't have hold on the extension or information of changes and we are also from world of that specific construction industry and some information is also classified for the research.

1.3.1 In Scope

The main activities which are in scope are as follow:

- Collection of data
- Arrangement of data and information
- Selection of test model
- Calculating the results and interpretation
- Suggestion for future studies

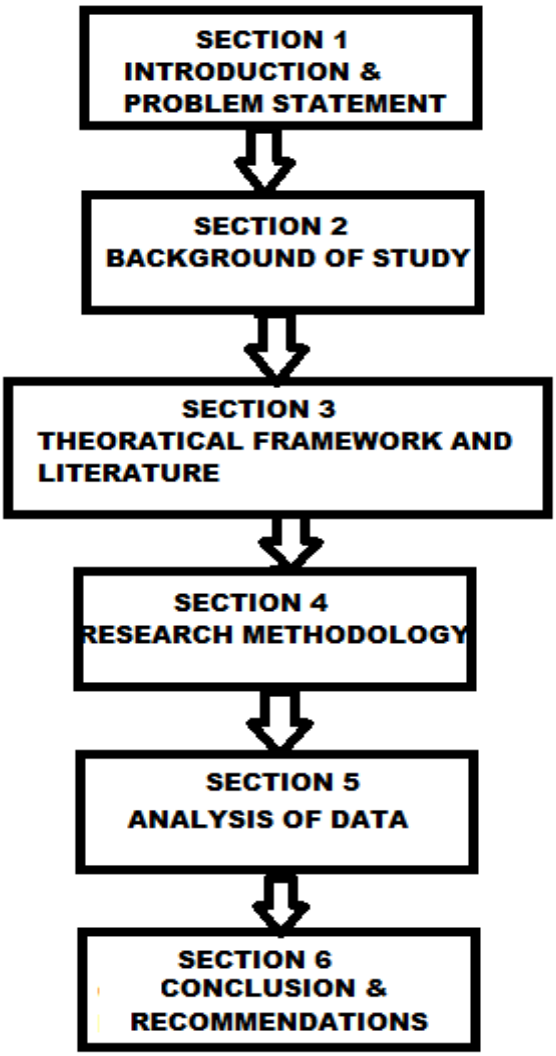
1.3.2 Out of Scope

The main activities which are out of scope are as follow:

- In depth detail of data
- Opinions and advise about Risk and difference among stakeholders
- Involvement of other parameter in the Risk

1.4 Structure of the paper

The study is designed in a way that the first chapter explains introduction and problem statement of the study being performed. Chapter 2 Background of the study and evolution of construction sector and problems across that will be discussed in Chapter 3 as Theoretical framework (research methods) and Literature Review done in order to find the solution of problems a explaining the core importance of relationship needed between the key stakeholders. Chapter 4 will provide readers information about the methodology of research, sample selection, hypothesis and method to do the research. Chapter 5 will put light on the analysis results got after the survey and a detailed discussion will be made after running the tests on data, Chapter 6 will provide readers recommendation of the study in order extend future study within the scope. Limitations shortcoming of the study will be explained as well.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2. Background of the Research

2.1 Natural Risks:

Supply chain risk managers must be careful of the latent disruptions from terrorism in Pakistan. International owned or export oriented companies do not appear to be generally targeted. Most of the attacks have been against soft targets, such as crowds of people, frequently in link with public transportation. There does not appear to be a primitive anti-western or anti-foreign feeling in Pakistan, as the terrorism has generally been of religious or domestic nature. It is often not the casualty from the disaster itself that impedes and slows down supply chain operations. If an explosion destroys train tracks or a highway, it will have a direct effect on that transportation route, but the indirect impacts can be more intense, such as prolonged delays and intrusive security measures. Hazards happening within supply chains can also have wide ranging results for other parts of a company's supply chain.

2.2 Man-Made risks:

Pakistan's yearly floods are likely to be more certain than supplier bankruptcies. It is often that one single incident or failure can causes a disaster, but a confluence of events that in combination leads to significant problems. Events often have a domino effect with unpredictable and possibly exponential consequences. As Knemeyer et al. (2009) mentions, while a supply chain manager does not know exactly when and where a tornado will strike, he can find out information about what conditions typically lead to their occurrence, when and where they are most frequent, and their likely paths. Because a disorganized system is not totally random, awareness of the initial conditions help in confining a "chaotic" string of events to within a certain range. For example, massive Pakistan monsoon rains in the month of June will inevitably lead to flooding somewhere at some near point in time. The "somewhere" portion can be pin pointed accurately by using discovered data from former seasons.

2.3 Stakeholder Relationship:

Existing of factors that play major part on the end of the selected key stakeholders are the contractors mind set of understanding the demand of their customer in a project which directly leads to the success and collaborate strong relationship, thus developing a strong supply chain management. The agreement in a relation with the parties are judged & analyzed with the help of questionnaire in a way to find if they have a deep knowledge of importance for the determinants of relationship and it's not taken for granted especially by contractors. Also found by the study Saada et al. (2002) that in the construction field the main emphasis is on some important factors that include the mutual acceptance of concerns, openness to resolving the incoming problems that were promised or decided at the starting point in a project, using the key incentives to make improvements on the performance. The problem that is stopping or coming in the way to achieve the desired level of efficiency in the sector are not well soughed and will be needed to look over again by government, key stakeholders and researchers who are involved directly and indirectly with this to achieve the optimize level of efficiency. The study will make important contribution in the supply chain management and will give recommendation to the sector that will be helping stakeholders.

For the research the contractors and supplier are divided into two groups which are discussed in further parts and the researcher has compared their prospect on the natural and man-made risk factor and stakeholder relationship. For this there were many tests like ANOVA, Mann-Whitney and Kruskal-Wallis etc. But the researcher has used Shapiro Wilk Normality and Mann-Whitney which are explained in next step**.**

2.4 Division of groups:

Based on the research opted by Akintola Akintoye et al. (2000) the respondents were categorized into three types of group that was based on annual turnover or revenue in order to find the difference of natural, mad-made risk and stakeholders' relationship on the base of size. As mentioned by Watt (1980) who has pointed that size could be determined for the companies on the basis of number people employed, net assets, turnover as well as addition of value.

2.5 Method of Research

The study done by researcher was by the help of both inductive and deductive reasoning that was tried to cover the most areas for the research and it has mainly focused on the mixed approach. Through this theoretical knowledge could be gathered by the help of previous literature, articles as well as software for the statistical analysis. The use of Kruskal-Wallis and Shapiro Wilk normality test and latterly used expert viewpoints and explaining the results derive from the gathered data. Finally, the study was a practical approach since the current research has focus on the application of tools and techniques included in the course of Practical statistics (KTH).

2.6 Shapiro Wilk Normality Test:

The Shapiro-Wilk test is used to analyze the normality of the sample. For this the null hypothesis is considered as the sample is normally distributed and alternative hypothesis is considered as the sample is not normally distributed and p value is kept 0.05. The Shapiro-Wilk is also used in the study to check the normality of the independent variable so that it satisfies the condition of Mann-Whitney test. If the results show that p-value obtained from the test is less than the alpha level which is considered as 0.05, then we will reject the null hypothesis and the will imply that the data does not fulfill the requirement of normality and is not normally distributed.

2.7 Mann-Whitney

The basis feature of Mann-Whitney test is to compare the existing difference between the selected two independent groups when a sample is not normally distributed. Mann-Whitney test gives option to draw alternative conclusions on the data set depending on the assumptions that you have made for your data. The conclusions made by Mann-Whitney test about whether there exists a difference between the groups on the basis of difference of medians.

2.8 Kruskal-Wallis Test

It is extended from of Mann-Whitney test as Mann-Whitney test is used in the comparison of only 2 groups. Kruskal-Wallis test is used on non-parametric and rank based in order to find the existence of significance of difference between 2 and more than two groups with the independent variable or ordinal dependent variable.

Assumptions of Mann-whiney test are as follow

- First is that data set should include a Likert scale e.g. 5-7 scale that could be in the form of strongly agree to strongly disagree. Our data set also contains the same feature.
- The dependent variable must be ordinal.
- Secondly the independent variable consists of two or more groups and for 2 groups usually Mann-Whitney Test is applicable and for 3 or more groups researcher use Kruskal-Wallis Test. We have 3 groups or categories and in our case and grouping of contractors are done the basis of size.
- Thirdly the drawing of sample in the population should be random like we have done random sampling among contractors in the construction industry.
- Fourthly the size of group should be equal and same in this case as well we have taken 11 contractors from each of the size of the group.

2.9 Determinants and Specification of the Model

Natural, Man-made disaster and Stakeholder relationship are big risk in a supply chain. They have different effect on different kind of companies. Different researchers have tried to find and compare that in different ways. Sodhi et al. 2012, finished a paper in *Production and Operations Management* with their discovery that there are three gaps relevant to the future investigations in supply chain risk management: 1) No clear agreement on the definition of SCRM (Supply Chain Risk Management); 2) Lack of coextensive research on outcome of supply chain risk incidents; and 3) a deficit of verifiable research in the area of SCRM (Manmohan S. Sodhi, Son, & Tang, 2012). This dissertation is an effort to add to the body of knowledge by altering a methodological structure and adding up-to-date verifiable information to assist the line of work in controlling and minimizing supply chain risks.

As mentioned by Sodhi & Lee (2007), risks involved in supply chain can be Act of God as well as Natural and Man-made risks, Political risks, Mergers and Acquisition, Delay caused

by supplier risks, Environmental risks, Exchange Rate risks, Financial risks, Cultural risks, System involvement risks and Inventory risks.

