1.1 INTRODUCTION

Supply chain management (SCM) is the most important part of production system. There has been a growing interest in supply chain management (SCM) since late 80’s. SCM has picked up consideration as it spotlights on material, data and money streams from sellers to clients or the other way around. A key element of present day business is the real trick that it is supply chains (SCs) that contend, not organizations (Christopher and Towill, 2001) and the achievement or disappointment of supply chains is at last decided in the commercial center by the end purchaser. Getting the right item, at the perfect time to the purchaser is the linchpin to aggressive accomplishment, as well as the way to survival (Agarwal et al., 2005). SCM takes care of this important objective of the companies for better customer satisfaction and it searches for the joining of a plant with its suppliers and its clients to be overseen right now and the co-appointment of all the info/yield streams (materials, data and funds) so items are created and disseminated at the right amounts, to the right areas, and at the perfect time (Simchi-Levi et al., 2008). Many definitions of SCM have been published in different articles and books; however, these can be explained with three perspectives: activity-based perspective, benefit-based perspective, and component-based perspective. Stadtler (2008) defines SCM as the demonstration of sharing material, information and monetary information inside authoritative units, to satisfy client needs and right now, improve the execution of whole store network included. SCM has turn into a vital center of upper hand for association business on the grounds that the chance of a coordinated administration of SC can decrease the proliferation of surprising/undesirable occasions through the system and can influence definitively the gainfulness of the considerable number of individuals (Guillena et al., 2005). The principle reason of SCM is to give a key weapon to develop and improve practical upper hand by expense lessening without trading off consumer loyalty (Mentzer et al. 2001). Since these SCs involve manufacturers, distributors, retailers, as well as consumers, which are spatially dispersed and hence, they are characterized by heightened risks and uncertainty (Nagurney and Toyasaki, 2005). For the success of supply chains, it is very much important to study and analyze the risks associated
To have the capacity to examine the risk of SCs, it is important to audit quickly the meaning of risk. Word references have characterized risk as a probability of misfortunes or unsafe outcomes. This sound judgment definition uncovers the two key segments of risks: misfortunes and vulnerability about their event and sum (Hallikas et al., 2004). Numerous different meanings of risk exist in the writing. Sitkin and Pablo (1992) have characterized risk as the degree to which there is instability about whether possibly critical and disillusioning results of choices will be figured it out. Zsidisin et al. (2004) characterized supply risk as the transpiration of critical and/or frustrating disappointments with inbound merchandise and administrations. Supply chain risk is characterized right now that antagonistically influences supply chain operations and henceforth its fancied execution measures like expense, extensive administration levels and responsiveness (Tummala and Schoenherr, 2011). In short, it can be said that risks of the companies are related to their objectives e.g. profitability, future growth, better position in the market, customer satisfaction, better competitive edge and capability to handle corporate social responsibility etc. However, management of profitability is usually needed to survive and to achieve other possible objectives. Therefore, for achieving good profitability, SCs must respond to the realities of world events, which, in the given age, are characterized by heightened risks and uncertainty. The risks initiate from uncertainty. Hallikas et al. (2004) have emphasised that the main uncertainties for companies come from two sources: customer demand and customer deliveries. The demand of the end customer does not guarantee the business for a supplier. Delivery uncertainties are connected to the ability to manage the costs, time and quality as well as the responsibilities for confidential information. They have further, reported that an additional uncertainty is the future requirements; how the current orientation, knowledge and resources should be maintained and modified to succeed in the future objectives.

Therefore, risk management is the most important part of supply chain and for this purpose, it is very much necessary to identify and classify different types of risks associated with SCs. The literature on supply chains reveals different types of risks and their classifications. Tummala and Schoendherr (2011) have reported some types of risks related to SCs such as demand risks, delay risks, disruption risks, inventory risks, manufacturing (process) breakdown risks, physical plant (capacity) risks, supply (procurement) risks, system risks, sovereign risks and transportation risks. Kleindorfer
and Saad (2009) categorized these risks into two groups i.e. those arising from coordinating complex systems of supply and demand and those arising from disruptions to normal activities.