Also found by Thun & Hoeniy as they have divided the risks involved in supply chain in internal and external parts (Thun & Hoeniy, 2011). The can be explained as:

Internal Risk involves failure of supplier, Problem in IT system, Quality & defects, failure of transport, other technological issues etc.

External risks involve Natural disasters like earthquakes, flood, etc., accidents, terrorist attacks, custom problems, wars etc.

Secondly in the supply chain the relationship between important stakeholder as per followed from the previous researches and strategies and had a strong base on the research done by Latham (1994) and Egan (1997) reports which was also further followed and studied by Akintola Akintoye et al. 2001 and the researcher has compared the base of relations by forming and comparing the three contractor groups on the basis of revenue in his study. We tried to opt the same variables used to conduct the study as by Akintoye et al. (2000) further divided into four basic areas as Internal organization functions that are important for the supply chain, secondly factors in building relationship with supplier and thirdly with clients, fourthly developing construction sector supply chain, and finally factors leading to effective supply chain and barriers and hurdles in the supply chain. We can mention the variables used by Akintoye et al. (2000) as follow:

- Inventory or Raw Material
- Transportation or Means of delivery
- Leading time or delivery time
- Purchasing or buying of Material
- Production Planning or Project Plan
- Improved customer service or Customer relations
- Increased profitability or Profitability
- Increase Market competitions or Competitive advantage
- Benefits to clients or More profits to customers
- Benefits to Supplier or More profits to supplier

- Improved Quality Assurance or Quality Assurance
- Reliable delivery date or In-time delivery
- Level of complaints or Acknowledgement of complaints
- Flexibility for customer or customer satisfaction
- Quality of Material and services or Quality Management
- Trust or level of trust
- Reliability of supply or Reliability of product and services
- Top Management support or Management support
- Trust
- Mutual interest and closer links or Follow ups
- Free flow of information and meetings or Communication and information
- Simplification of process and bidding or Simplification of system
- Late and incorrect payment or Bad Debts
- Bidding process or contract procedure
- Retention
- Too much demanding estimators or Mutual understanding
- Companies unable to understand each other or Faulty Reasoning

3. Theoretical framework (research methods) and Literature Review

3.1 Research Methods

The basic feature of methodology is to collect the required set of data and information that can be used for the analysis. The methodology can be composed of direction previous research, survey or statistical analysis tools and methods in the direction of purpose of study. This leads the researcher towards the purpose of study and toward the desired output. There are generally two basic methods in the research which can be categorized in two parts as qualitative methods and quantitative methods.

3.1.1 Qualitative research methods (Inductive)

Another aspect of qualitative approach is not generalizing of the study by the findings or research. It can also be based on small sample size, personal meetings, observations and questionnaires (Jha, N.K, 2008). In order to help in coding the interpretation of that data, there are many computer software's and programs that help in facilitating the qualitative approach and its analysis.

3.1.2 Quantitative research methods (Deductive)

The quantitative approach is also defined as deductive approach, there the researcher use the method of quantifying the problems as by Jha. N.K (2008). In this method there is always a set of numerical data which by use of statistics can be measured, organized in a usable form in order to get and interpreted results. This approach has specific emphasize on the objectivity via conceptualization that was to develop the research hypothesis (also known as research question). The main characteristics of this approach are to have a certain design that will lead to a systematic study. The objectivity in quantitative approach can be interpreted by the help of literature, theoretical framework in the way to express the question of research. The quantitative approach is easy to handle and gathering data is much simpler as compared to qualitative approach.

3.1.3 The mixed method

A mixture of both qualitative and quantitative approach can be significant and this will be called the mixed approach which might be able to help to process and analyses the data and research question in a better way. The mixed approach was explained by Teddlie and Tashakkori (2003) by the practical application of different combination of methods in the study. Johson and Turner (2003) had a strong argument on different approaches of studying on basis of the nature of study. Here in the mixed approach the scientist uses multiple sources and methods (a combination of qualitative and quantitative) and through that they gather the required data and use that in the effective way.

3.2 Different types of Risk analysis

As defined by (AS/NZS 4360, 2004), the process of risk analysis can be defined as a systematic way in order to understand the process and to comprehend the risk level. There can be multiple classification of analysis and it might be different and have different details. The level in the form of details is the dependent of risk, available data and the analysis of information. As per explanation the analysis of risk might be qualitative, quantitative and semi quantitative. While the comparison of risk analysis in our case is natural, man-made risks and stakeholder's relationship will be qualitative and semi quantitative.

3.2.1 Qualitative Analysis

The qualitative analysis can be defined as the degree of possible level of significance (Risk) and chance of likelihood that those possibilities can be happened. The scale is defined as per circumstances and is matched for the different risks. Qualitative analysis needs actual data as well as facts which is most important in that. the norms of qualitative analysis includes firstly that it can be used to identify risk in the first step but need more comprehensive analysis. Secondly, if the quantitative analysis is absent and less presence of numerical data.

3.2.2 Quantitative Analysis

The quantitative analysis is based on numerical data for the analysis and likelihood from multiple ways. The quality is depending on the tendency to gather accurate data and the valid

use of methods and models. The process of risk management is not only helping the project managers in a way of identification of potential risk but it is also providing opportunities by which they can control and mitigate the risk like in measuring the impact of factors or causes in the risk.

3.2.3 Semi quantitative Analysis

It can be categorized from the qualitative analysis and further be used to expand the analysis and this involves the quantitative analysis. It is very important fact that semi quantitative analysis does not endeavor the realistic values as compared to qualitative analysis but the real concern is to make the scale of possible consequences and probabilities to the occurrence level. The standards attached to all description (Risk) might not be replicating the true and accurate relationship of the real level of risk and probability, thus a formula can be formulated that could distinguish the boundaries of such things whenever the researcher is liking the numbers.

Finally, it can be concluded that qualitative risk analysis method is somewhat quick and easy in order to perform in most of situations. But there are some constraints on the way of qualitative analysis as all the employees are not well trained for this. It is also hard to identify in the numerical way the risk and correlation. But one of the main advantages of this is that it helps in analyzing the data in the next stage.

3.3 Literature Review

3.3.1 Supply Chain

A supply chain consists of system of organizations from providers to consumers, with the objectives of integrating in the context of supply as well as demand through a proper channel of coordination in terms of efforts from a company (Frankel, Bolumole, Eltantawy, Paulraj, & Gundlach, 2008). It is perceivable that sourcing, acquisition and substantial management are components of Supply Chain Management. It is most of the time essential in order to make sure that production and manufacturing as activities under the scope of logistics and supply chain managers. As Coyle et al. point out, logistics, by its nature; will always focus on processes that sliced across traditional functional limits (J. J. Coyle et al., 2013).

The entire method of producing the raw material in order to ensure the selling of the product to the company or a wholesale dealer is considered to be supply chain. Various organizations are observed in taking part in this process within manufacturing goods and sending those commodities and manufactured items to the consumer. Chopra & Meindl (2007) have specified the process of supply chain in a way that is a combination of companies which tends to be a part in the process of satisfying the consumers needs. The associates of supply series can never be limited to the producers and suppliers. Storehouses, wholesalers, shipping agents and consumers are considered as the vital players in supply chain. As referred by La Londe and Masters (1994) one supply chain can be considered as one company manufacturing raw material, then it selling it to other which after is using the raw material that was bought and turn it into a unit or a component. Then the next company buys the new product or component that was manufactured by the former company and put it together in order to shape a commodity which can be sold to the fourth company that can be a retail supplier. These retail suppliers then give the product to the different merchants so that they can finally sell the new product made from the previous steps to the final consumers. These groups of companies which bring these goods forward can be considered as supply chain.

3.3.2 Supply Chain Management

Mentzer et al. (2001) have given different theories that can be deep-rooted within the firms to act systematically with the Supply Chain Management school of thought. In this research, the centered acts are; coordinated action, correlative data sharing, cooperatives as well as partner's structure & keeping relationships for a longer period of time. Coordinated activity, cooperation and coordination of a consumer with their suppliers are considered and motivated and highly advised by running into correlative expectations and relations in the longer period (Mentzer et al., 2001). Also that the Partners structure that holds a long relationship are mandatory for accelerating the effect in the process of Supply Chain Management (Mentzer et al., 2001). The study done by Lee (2004) recommended "collaborative relationships'' as necessary for interacting with suppliers and consumers so that organizations can work together to design or redesign their methods, components and products as well as for set up substitute plans. The research by Thomas & Griffin (1996) about supply chains concluded that 'the process of Supply Chain Management is actually a way to administer materials and data flow and can be a combination of both in the respective facilities, like merchants who are

involved in the manufacturing as well as assembling of the plants and supply units'.

It is essential to put into account and consider the sensitivity in the process of supply chain while scheming the supply chain that is fundamentally modified through continuous data flow (Chopra & Meindl, 2007). Additionally, the data recorded and its flow has got importance and has strong impact on the planning, control on the stocks and transportation and their plans that involves the basic factors in terms of the cooperation of players in managing a supply chain (Lee et al., 1997). The term supply chain scheme by which numerous organizations count on acquiring faster action and response of the user rate of flow as it is composed of enormous effect to increase and achieve the optimize the company's level of performance. Therefore, in an effective supply chain management scheme there should always be formed to accomplish the supreme objectives defined by the company; giving competitive benefit. In this paper, most of the creations of meaningful collaboration is within and through far sight of the limits of a company that are important to change competitive benefit to profitability are sought.