For the management of these uncertainty and risks, already some approaches and models are available in the literature. But, these techniques are too complex to be used in real industrial environment. Therefore, for the purpose of avoiding costly mistakes and realizing the objectives and optimal productivity of supply chains, there is a strong and justifiable need for extensive analysis of risks and elaborate design of these SCs before their trouble free implementation. This research is aimed at examining different types of risks and uncertainties associated with SCs and suggesting some proper mitigation techniques for getting fruitful results through SCs.

1.2 NEED AND BENEFITS OF SCM

There are certain objectives to be achieved through SCM. Improving customer satisfaction, service and competitiveness are a number of these objectives. Supply chain management also aims to lower the costs and resources involved in the creation of products as well as improve efficiency and effectiveness. SCM also focuses on reducing inventory levels and respective costs, increasing profits and improving cooperation. Supply chain management has been becoming increasingly important in competitive business.

To compete at the supply chain level, firms must adopt an appropriate supply chain management strategy. Mason-Jones et al. (2000) have suggested that supply chains need to adopt a strategy that suits both their particular product and marketplace. Fisher (1997) have suggested that the first step in developing the supply chain strategy is to consider the nature of the demand for an organization’s product, proposing that these are either functional or innovative.

Fawcett et al. (2008) reviewed key benefits of SCM proposed in literature and noted the following in the order of their importance:

- Increased inventory turnover
- Increased revenues
- Cost reduction in SCM
- Product availability
- Decreased order cycle time
- Responsiveness
• Economic value addition
• Proper capital utilization
• Decreased time to market and
• Reduced logistics costs.

No doubt, SCs offer many benefits as listed above, but their proper implementation and maintenance is not hassle free.

1.3 UNCERTAINTY AND RISK MANAGEMENT IN SC

There are numerous meanings of Uncertainty and risk in the field of SCM. Uncertainty is one fundamental normal for the SC arranging issue. This Uncertainty may influence the assumptions about the crude materials supply and/or the business sector conduct (interest, costs, conveyance prerequisites, and so on.), and other inner components (i.e. working parameters like lead times, transport times, and so forth., or the accessibility of generation assets). A risk is breakdown of streams between diverse individuals from the supply chain. This variability can possibly influence the stream of information, materials and/or items, and it may adjust the utilization of human and gear assets.

Risk is characterized presently or baffling aftereffects of actualized choices (Sitkin and Pablo, 1992). Supply chain risk is characterized right now that unfavorably influences supply chain operations and thus its fancied execution measures like expense, extensive administration levels and responsiveness (Tummala and Schoenherr, 2011). Despite the fact that outcomes are normally negative, they can possibly create positive results if proper risk-taking is performed (Ritchie and Brindley, 2007). Sitkin and Pablo (1992) have characterized risks as the degree to which there is instability about whether possibly noteworthy and/or frustrating results of choices will be figured it out. Zsidisin et al. (2000) have characterized supply risks as the transpiration of critical and/or baffling disappointments with inbound products and administrations. Zsidisin et al. (2004) have characterized supply risks as the likelihood of an occurrence connected with inbound supply from an individual supplier disappointment or the supply market happening, in which its results bring about the powerlessness of the buying firm to take care of client demand or reasons dangers to client life and security. On the off chance that risk is excessively solid, then it is no more a risk yet an occasion sure to happen. On the off chance that the
likelihood is too low, there is liable to be an unlikely and unwarranted apprehension that supervisors won't look to deal with the circumstance. This conveys to the bleeding edge the need to fittingly survey risk and create procedures to oversee it. Recently, many manufacturing companies have introduced supply chain management (SCM) strategies for the reduction of time and cost but to increase the benefits. If hazardous events such as fires and earthquakes occur, their effects could propagate quickly through the supply chain because of low inventory and short lead time, and cause enormous losses. Furthermore, recent supply chains entail greater risks due to the advances in globalization. Moreover, the introduction of new technologies also results in new risks such as information and communication technology risks.