3.3.3 Natural and Man-Made Risks

The South Asian collection of Pakistan, India, Bangladesh and Sri-Lanka have many shared socio-economic and climatic hindrance. This region is prone to many natural calamities such as typhoons, heavy monsoon flooding and earthquakes, and a poor and thick population causes social ills and worsen the governments with the revenues they need to build infrastructure. Other problems include ethnic and religious animosities that often rise up in the form of violent actions, riots and armed attacks. Considering earthquakes and flooding, it turns out that Pakistan is sometimes severely affected by these. Moreover, human disasters, like these, consist of industrial mishaps like chemical spills, structure collapse, detonations, flames, gas leaks and poisonings, in addition to a variety of transportation accidents. With accelerative development, there is, however, a tendency that the economic damage is getting higher. L. Coleman writes, "The measure of any case affecting the people and their assets has risen significantly because of the raise of the world's population since about 1970, and a trend to find out assets, often of high value, in more hazardous areas e.g. coastlines" (Coleman, 2006). Wagner and Bode comment that "the vulnerability of supply chains to disturbance has been increased" (S. Wagner & C. Bode, 2006). Because of a collection of component such as more individual and worldwide sourcing. Asia is the most disaster prone continent. From

2001-2010, 40% of the natural disasters happened here, 90% of the victims (fatalities or affected) lived here, and 38% of the monetary damages happened here. Hydrological disasters like floods commonly have many victims. Flooding combined with population density is a dangerous collection. About 50% of the reported natural disasters that occurred in Asia between 2001 and 2010 were hydrological i.e. floods and mudslides. Supply chains are much susceptible to property damage and disruption caused by violent attacks, either directly as sometimes assets were destroyed, or indirectly through transportation delays and safety measures in the aftermaths of events. Although the timing and intensity of global terrorist attacks are quite stochastic, the locations of such attacks are mostly concentrated to a few areas. Unfortunately, Pakistan is one of those areas. Having good subject matter and understanding risks in quantitative terms provides a road-map that is critical for risk management and continuity planning (Braun, 2012).

The Supply Chain Risk Leadership Council (SCRLC) recommends that the risk management process should begin with distinguishing internal and external state of affairs (SCRLC, 2011). Distinguishing relevant dangers is possibly the most essential step (Kern et al). The first-rate risk identity always assists the risk sorting and this gives a way to reduce the risk in a way better form of reduction of the risk (Kern, Moser, Hartmann, & Moder, 2012). Most of the researchers had categorized supply chain risks in operational as the internal risks and the riss and disruption that are considered as external risks (Kouvelis, Chambers, & Wang, 2006; C. S. Tang, 2006). The term operational risks can be internal to the organization or internal to the prolonged supply chain, while the disruption risks mainly consist of environmental and artificial hazards. Environmental risks can be prevented through “business continuity is planning”, while artificial attacks can be prevented with “supply chain security management”. (Markmann, Gnatzy, von der Gracht, & Darkow, 2011). Supply Chain Digest’s tri-annual listing of “The Top Supply Chain Disasters of All Time” (Gilmore, 2009) gives a glance of the intensity of operational risks. Of the sixteen costly episodes enrolled, at least eleven of them relate to fatal transitions and implementations of new and aspiring operating processes, such as production or warehouse management systems. As a matter of fact, of the sixteen top-ranked disasters, none of them are external disruptions like natural or man-made disasters.

Because risk is a creation of exposure and uncertainty (Holton, 2004), one can conceive exposure as being inherent in the firm’s nature, while the uncertainty comes from the wide

environment in which the firm is operating. In a method signified, there is also a dynamic interaction between a firm's exposures and how it reacts to its situations, and how the situation reacts to the firm's exposure. A firm's exposure to a disruptive case will influence how vulnerable it is to such a scenario, as the firm's vulnerability and exposure to a riotous outcome can be regarded as a collection the results probability of a disruption that sometimes is a possibility of severity (Sheffi, 2005). Exposure makes a company open to disruptions. There is agreement among supply chain academics and professionals that over the past few decades, vulnerability of supply chains to disturbances or disruptions has enhanced (Christopher, 2002; Christopher & Lee, 2004; Kotabe & Murray, 2004; S. Wagner & C. Bode, 2006). Disruption risks are the results of the events that make a supply deficit for certain period of time (Haksöz & Arslan, 2012). Disruptions can change from everyday conditions such as incoming deliveries if late by a a couple of hours results in major catastrophic event that in the worst case might not just harm people and the environment, but can also force the company out of business. Just by reading the daily newspaper, one can easily find headlines announcing yet another supply chain disaster somewhere in the world.

3.3.4 Stakeholder Relationship

As the researcher and readers know, supply Chain management in developing economies like Pakistan is in developing stage and especially within the construction market. Innovation within the scope of supply chain management in the selected sector is in the embryonic state, still there are number of hurdles on the way which need to be eliminated (Cox & Townsend, 1998). Conventional wisdom involves the acceptance of the construction sector and the players in a relation to projects in supply chains and in many markets (O'Brien et al., 2002). Construction companies with the suppliers and end users are the vital players for this sector. During this study the researcher will have a glimpse of patenting relationship of these important players because of the reason that researcher knows that company's partners which are involved in supply chain are the determinants of company's efficiency and effectiveness which leads to success (chopra & Meindal, 2007).

There exist few attributes in the industry of construction that are different as compared to the other type of industries that can prevent the existence the proper utilization of Supply chain management specifically within construction industry. Also indicated by Vrijhoef & Ridder (2007) indicated that main difference of Supply chain in a construction sector as compared to

the other nature and type of industries appears to be at consumer level, as consumers are active in a controlled atmosphere and the chain both and specially at the beginning & might be at the ending for projects involved in construction. The construction industry thus develops significant difficulties like shortage of necessary communication, missing and existence of enough knowledge sharing infrastructure are observed as obstructions in the improvement of supply chain management in construction. Latham (1994) said that the "Splitting and adversarial nature of the construction industry have a direct negative effects on communication between all parties on a construction project". Chinowsky et al. (2007) points out that knowledge and information sharing about the sector infrastructure is the basic obstacle in forbidding the fruitful and implementation of effective organizations. It might be that as an infrastructure could not be made in order to share and pass the required information, sharing and exchange of necessary knowledge is only possible and restricted within individuals. Finally talking about quality needed in communication and simplicity to pass and share information among the important stakeholders like contractor companies and their suppliers as well as the end-users or clients, they are the key to determine the level and height and of achievement of these basic and most important key principles. The findings by Vrijhoef et al. (2003) noticed that if there is insufficient management in the supply chain, it is the result to trigger the natural problems they are hidden in the construction industry; such as large quantity that are present as form of waste and become problems. The basic duty of ex-management in the light of supply chain shows a method to solve waste problem as it is because of existence of independent and free control in each of the stage of supply chain (Chopra & Meindl, 2007). While focus on the improvement and betterment in local aims present better results as compared to that of concerning the entire and complete chain and the presence of poor information and communication flow between the most important stakeholders and players in a project may cause the low level of coordination and trust in the key parties (Latham, 1994).

This immature cooperation results in uncertain situations, existing on counter evidence has the not alone wastage and rework, it is also the cause of in the form of reduced efficiency, lacks predictability and leads to low profits and expectations (Vrijhoef and Ridder, 2007) which is a way to spoil the development of chain and lacks sustainability in the term of Supply Chain and coordination in the selected sector that was construction industry. Partnership is considered as one of most vital method that helps in forbidding such kind of conditions. As by taking this into consideration, the contractors and their partnership statements they make with

their customers as well as the suppliers were the past of examination done specifically in this survey. The researcher in this survey has tried to form a questionnaire that was fashioned and used for contractor and the companies that are acting or dealing as contractors in order to demonstrate knowledge by management and the key understanding to find out the basic idea and provide mean of effectiveness that they most essential and functional as an application in he selected and chosen construction industry (Mentzer et al., 2001). The fairness in the relation within the vital members like contractors and the service providers that also involves the consumer was taken and analyzed in order to develop underlining basics of demand in supply chain management and its practical application while the emphasis is to form from and within the direction of perspective by contractors. The approaches accounted by contractors, that we have selected and used as the most elementary approach for the participants that will be enabling the positive and rational flow of the selected sector companies. The main idea was to examine and reveal the idea of Supply Chain Management, since there is always the presence of a relationship and support between changing and modifying of the current Supply chain management scheme in the construction projects and programs. It refers to the proper understanding towards the integral approach and behavior of sector and the companies that are functioning in the current markets and their structural attributes within such kind of markets (O'Brien et al., 2002). Furthermore, the nature and type of the selected construction projects industry can forbid the existence and implementation of decent execution of the process in supply chain, the existence and caused obstructions will be appearing during and after the raise in the construction industry and these were asked in order to solve and find the most common difficulties and use to erase them for the constructors. On the way to achieve synchronization within supply chain, it is necessary to satisfy customer's need and a balance is to be made between supplier and the partners of company (Martell, 2000). Secondly emphasis on the communication is to be made between the active or beneficiary parties which ultimately lead to a fine example of collaboration. Discussion are also made by Elliman & Orange (2000), one of key problem within the span of construction sector that fragmentation and the advertisal nature relationships misleads the communication and ends up as a poor relationship among all parties with in a project. Sharing of information and the commutation with contactors, suppliers and end user has a quality which in fact determines the achieveableness of goals with in a project. The add-on in order to create balance between the needs of users and the supplier, the equilibrium and balance should be created among the information that needs to be exchanged and open communication (Martella, 2000).

4. Research Methodology and Strategy

For conducting the study, the researcher has adopted Shapiro-Wilk normality test to check the normality of the data in the first stage and after that he has used Kruskal-Wallis Test and the researcher has gathered data by the help of questionnaire. This section will elaborate the choice of questionnaire, research paradigm and types of tests that will be used in the research. Also that, the reliability and ethical consideration for the study would be discussed here as well.

4.1 Research Rationale

This study was conducted in order to understand the natural and man-made disaster and investigated the attitudes of the stakeholders like contractors, supplier and end-user or customer in relation to Supply Chain Management specifically in Pakistan's construction sector. The study has a special emphasis on natural and man-made risks and the relationship of contractor with their suppliers & end-users. And for this the contractors point of view is asked and compared to find that if they have same or different prospect of risks with different size of companies on the basis of revenue.

4.2 Questionnaire Design

Survey questionnaire can be regarded as the measurement or a specific tool that helps to pick and conclude the opinions and different viewpoints of a specific or sometimes different group towards certain topic and subject. The researcher has developed a questionnaire in order to conduct the survey that was specifically designed and gather data that will help to identify as well as and discuss the thinking and opinions given by contractors towards the practical implication of supply chain management in Pakistan's construction industry. The researcher got inspiration and background knowledge from previous studies conducted in the nature and sector of supply chain and management in a developed country (UK) in the same nature of industry (Akintoye et al., 2000) as well as in the field of manufacturing and the supply chain management in another developed country (China), (Pyke et al., 2000).

4.2.1 Methodology for distribution Questionnaire

In this study the researcher has developed two-page questionnaire that will support and gather knowledge from the contractors selected in the Pakistan in the construction sector and they were randomly selected from a big population. A questionnaire form has been personally handed to the contractors by researcher because of less time and contractors were requested to fill them as fast because of the time limit. The idea of handing over by researcher himself was a catalyst in collecting data as researchers have found previously that personally handing the questionnaire instead of posting the mail surveys achieves speed as well as becomes cost efficient (Sheehan, 2006). Also that The researcher´s questionnaire was designed and formed by the help of previous implications found two big and main studies that was supported and carried by the researcher Akintoye et al. (2000) ¨A survey of supply chain collaboration and management in the UK construction industry and Pyke et al. (2000) 'Manufacturing and supply chain management in China'. US contractors¨, the approach used by them was to clear the concept in selected field of supply chain management and the research helped management in the construction industry.

4.2.2 Composition of questions

The questionnaire survey was formed as by 6 questions. Firstly, contractors were as asked to select the most significant natural and man-made risks that is cause of disruption to the supply chain management and secondly they were questioned about the degree to which raw material, means of delivery, delivery time, buying of material and project plan impact their ratio of supply chain in relation with their supplies. Thirdly, they were asked to state about factors such as customer relation, profitability, competitive advantage, and quality management. In the fourth question, contractors were asked to indicate variables such as time of delivery, acknowledgement of complaints, customer satisfaction, quality management and level of trust. Questions five was involved in questioning about the product/service reliability, trust, follow ups, communication & information and simplicity of system. Finally, question six they were asked about provisions of bad debts, retention, project completion time, contracts procedure, mutual understanding, and faulty reasoning. There are researches in the field of supply chain management but still innovation in construction is in need and it is the in the stage of immaturity, a number of barriers exists and the need is to overcome them and

should be removed (Cox and Townsend, 1998). The research in the field on supply chain is believed to be in developing and a continuous improvement process in the field of construction sector. The aim of this research is to seek the barrier and remove them in a way to prevent and develop improvements in the field of supply chain specifically in the selected construction industry.

Contractors were asked about the intensity of natural and mad-made disaster effect and which was the most significant among them and is a strong reason in causing disruption in supply chain. The study tried to find the relationship of contractors with their suppliers and users was conducted in order to determine the significance and value of supply chain in the construction organizations. The judgment and finding the level and quality in terms of relationship between the key stakeholder and important members in supply chain of construction sector that will be one of the important and main factors that will help to analyze and determine the optimal level in a way to accomplishment the process of supply chain management. That's why the main strategy of the researcher was to develop the questionnaire form that had mainly concern on the relationship among the important mentioned participants and tried to measure the effectiveness and the points that leads to the success of entire supply chain management and strategy for the contractor firms and the in the construction industry.

The terms concerned with the visual modality that supports the process in order for mapping the supply chain in terms of structure is composed of three major factors: the first is that members in supply chain, second is structural magnitudes and thirdly the types of procedure links. The demonstration of structure within the scope of alternative supply chains and interconnection exists within number of pivotal organizations in term of supply chain that issue to the resultant networks in a term of supply (O'brien et al., 2002). The survey questionnaire that was formed is composed on initially the natural and man-made disasters and then the key members that are mostly significantly in supply chain.

As per conclusion, this questionnaire form to conduct the survey and it was designed so that the researcher can gather data from the contractor and supplier organizations in Pakistan that will help to demonstrate and develop management support and understandings that will help to clear the concept in order to become an effective milestone within construction industry (Mentzer et al., 2001).

4.3 Composition of Hypotheses

The null and alternative hypotheses are as follow:

H_o = There is no existence of difference between means among the 3 formed different types of groups based on revenue in a relation with Supply Chain Management

H_1 = There is existence of difference between means among the 3 formed different types of groups based on revenue in a relation with Supply Chain Management

Questions were analyzed answered by contractors in the relation to supply chain management. The reliability was kept in mind as the questionnaire was adopted by researcher was a reliable scale to measure data from the prior scientist mentioned. The study was done in order to show and to make readers understand the hurdles and causes on the way to effective supply chain management in the construction industry.

4.4 Shapiro Wilk Normality Test

Kruskal-Wallis test is applied on the data which is not normally distributed. So in order to apply Kruskal-Wallis test the researcher has to check the normality condition. For that Shapiro Normality test is selected to check the normality of data. If the data is not normally distributed than the researcher can move forward to the Kruskal-Wallis test. The significance of all variable is required for this test. The null hypothesis is always assigned as the data is normally distributed and the alternate hypothesis states that the data is not normally distributed.

4.5 Kruskal-Wallis Test

After checking the normality of data, the researcher moved to the next testing of the data that was Kruskal-Wallis test and since it is an extension of Mann-Whitney test which compares two or more independent sample groups. It is used to test the probability distribution of 2 or more ordinal variables are same for 2 or many time more than two independent populations. Thus it is used for the testing in order to check the presence of difference in their location like

mean or median within two or more groups or population like raking etc. (Agresti 1997; and Finlay Washington et al. 2003).

4.6 Data collection

The data collected for the study is primary data that is collected by the help of questionnaire. The sample was selected from different construction companies operating in Pakistan and for that personally questionnaire was handed over to the 80 contractors that made a speed in gathering data collection process. Researcher distributed questionnaires and got back 43 questionnaires and it was a good response. Then the researcher has sorted the data in terms of revenue of the companies and divided it in the form of 3 groups based on revenue. Kruskal-Wallis testing was used in order to as if there is some significant difference in the thinking and view of with respect to the groups made on the basis of revenue. And the reason and theory of division of groups is stated above in Chapter 2.

4.7 Software for Shapiro Normality and Kruskal-Wallis Tests

The researcher has used Shapiro normality test and Kruskal-Wallis testing as tool of testing and SPSS 16.0 was used for that. Since SPSS is the most convenient and easy software to use and researcher has already experience of using SPSS. That's why researcher has selected SPSS for the study as a tool of testing.

4.8 Reliability and Validity

In all types of research design, the responsibility of the researcher is to account for changes and interventions which might can affect quality as well as result from that study. As explained by Creswell, 2009, that there are always potential threat which can be responsible on affecting the validity of the research and process or outcomes. The validity refers to the way or tool of measurement if it is accurate and research is a tool to measure about the planned things to measure (Golafshan, 2003). The mindset is to check the methodology if it is as evaluating along with standards of quality (Luko & Rojas, 2010).

In quantitative type of researches, the term validity is divided into two categories, the internal and external validity. Internal validation is tackling the concept of causality as well as

derivability within data (Luko & Rojas, 2010). While the external validity deals with generalizability in the results that can be used in prediction purpose (Luko & Rojas, 2010). It mostly comes from wrong influences in the sample etc. & could be due to faulty representation of population and research timings.

In qualitative type of research, the shape is different from quantitative research, as in this method the validity, trustworthiness might be measured by documentary procedures, sometimes by setting protocols, using valid database (mostly case studies).

The current research is done in the construction sector and by comparing Natural, Mad-Made risks and stakeholder relationship between the contractor group. As there was limited research present on the subject to provide more details and explanation specifically for the developing countries like Pakistan, the researcher gathered primary data by the help of questionnaire from the contactors in the construction sector of Pakistan. While going through collection of primary data, the researcher should be very careful due to the complexity in the analysis part as it is a challenge to present the findings away from manipulation (Burnard, 1991).

4.9 Ethical consideration

While doing the whole research it was kept in mind the basic and most necessary ethical consideration and trust as well for handling of information and data that is most important issue of the study. From the beginning we mentioned details about construction sector which is the main research area, the agreement of the parties is very much necessary in the specific construction sector. There was an agreement with the contractors in the sector that researcher will not disclose neither their names nor their company's names while filling the questionnaire and in the research. The analysis of the researcher would be generalized for the sector and not for some specific brand names or companies.