To cope with such problems, manufacturing companies should consider supply chain risk management (SCRM), which evaluates the probabilities and magnitudes of losses caused by hazardous events and implements the necessary countermeasures. The importance of SCRM gained recognition in the late 90’s owing to the occurrences of supply chain risk events. The issue has been discussed from various researchers such as risk identification and modeling, impact assessments of various types of risks, evaluation of vulnerability of supply chain network, countermeasures to mitigate risks, and the simulation technologies for evaluation of supply chain risk.

The literature on supply chain risks suggests a number of different risk identification and classifications. Tummala and Schoendherr (2011) have cited these as supply chain risks as demand risks, delay risks, disruption risks, inventory risks, manufacturing (process) breakdown risks, physical plant (capacity) risks, supply (procurement) risks, system risks, sovereign risks, and transportation risks. Kleindorfer and Saad (2009) categorized these risks into two groups, those arising from coordinating complex systems of supply and demand and those arising from disruptions to normal activities. Chopra and Sodhi (2004) have identified nine risk categories such as disruptions risk, delays risk, systems risk, forecast risk, intellectual property risk, procurement risk, receivables risk, inventory risk and capacity risk.

Many researchers have attempted to find risk mitigating strategies in SCRM. This has resulted in to several different models, however, a four-step system seems common as a means to manage risk. These four steps are identifying risks, assess risks, implement solutions and control risks. According to Harland et al. (2003), attitude toward risk depends on trade-offs made by organizations; what is deemed as an acceptable level of risk, the size of the benefit and the attitude of the organization concerning risk.
taking. Some organizations and individuals are highly risk-averse, others are risk-takers. Attitude toward risk is influenced by the nature of the business but also by individual style, behavior and it changes with experience and maturity. An individual, organization or sector accustomed to taking risks may change their attitude after experiencing heavy losses. Harland et al. (2003) describe six steps to manage risk in a logistics network, which are as follows:

Step 1: Design supply chain network
Step 2: Identify risk elements and their location
Step 3: Assess risks occurrence, stage and losses
Step 4: Proper management of risks
Step 5: Shared supply network strategy and
Step 6: Execute shared supply network strategy.

1.4 MOTIVATION OF RESEARCH

The purpose of this research is to investigate the research development in supply chain risk management (SCRM), which has shown an increasing global attention in the past. In today’s volatile era with businesses more specifically, supply chains becoming increasingly global, the industrial environment is heavily affected by uncertainty and risk, which can potentially turn into unexpected disruptions. Financial and political turmoil, socio-cultural changes, highly fragmented and demanding behaviour of consumers, rapid development and changeover of products, have seriously modified the economic and industrial environment in which companies act, bringing out new issues related to continuity of the business against potential disruptive events.

Moreover, one of the key factors contributing to disrupting supply chains is the focus on lean supply chains in academia and industry. Zero-inventory and just-in-time movement of goods became the dominant model that increased the sensitivity of supply chains. Little issues quickly become big issues. Outsourcing has also become the dominant model, increasing the forces driving disruptions such as other customers competing for volume and attention, information flow issues, mistrust, win-lose negotiations, financial stress, misalignment of interests and goals. These have increased the likelihood of a disruption exponentially.
As a common term to designate the likelihood of occurrence of such events the word risk is used although the concept of risk is multi-dimensional and not univocally defined, it is generally established the fact that it is linked to uncertainties associated with events.

Amid the most recent events, a few occasions (i.e. seismic tremor in Kobe in 1995, terrorist assault to World Trade Center in (2001) have essentially disturbed supply chains and created significant misfortunes for the organizations included (Tang, 2006). Organizations, for example, Ericsson, Hershey, Apple, Walmart and a large group of other real organizations who depend on convenient conveyance of items and administrations to address client issues have caused significant misfortunes because of supply chain disruptions. Traded on an open market firms encountering supply chain disruptions, for instance, have reported negative stock exchange responses to declarations of such troublesome occasions, with the greatness of the decrease in business promotion being as substantial as 10% (Knight and Pretty, 1996; Hendricks and Singhal, 2005). Ericsson reported a $400 million misfortune on the grounds that it didn't get chip deliveries from the Philips plant in a convenient way (Latour, 2001).