Also that ethical confidentiality has been guaranteed by the researcher to the contractors. The emphasis on confidentiality has been given that help the respondents to be comfortable and feel confident in the process that will ultimately lead to freedom of expression as well as response (Collis & Hussey, 2009).

The rasher has not forced any contractor to fill the questionnaire. The information about limit of time to conduct the research and have details mentioned in the study. Lastly due to

confidentiality issue and promise the company names are not mentioned and the researcher has just used the name of sector and specific groups made for the study.

4.10 Limitations

As the study is based on the selection and used 33 questionnaires from three separate contractor groups based on the size of Revenue. The researcher is using semi quantitative data as well in the research. The small sample size can be considered as a limitation for the study. Also that among the contractor's groups the experience and education matters and the understanding of the questionnaire is much more important limitation. Moreover, the research couldn't take all aspects of Natural, Man-Made risks and stakeholder relationship into account because of limitation of time and resource. Also that the limitation of literature was a big problem since there were not many researches were done in this specific field in Pakistan.

5. Results and analysis

The results and the analysis of data is done followed by testing of gathered data and applying different scientific tools and techniques and the results and findings are explained in accordance with previous literature and references as well.

5.1 Shapiro-Wilk Normality Test

The researcher has applied Shapiro Wilk normality test in order to test the normality of data. Shapiro-Wilk normality test has two hypotheses as the null hypothesis is that data is normally distributed and alternate hypothesis is that data is not normally distributed.

The null and alternative hypotheses as per Shapiro-Wilk Normality test are as follow:

H_o = The selected variables for the study are normally distributed

H_1 = The selected variables for the study are not normally distributed

The found results showed that all variables are statistically significant and we shall reject the null hypothesis and the researcher found that data is not normally distributed. This will make the researcher move to the next step as the data is not normally distributed so the researcher can apply Kruskal-Wallis Test on the data.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Earthquake	,207	33	,001	,896	33	,004
Flood	,242	33	,000	,855	33	,000
NaturalAccidents	,196	33	,002	,872	33	,001
Terrorism	,231	33	,000	,887	33	,002
EnergyCrisis	,221	33	,000	,858	33	,001
Crimes	,187	33	,005	,900	33	,005
Politics.Corruption	,167	33	,020	,910	33	,001

RawMaterial	,227	33	,000	,850	33	,000
MeansOfDelivery	,278	33	,000	,835	33	,000
DeliveryTime	,210	33	,001	,854	33	,000
BuyingOfMaterial	,218	33	,000	,841	33	,000
Projectplan	,204	33	,001	,876	33	,001
CustomerRelation	,286	33	,000	,773	33	,000
Profitabilty	,240	33	,000	,845	33	,000
CompatativeAdvantage	,259	33	,000	,838	33	,000
MoreProfit4Customer	,318	33	,000	,748	33	,000
Moreprofit4Supplier	,250	33	,000	,872	33	,001
QualityManagement	,232	33	,000	,807	33	,000
IntimeDelievery	,353	33	,000	,689	33	,000
Custmer.Satisfaction	,286	33	,000	,773	33	,000
Ack.OfComplaints	,263	33	,000	,861	33	,001
QualityAssurance	,302	33	,000	,766	33	,000
LevelOftrust	,439	33	,000	,579	33	,000
Trust	,243	33	,000	,823	33	,000
Reliabity	,211	33	,001	,851	33	,000
CommunicationNinformation	,202	33	,001	,880	33	,002
FollowUps	,255	33	,000	,861	33	,001
SimplicityOfSystem	,234	33	,000	,868	33	,001
BadDebts	,301	33	,000	,811	33	,000
Project.Completion.Time	,259	33	,000	,838	33	,000
Contr.Procedure	,204	33	,001	,857	33	,000
Retention	,236	33	,000	,868	33	,001
MutualUnderstanding	,285	33	,000	,777	33	,000
FaultyResonin	,338	33	,000	,761	33	,000

a. Lilliefors Significance Correction

5.2) Natural and Man-made Risks in relation to Supply Chain:

The researcher has asked contractors about the most important and significant natural and human made disaster that causes distress in supply chain in Pakistan and by that supply chain in Pakistan and is most affected in recent time. The researcher tool has selected the most popular risks and ranked them in terms of natural and human made disasters and risks, some of these risks are hardly found together in the newspapers.

The contractors were asked to rate them from 1 to 5 on the Likert-scale. The frequency reported by the contractors showed that there was no significant difference between the floods, natural accidents, and crimes in terms of size of company. In our case the worthiest and significant were Earthquakes, Terrorism, political corruption and energy crises and their impact in the case is catastrophic. They are also not insurable. This chronic problem tends to be ubiquitous impediments and the managers that are operating with them are forced to recognize and work with appropriate solution which is sometime not possible.

The interesting thing was that risks like flooding and natural accidents proved to be insignificant between the groups. Problem which are related to the suppliers as well as labor are taken generally as internal within a supply chain and earthquakes, terrorism, political corruption and energy crises are considered to be external on the company. As known before that supply that supply chain is not meant to be closed system and its risks are intertwined, that means the firm´s labor problem is transformed to customer´s supplier issue.

The difference proved from the results that the 3 types of companies differ in terms of earthquakes, terrorism, political corruption and energy crises. The results show that smaller companies are more affected by earthquakes and it has strong impact on their operations as compared to medium and big companies. This causes delays and affects the effectiveness of the company. Pakistan had several examples of earthquake and distress caused by that. Just to mention some strong cases, the earthquakes on 8 October, 2005 with the magnitude of 7,6 caused more than 80,000 deaths and more than 4 million people were homeless. On 29 October, 2008 caused around 215 deaths and made 120,000 people homeless and the magnitude was 6,4. There were many other cases as well as on 18 January, 2011 with magnitude of 7,2. On 24 September 2013 with a magnitude of 7,7, also that on 8 May, 2014,

and on 26 October and 25 December 2015 with magnitude of 7,5 and 6,3 respectively. These are some examples and in Pakistan earth quake comes often and cause distress in the operations of the country.

Secondly terrorism is a big problem in Pakistan and Pakistan ranks fourth on the global terrorism index of 2015. The same report was presented by the famous DAWN newspaper in Pakistan. This could be a cause due to proximity to Afghanistan. Also that Pakistan is involved in War against terrorism since 9/11. The researcher will mention 2 major terrorist activities that caused distress in the operations of entire country. On 16 December, 2014 attack on Army school in Peshawar killed 141 people in which 132 were children and it was a sad attack and whole country was closed for certain days. Secondly the attack in a park on 27 March 2016 killed 74 people and more than 338 injuries in Lahore caused distress in entire country.

Corruption is a significant problem in Pakistan to deal with. Pakistan was ranked 117 out 175 on the global corruption index by the world Transparency organization. The significant difference the group can be explained small companies do not have much money and revenue to pay money in form of bribes and if they do that it causes burden on their economy as compared to big companies. Small companies can also be easily influenced by political pressure as compared to bigger ones. The null hypothesis was rejected in this case.

Pakistan is facing problem of energy crises as there is shortage of electricity supply in whole country due to which the PESCO (Pakistan electricity Supply Company) has to close electricity about 8-14 hours day in different cities. Due to this small companies suffer more as compared to big countries since big companies can afford alternative to produce and keep operations running by using generator and solar plants but small companies are more on risk as compared to them since they cannot afford it or if they do it’s an additional expense on the company.

Risks like natural disasters and man-made disasters actually can’t be avoided since there is no way to stop them and they will happen, specially the natural disasters. To avoid them is not that simple like move the company from Pakistan to Sweden or any other country where there are no earthquakes and floods or other natural disasters as well as man-made disasters. Avoiding them is almost impossible but making or having emergency plan from the beginning

can be a counter to that. Contractors can plan ahead things as it is a good way to make sure that supply chain can be run in an effective way. Establishing crises management team is also one of the counter acts to keep the supply chain going on at the time of crises. Maintaining good communications with your supplier allows both parties to plan together and come out of the crises situation. Before the start of the company the most essential thing is to find and analyze the threats and disaster that could happen in the life of company that could be like earthquakes, political and economic crises etc. flexibility is also a mean towards taking or holding yourself in the crises situation. There are sometimes some regions which have problems from the natural disaster or can be political or economic as well, like in Pakistan we can earthquakes mostly in the northern part and there is political instability in the Balouchistan province. So the contractors can also avoid the situations.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Earthquake	33	2,3636	1,08450	1,00	5,00
Flood	33	3,9091	,80482	2,00	5,00
NaturalAccidents	33	2,2121	1,11124	1,00	5,00
Terrorism	33	2,9394	1,22320	1,00	5,00
EnergyCrisis	33	2,3939	1,34488	1,00	5,00
Crimes	33	2,5455	1,09233	1,00	5,00
Politics.Corruption	33	3,1515	1,30195	1,00	5,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	Earthquake	Flood	NaturalAccidents	Terrorism	EnergyCrisis	Crimes	Politics.Corruption
Chi-Square	6,753	,898	4,410	15,641	8,422	4,789	6,095
Df	2	2	2	2	2	2	2
Asymp. Sig.	,034	,638	,110	,000	,015	,091	,047

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

5.3) Characteristics of effectiveness in Supply Chain

Raw material, Means of delivery, Buying of material and Project plan are the key elements that have a direct effect on the effective ness and are causes that can lead towards an effective supply chain management and relationship involved in it with in key stakeholders. This question is the answer from contractors to the rate of functions and elements that were supposed to influence and effect the relationship of the supplier and other key parties.

As scheduling is the basic and most important feature in the construction sector, so a big group of the contractors have given the opinion that buying of material is most important element as the mean was quiet high and function that is involved in scheduling. Moreover ¨Means of Delivery¨ can be explained by non-parametric testing of by variable by Kruskal-Wallis test in with the relation to total revenue generated per year. As the yearly revenue increases so not so much attention is given to the means of delivery since the response rate was quiet high to that as the companies start to neglect the means of delivery and there was no significant difference between the 3 types of companies.

The reason for this is when the income increases so the companies thinking grow more of the money instead of means of delivery. Although the findings of results can be regarded to ratio of methods and ways of delivering especially their cost on the firm's budget, sometimes the effect of rise in the fuel prices could be considered since that has an effect on transportation cost. These things ultimately change the costing and can increase the cost of overall project. This function can be regarded as important and have impact within construction sector especially in future. There is no rejection within the null hypothesis in our case as shown in the results since all types of companies thinks the same.

In construction industry the stakeholders and the risk involved must be found and identified first then the people responsible to handle the projects must take care of them each by each separately (Bennett, 2003). It will lead to find a potential solution for the problems and risks. As the result of that the found solution can be categorized and tanked on the scales and can be further chosen as the appropriate method (Westland, 2006).

The results have also proved that the most emphasize or the factor that is considered by contractors as most effective element is the supply chain is delivery time. Resources like the variables raw material, means of delivery are supposed to be tracked, if any type of irregularity found here in these resources that could be negative effect on budget and quality and can cause delays and disturbs the budget (Bennett, 2003). All the parties involved in the process want to have work done in time and that is why the delivery time has the highest mean value among other variables. The delivery time can be improved by using proper channel and a variety of methodologies and with improving project planning as well which is also one of the points related to effectiveness of supply chain so that the deliverables can be delivered in time. Also that the second highest variable rated by the contractors was buying of material that is essential to the construction industry and without a proper and reliable supplier that is neglected, a variety of supplier can be a mean of improving the solution of the problems related to buying of material.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
RawMaterial	33	3,0000	,82916	2,00	5,00
MeansOfDelivery	33	3,3030	1,07485	2,00	5,00
DeliveryTime	33	3,9697	,91804	2,00	5,00
BuyingOfMaterial	33	3,8485	1,09320	2,00	5,00
Projectplan	33	3,6667	,98953	2,00	5,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	RawMaterial	MeansOfDeliver y	DeliveryTime	BuyingOfMaterial	Projectplan
Chi-Square	4,911	2,435	4,703	1,095	1,795
df	2	2	2	2	2
Asymp. Sig.	,086	,296	,095	,578	,408

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

5.4) Characteristics building relationship in Supply Chain

Contractors were asked to give opinion on the development of Supply chain management that is most essential in a way to develop a unique collaboration between the other key stakeholders, thus lacking towards an improved supply chain management. Customer relations, Profitability, Competitive advantage, More profit for supplier, More profit for customer and Quality Management were selected as the effective factors that have positive or negative impact on the sector in order to contribute and develop an effective supply chain management.

After analyzing all the selected factors Customer relations, Profitability, Competitive advantage, more profit for supplier, more profit for customer and Quality Management. The results showed a relative difference between more profits to customer than more profit to supplier. The contractors have more strong relationship with their customers as compared to their suppliers in terms of profitability. Also that in our case there is no rejection of null hypothesis in this case. This means that many of contractors in supply chain use to neglect their suppliers and put more light and attention on their customers as the end-users are more important in a supply chain management. Although the key stakeholders are significant parts of the effective supply chain management and its tools, a need to have a centralized supply chain management among the selected key stakeholders. The effort to optimize the aims that results in the lack of cooperation and coordination and negatively effects the supply chain (Chopra & Meindl, 2007). ¨Total management of the supply chain enhances the competitive edge of all players or their in¨ by (Berry et al. 1994).

It is responsibility of companies in the sector to balance between the needs and necessities of supplier and customer in order to have optimum level of collaboration and a synchronized supply chain. It also refers that the companies at the start try to build good relationship with their suppliers to increase profit. But when the companies come to a growth phase, they start neglecting their suppliers. It is most important to overall profitability and effective supply chain management that contractors should consider both of suppliers and customer important since it has worth on the long term relationship and helps in planning and solving problems (Maloni & Benton, 1997). By adapting the partnering relationship in especially construction sector can decrease the common or routine problems in the same way like trust problems,

honesty issues, and fairness between professionals (Mathews et al. 2000).

According to the researcher there should be same consideration for both supplier and customer but the results proved to be different as tt is a fact that contractors are found to be more inclined towards their customs or end-users as compared to suppliers, the study by Jones and Saad (1999) has mentioned the contractors are found to more close towards upstream as compared to downstream within supply chain. Further study concluded that collaboration or relationships are preferred to the end-users while making comparison with suppliers. But in the supply chain that fact should be avoided in order to have proper balance between the parties which is much important for creating a proper balance in within a supply chain. Also mostly considered factor is the profitability that comes over all and it is a fact that contractors are working for the profit and gaining something. However, the profitability is better for the growth of the supply chain as well. Quality management is an important tool for adding value in the relationship within the group and by use of different quality management techniques the contractors can add value to their work that can be fruitful in the process.

As the main feature of quality control begins with assuring of the ongoing and completed project and the questions that does it meets the defined and all quality standards that was predetermined by the contract. In order to do this task, a contractor can prepare a plan that ensures that quality standards for the construction are up to mark or not and have they met or not. In this process, the job of the contractor is to make such procedures which could manage and control tasks and also that it could be in the same stream as that of supplier's' activities and completed project in the result of that complies with customer and agreed terms of contract. An effective quality helps to reduce the largest problem that comes in the form of cost for contractor, the wear and tear as well as replacement is a big cost in the construction industry and cost also involves workmanship as well as materials. Also that minimizing the costs is resulted in profitability that was mostly highlighted by the contractors. This in a result enhances the high quality and improves the performance that ultimately gives rise to reputation and a better market image of the contractor that provides the contractors opportunities in the form of future contracts. This is a two-way process as the effective quality management also gives birth to a quality in the product and is delivered safely, within specified time, and predefined budget. (CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS (NAVFAC)).

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
CustomerRelation	33	4,2121	,81997	3,00	5,00
Profitabilty	33	3,9697	,95147	2,00	5,00
CompatativeAdvantage	33	3,6364	,74239	2,00	5,00
MoreProfit4Customer	33	3,3333	,59512	2,00	4,00
Moreprofit4Supplier	33	3,2727	,94448	2,00	5,00
QualityManagement	33	3,8788	,73983	3,00	5,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	CustomerRelation	Profitabilty	CompatativeAdvantage	MoreProfit4Customer	Moreprofit4Supplier	QualityManagement
Chi-Square	1,899	,104	1,217	,017	5,128	4,125
df	2	2	2	2	2	2
Asymp. Sig.	,387	,949	,544	,992	,077	,127

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

5.5) Characteristics building relationship with supplier in Supply Chain

While in the operation phases the contractors comes across a series of activities that are in addition from those that of the construction itself like for instance monitoring of the projects and controlling of the allocated resources and their documentation. The procedure of monitoring and controlling involves keeping eye on famous points like time, cost and quality (Bennett, 2003).

While talking on improving relationships and coordinating, the contractors should have good relationship with their supplier and end-users. Their effective and good relationship contributes to reliability & creates positive environment that results in effectiveness and increase in profits for this question the contractors were given the factors that develop strong

relationship among stakeholders.

The chosen factors were in time delivery, Acknowledgement of complaints, Customer satisfaction, Quality Assurance and Level of Trust. As know before scheduling is one of the most effective elements in the construction industry. In time delivery or fast delivery reveal the effectiveness from the factors selected in order to develop effectiveness from the factors selected in order to develop effective and strong supply chain relationship. Customer satisfaction proved to be one of the most important points as the response rate was high, it implies that strong relationships are based on satisfaction of customers and only satisfied customers built strong relationship with their contractors and are generally long term relations are formed.

While talking about the level of trust, it showed a good response rate among the groups. The study done by Wong and Cheung (2004) has successfully shown that partnership is a dependent and it depends on trust, an effective factor which is difficult to imply in construction sector as per its ¨Fragment and Continuous¨ structure.

The acknowledgement of complaints proved to be significant element across the different size of companies since for big companies have more clients and even if they neglect some of the complaint that will not affect the relationships or the number of clients but on the other hand the small companies have less customers and they are mostly found in taking good care of them and that also helps them to get more customers along with holding the same customer for long time as well. It was fairly good response as big companies are more effected by this, they encourage their supplier and customers to answer and the complaints and help to build a good and strong relationship. The most important and difficult element to control is the time, means that is can be calculated as the actual time that is taken for the execution of tasks involved in the project. The time factor is a mean to allocate resources and control the process of scheduling in a good way to reach to the final goal of the project (Westland, 2006). There has been a controversial relationship in respect to size and their effect in terms of time of delivery. This indicated that larger firms like to have fast delivery as compared to smaller firms since the damage in the form of liquidity in construction sector in terms of contract don't have restriction on the smaller companies. As high and more money in the budget and it increase their involvement and responsibility during a project, as more concern is to meet the deadlines and completion on the pre-decided time. A trust is basic issue of current era and it

is a fact that if there is no trust than there is no business. A particular level of trust is needed between the contractor and supplier and in the absence of that there will be many problems or the contractors will be switching their supplier every which is also a problem for the cost and in time delivery. As in time delivery was selected as most important element in the relationship between contractor and supplier and that could enhance the productivity of the contractors as well. Quality issue and complaints couldn't be forgotten in process as these are aspects that can't be avoided or neglected with the relationship. Contractor can apply different quality management techniques in order to produce good results.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
IntimeDelievery	33	4,4242	,86712	2,00	5,00
Custmer.Satisfaction	33	3,7879	,81997	3,00	5,00
Ack.OfComplaints	33	3,8485	,90558	2,00	5,00
QualityAssurance	33	4,3030	,76994	3,00	5,00
LevelOftrust	33	4,3030	,46669	4,00	5,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	IntimeDelievery	Custmer.Satisfaction	Ack.OfComplaints	QualityAssurance	LevelOftrust
Chi-Square	2,548	,594	6,125	1,335	4,452
df	2	2	2	2	2
Asymp. Sig.	,280	,743	,047	,513	,108

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

5.6) Characteristics building relationship with End-user in Supply Chain

Schultz and Unruh (1996) found that construction industry has trust problems and is unwilling in form of trusting and sharing the present form of information and contractors feel that while being in the same industry it is therefore more important to share so that it will help in achieving the success within a Supply chain. Perhaps this is a good signal in a new and developing country with different cultural form in the construction industry.

The researcher has found that contractors had knowledge of how to develop an effective Supply chain relation. This question was composed of factors that revealed the importance of factors contributing to that. The selected factors were Reliability of Product/services, Trust, Follow ups, Communication & information and Simplicity of system.

The variable communication and information proved to be significant among others as there was a difference found on the basis of size of companies. The degree of extent of communication and information within contractor companies' supplier and end-users are the determinants of the extent of achievement for the key factors. It was found that frequent meetings should be arranged that will help to make supply chain collaboration between the stakeholders. The found response on communication and information was in accordance with the theories that said that lack on sharing communication and information within the parties is cause of lack of improvement for the supply chain collaboration. From the contractors' side it might be like if they are having more meetings and coming directly in front of their supplier and customer is a consumption of time rather they want to skip it and want to spend more time on the project. On the other hand, in order to develop new things and technology, they might be dependent on communicating directly with the customer. In the past, there were many old informational management techniques which were time consuming, manual and required sometime expertise, needed improvements like example of XML, E-Commerce that was helping construction sector in terms of flow in the information system. The flow of communication and information directly effects the scheduling, helps in controlling inventory and fulfill the times of delivery that are the fundamental constructs for coordination and helping the members involved in supply chain (Lee et al. 1997).

Implementation of the new or an effective information system is the cause of reduce in the

complex levels in supply chain and it helps in simplification of process. In the absence of information in different levels, they might also find the repetition of information in different levels. They might also find the same forms again and again and will be filled and of course it will take more time during the project because they have to check the system by help of the forms that were filled before. The structure will cause inconsistencies, misunderstandings and faults or errors in the daily routine and thus leading to waste of time and work. On the contrary implementation of effective information system might be expensive for small companies and also at the start. The companies will always try to avoid it but in long run it will be benefit to the company and form an important part of the system.

Whenever there is a business so there exists a trust and in the lack of trust it is very difficult to work side by side or between two parties. The customers like to have feedback and follow ups as this is very necessary in every system and industry. The feedback has a big effect on the progress of project and relationships between the parties. A good feedback can be obtained by proper mean of communication and information. This implies that both of the parties (contractors and end-users) have proper channel communication and are aware of changes and modifications and other things involved. And through proper follow up and meetings and proper communication and information a trust could be developed between the parties. Of course, it is an additional cost to the small companies to have more meetings and implementing of such a high information system as well but they can perform better in personnel meetings and build strong relationships with their customer.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Trust	33	4,1515	,79535	2,00	5,00
Reliabity	33	3,9697	,84723	2,00	5,00
CommunicationNinformation	33	3,5758	1,00095	2,00	5,00
FollowUps	33	3,6364	,85944	2,00	5,00
SimplicityOfSystem	33	3,3333	,81650	2,00	5,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	Trust	Reliabity	CommunicationN information	FollowUps	SimplicityOfSyst em
Chi-Square	2,758	2,162	15,511	4,490	6,107
df	2	2	2	2	2
Asymp. Sig.	,252	,339	,000	,106	,047

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

5.7) Problem for relationship in Supply Chain

As the nature of the selected construction sector tries to prevent various implementations in the way of supply chain and also becomes barrier in its progress, the contractors were asked to point out the reasons and barriers that are in existence as per previous researches in order to figure out the important hurdles for the sector. By pinpointing the problems will be a precautionary measure for the sector as focusing on specific problems instead of entire supply chain problems forms lack of focus and consideration between the stakeholders (Latham, 1994). The selected factors in terms of barriers were Bad Debts, Contract procedures, Retention, Mutual Understanding, Faulty Reasoning. Traditionally contracts were much not related to the relationship between the stakeholders unless the modern world and procedures came into being because of much more uncertainty and reluctant stakeholders and new era came into existence and became too demanding for the small organizations. And if they don't understand the contract procedures within the business so it might become a barrier for the future contracts and trust will be the issue as well as Contract procedures. Project completion time came significant in relation to size of companies that means smaller firms have more concern to finish projects in time as they are handling most of the small projects as compared to big firms but it will not always be the case since project completion in time is important for all type of firms but in big project delay comes most of the time. So the project completion time came as the significant within the barrier group selected by the contractors. Hence it was considered to be a vital one and null hypothesis was rejected in this case.

As found by Kornelius and Wamelink (1998) that the massive paper work and documentation is present in construction industry which makes it complex and it is necessary to coordinate and make it easy and more feasible in Supply chain. By making the contract procedure easy and less documentation or less complex form of documentation could be a better solution for

the effective process and thus eliminating the barriers within the supply chain. Also that by putting the provisions of bad debts or by increasing them can make a clearer and for casting the negative effect of that for the future, of course there are factors that can't be neglected like these. Mutual understanding between the parties allows a smooth relationship and that is the most essential cause of effectiveness and the worst barrier as well towards effectiveness in the supply chain. There should be a clear and proper understanding between the supplier, customer and contractor. For the barriers like these must be taken care or contractors should plan before getting the project because these problems and hurdles exists in almost of the countries and there should be an initial plan for them.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
BadDebts	33	3,6061	,65857	2,00	5,00
Project.Completion.Time	33	3,6364	,74239	2,00	5,00
Contr.Procedure	33	3,8788	,99240	2,00	5,00
Retention	33	3,1515	,87039	2,00	5,00
MutualUnderstanding	33	2,6970	,72822	2,00	4,00
FaultyResonin	33	2,8788	,59987	2,00	4,00
TotalRevenue	33	$2,00	$,829	$1	$3

Test Statistics[a,b]

	BadDebts	Project.Completion.Time	Contr.Procedure	Retention	MutualUnderstanding	FaultyResonin
Chi-Square	1,876	8,111	5,363	,345	3,992	2,492
df	2	2	2	2	2	2
Asymp. Sig.	,391	,017	,068	,842	,136	,288

a. Kruskal Wallis Test

b. Grouping Variable: Total Revenue

6. Summary, Conclusions & Future Recommendations

The previous discussion will be summarized and the conclusions are discussed in the light of findings and this will also put light on future recommendations and implication for the study.

6.1) Summary and conclusion

The current study conducted was based on the survey that involved supply chain management and how it is perceived by Pakistan's contractors in the construction sector on the basis of Natural, Man-made risks and relationship between the key stake holders. The contractors have been asked to give the opinion but it might have extended as by including other stakeholders, product manufacturer, government institutions involved and trade union as well. But due to time limitation it could not have done like that. The analysis of research was composed on 33 contractors' opinions that were selected from the construction industry in Pakistan. Due to less time and certain other barriers and constraints the data set could not be increased to have more good results and information for the research and current situation may produce and used as a method of preventation and having accurate results.

The main task of the supply chain management is to boost up companies in terms of effectiveness. The sector is trying to take steps and increase the effectiveness of the entire industry for the last couple of years and certain alignments that might can improve the sector on basis of budget & quality in terms of services and product as well as delivery time but of course there is still a long way to go further for the improvements needed for the sector. The activities related to company that are adapting supply chain and their philosophy, sharing of information, building of their long term relationships were included this research (Mentzer et al. 2001).

By the help of resources, Pakistan can of course continue growing especially with in the construction sector. The research has outlined the important risks for the supply chain. The emphasis of this study was on the risk factors in terms Natural, Man-made and stakeholder relationship in a supply chain and found the difference of effect of risk in the basis of size of companies. The study was composed on crucial information of risks under which the construction sector is operating in Pakistan and assessing the importance of severity of these risks in the relation with the size of companies. The study will helpful in preparing the action

plan by companies in order to run daily tasks and challenges within the complex form of industry. One of the significant additions that were done in the research was to uncover Pakistan's risks involved in the supply chain and the severity of those risks pointed by the contractors in the construction sector. The outcomes of the research revealed most of the truths like smaller companies are more exposed to risks and can be affected severely by some of chronic risks as compared to big companies. The nature of the selected industry is fragmented and has adversial structure that prevents and becomes barrier for the proper implementation of supply chain and that also inhibit the progress and development of supply chain management.

By comparing Natural and Man-made Risks in relation to Supply Chain the selected variables were floods, crimes, natural accidents, earthquakes, terrorism, political corruption and energy crises and from the comparison it proved that earthquakes, terrorism, energy crises and political corruption have significant effect on the size of the companies.

In the relation to check characteristics of effectiveness in relation to Supply Chain the researcher selected the variable Raw material, Means of delivery, Buying of material and Project plan and the results proved that none of these has any significant effect on the size of companies.

By following the Characteristics in terms of building relationship in Supply Chain the selected variable were Customer relations, Profitability, Competitive advantage, More profit for supplier, More profit for customer and Quality Management and same as followed by previous researches the results proved to be insignificant on the basis of comparison.

As per knowledge of Characteristics building relationship with supplier in Supply Chain the variable in the study were in time delivery, Acknowledgement of complaints, Fast delivery, Customer satisfaction, Quality Assurance and Level of Trust and out of all Acknowledgement of complaints proved to be significant in the relation to the size of companies followed by previous researches and study the result showed significant effect.

The variables selected for finding Characteristics building relationship with End-user in Supply Chain as factors were Reliability of Product/services, Trust, Follow ups, Communication & information and Simplicity of system. The resulted proved to be

significant in terms of simplicity of system and communication and information.

Lastly the variables becoming Problem and hurdles for relationship in Supply Chain were Bad Debts, Contract procedures, Retention, Mutual Understanding, Faulty Reasoning. And the results concluded project completion time has crucial effect on the size of the companies. These related factors came into being because of traditional management and its methodology that has caused cumbersome structure and gave space to unreliable environments in the sector. A proper look on these problems might give set of precautionary measures for the sector that will diminish the ongoing and current barriers coming in the way of optimum supply chain.

The results have proven that Pakistan's supply chain is severely stressed by the risks such as earthquakes, terrorism, political corruption as well as energy crises. And the researcher has tried to mention and point all important natural and man-made risks like floods, natural accidents, energy crises, terrorism, crimes and political corruption and factors like earthquakes, terrorism, political corruption and energy crises proved to be significant on the size of companies as mentioned by the contractors. The knowledge of serious risks within supply chain has proved to be mostly external and can be partially or fully fixed with the help of competent management. Less competent companies have to learn about the navigation of challenges in Pakistani environment. Thus the resources are needed in the form of experienced and skilled mangers, more information and strong internal support system that can handle the disruption in an appropriate way.

As establishment of good partnering relationship is the ultimate key to the proper implementation of activities. The construction industry revolves around basic three aspects; the first is agreement of mutual concerns between the key stakeholders, secondly the decisions made on the way to solve problems during the project and thirdly goals made to improve and achieve improvements in terms of performance by the help of incentives (Saada et al. 2002). Therefore, contractors have big role at upstream as well as downstream within supply chain was the base of this research and helped to analyze the on-going situation in the construction industry.

The comparison of three selected or made group of companies on the basis of revenue, still there were differences in the approaches that help to enable an improved environment towards

the basic supply chain management. It was also observed in the research that companies which have high budget have more responsibilities during a project, so ultimately these types of companies have more emphasis to finish task and projects in time otherwise this may cause damage to the company's repute and in terms of financial benefits. We cannot neglect that the free flow of information has an impact that can be especially on the raw material control and means or plans of delivery that are the key aspects of coordination between the members of supply chain. All the players involved in the process of supply chain should take part individually in adapting a strategy for the entire process instead of just optimizing or being selfish for only their own benefits and needs and this might cause lack in effectiveness of supply chain.

The results showed that Pakistan supply chains are most severely affected by the chronic risks of inadequate infrastructure, supplier and labor problems, and stifling bureaucracy. We broke the infrastructure risks into three categories – transportation, logistics, and utilities – and although all three came out as highly ranked problems, transportation infrastructure was deemed the worst. Potential disruptions that we read about in the press, such as natural disasters, terrorism and crime, were also ranked as that severe and have a lot difference on the company size by our sample of managers. Dramatic episodes and disasters may individually cause a major impact, but the daily grind of poor infrastructure, labor and supplier problems and bureaucracy is what relentlessly takes up management time and chips away at a company's bottom line.

We learned that certain categories (size) of firms are exposed to different degrees of severity when it comes to particular disruptions. For example, Pakistan owned companies reported greater severity (defined as frequency times impact) in the areas of problems. Smaller companies reported significantly more severe disruptions overall, and specifically in the categories of disruptions. Without more research and investigation, we just don't know yet what the underlying causes of these disruptions are, and why certain categories of companies are more exposed.

The knowledge that most of the serious supply chain risks are either related to external or internal to the supply chain, and could help companies in prioritizing their efforts and organizational practices. A silver lining is that such problems are partially fixable through competent management practices. Resilient companies gradually learn how to successfully

navigate the challenging Pakistan business environment. This takes resources in the form of superb managers, robust information systems, and strong internal routines for how to handle and dissipate disruptions.

The main purpose of this research was to give managers a big picture and help them to be prepared to make strategies against all these risks. Finally, in the conclusion the researcher can mention that by including more participants from the sector and gathering data from more companies and involving more stakeholders that directly affects the supply chain would be a good recommendation for the future research and it would lead to more accurate and precise information for supply chain management in the construction industry.

6.2) Prospects for Future Research & Limitations

This dissertation has tried to fill an existing information gap regarding supply chain risks in the emerging nation of Pakistan. By performing a semi-quantitative study, we have tried to establish certain traits based on the hands-on experience of Pakistan supply chain manager and experts. Focusing on the upstream portion of the supply chain, we uncovered which disruptions have the highest frequency, impact and ensuing severity. We have explored which mitigation methods were the most useful in alleviating the risks. Lastly, we gathered information on which risk factors of the supply chain profession expects to encounter over the coming years.

The significance from this can be stand point as the daily management has a long way in terms of remedying the severe risks. More detail could be given for each of the risk factor and for this more qualitative and quantitative data could be gathered by doing more questions and taking some interviews. The research will also help to fill space in terms of information for the supply chain operating in Pakistan. By the help of performing this empirical study the researcher has tried to connect primary traits which were based on experience of contractors in Pakistan's supply chain. By looking to upstream part of supply chain the researcher has revealed the disruptions that have crucial effect on supply chain and has defined and explained in terms of size of companies.

As long as future research and limitation is concerned, it can involve investigation of more

natural and man-made risks and more investigation of risks at individual stakeholder level. A more detailed research would be a valuable task in order to uncover sub categories of risks and their root cause so that it could be helpful in order to cope up the negative effects that can be caused by disruptions. Also that financial impact caused by risks could be further studied and explored. It can be an important milestone in investigation of mitigation methods that could help in tackling the worst effect of caused risks. The researcher could also apply other statistical tests like ANOVA, and other parametric and non-parametric tests for testing the data set.

Future research should attempt to further dissect the nature of the individual disruptions. As we suggested, a qualitative and a quantitative study of the supplier, labor and customer problems would be very valuable in uncovering subcategories, root causes and the intertwined nature of these serious risks. A qualitative or case based approach will enable researchers to analyze individual instances of disruptions and limited to specific sectors of the Pakistan economy. The financial impact of disruptions should also be explored further. It would moreover be valuable to investigate which mitigation methods work best to tackle Pakistan's supply chain impediments. The purpose of all of this research is to make managers better prepared and to suggest realistic venues for policy makers.

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Appendix A

Questionnaire for Risk Analysis in Supply Chain Management

What is the Revenue size of your company?

0-10 Million _____ 11-50 Million _____ More Than 50 Million _____

1. Which natural and man-made disasters and risks give significant effect on supply chain:

	Less impact				Strong impact
1) Earthquakes	1	2	3	4	5
2) Floods	1	2	3	4	5
3) Natural Accidents (Fire, viral disease (Dengi, Bird flu etc.))	1	2	3	4	5
4) Terrorism	1	2	3	4	5
5) Energy crisis	1	2	3	4	5
6) Crimes	1	2	3	4	5
7) Politics/corruption	1	2	3	4	5

2. Which factor do you think have less or strong impact on your supply chain:

	Less impact				Strong impact
1) Raw Material	1	2	3	4	5
2) Means of delivery	1	2	3	4	5
3) Delivery Time	1	2	3	4	5
4) Buying of Material	1	2	3	4	5
5) Project Plan	1	2	3	4	5

3. Which of the factors have less or strong impact to build relationship between the parties within supply chain for your company:

	Less impact				Strong impact
1) Customer Relations	1	2	3	4	5
2) Profitability	1	2	3	4	5
3) Competitive Advantage	1	2	3	4	5
4) More profit for customers	1	2	3	4	5
5) More profit for supplier	1	2	3	4	5
6) Quality Management	1	2	3	4	5

4. Which of the factors have less or strong impact on constructing and progressing relationship with supplier within supply chain:

	Less impact				Strong impact
1) In-time delivery	1	2	3	4	5
2) Customer satisfaction by Order	1	2	3	4	5
3) Acknowledgement of complaints	1	2	3	4	5
4) Quality Management	1	2	3	4	5
5) Level of Trust	1	2	3	4	5

5. Which of the following has less or strong impact on relationship with the end-users within supply chain for your company:

	Less impact				Strong impact
1) Trust	1	2	3	4	5
2) Reliability of product/services	1	2	3	4	5
3) Communication & Information	1	2	3	4	5
4) Follow ups	1	2	3	4	5
5) Simplicity of system	1	2	3	4	5

6) Which of the following has less or strong problems towards the growth of supply chain for your company:

	Less impact				Strong impact
1) Bad debts	1	2	3	4	5
2) Project completion time	1	2	3	4	5
3) Contract Procedure	1	2	3	4	5
4) Retention	1	2	3	4	5
5) Mutual Understanding	1	2	3	4	5
6) Faulty reasoning	1	2	3	4	5