Despite the fact that the genuine expenses of any supply chain disruption can be hard to measure correctly, no less than one firm studied by Rice and Caniato (2003) evaluated that the day by day expense effect of a disruption in its supply system to be in the area of $50-$ 100 million. In the view of above, it is clear that management of SC has become sensitive issues because a small disturbance can cause heavy loss to a company. That has motivated to focus the present research in identification of different types of uncertainty and risks associated with SCM and to suggest some effective risk mitigation techniques which are useful for industries.

1.5 GAPS IN LITERATURE

This review has piloted to identify and classify the uncertainty and risk associated with different flows, namely material, cash and information flows. Consequently, some research gaps regarding uncertainty and risk management in supply chain have been identified and there is an urgent need to study the supply chain risk management (SCRM) from industrial aspect. A review of literature brings out the following gaps in the context of uncertainty and risk management in supply chain.
• Low awareness regarding uncertainty and risk in supply chain in Indian manufacturing industries has motivated the researchers to pursue research in exploring and analysing the uncertainty and risk issues in supply chain.

• Quantitative models in the field of uncertainty and risk management are relatively lacking and information flow in risk has received less attention.

• It is also interesting to observe the evolutions and advancements of supply chain risk management (SCRM) discipline. Although various issues related to uncertainty and risk have been extensively explored during the past decades by researchers but their capabilities are not fully utilized. This is due to the wide gap existing between the theoretical research and practical expectations of Indian manufacturing industries.

• In the literature, the quantitative analysis of uncertainty and risk issues has not been up to the mark.

• In the literature, the uncertainty and risk issues have not been considered for selecting the best SC.

• Not much attention has been paid regarding the issues of disruptions, deviations and disasters affecting the SCs.

• A large number of articles have been presented regarding the uncertainty and risk issues and their management in supply chain. But techniques used by researchers for developing the risk mitigation models are too complex to be used in real industrial environment. Therefore, there is an urgent need of some simple techniques which can be easily used by industries for overcoming these uncertain and risky natures of supply chains.

Keeping in view the above identified gaps in SCM, an attempt has been made through this research to analyse the uncertainty and risk associated with SC both qualitatively and quantitatively.

1.6 RESEARCH OBJECTIVES

The main objective of this research is to study and analyse the uncertainty and risk measures in supply chain, thus making a contribution to the state of supply chain risk knowledge. Supply chains are being used by many industries in present scenario but to extract the maximum benefits from the SCs, it is very much essential to minimize the uncertainty and risk associated with them. Keeping in view the above fact in mind
the present research work has been taken up. The main objectives of the research work are as follows:

- To identify the important risks associated with SCM through literature survey.
- To understand the research trend both from industrial and academic perspectives.
- To identify the possible research gaps and opportunities in supply chain area.
- To identify the uncertainty and risk measures in supply chain and to develop a structural relationship among different risk factors.
- To identify the operational risks and to develop a structural relationship among them.
- To determine the evaluation criteria and ranking of different supply chain alternatives.
- To quantify the major risk factors in supply chain.
- To propose some important mitigation and different contingency actions.

1.7 RESEARCH METHODOLOGY

In achieving the above mention objectives, different methodologies used in the present research are as follows:

1.7.1 Questionnaire Based Survey

After identification of evaluation criteria with the help of expert committee, a questionnaire was designed on a 5-point Likart scale. It contained risks issues regarding the implementation and maintenance in SCs. Risks criteria were selected through literature survey and discussed with experts. The respondents were asked to indicate the level of difficulty in managing these risks criteria in supply chain, on the Likart scale from 1 to 5, in this scale, 1 stand for not much important and 5 stand for very important. The self-contact, e-mail and postal survey methods were used for the administration of survey. Survey was conducted in Indian manufacturing industries. The chief-executives/managing directors/general managers/works managers/senior executives were contacted for getting their response. Some questionnaires were e-mailed to Indian manufacturing industries, along with a covering letter, self-addressed and with a stamped envelope. In total, questionnaires were sent to 430 Indian manufacturing industries.
Out of 430 questionnaires, 87 filled up and complete questionnaires were received. Seven questionnaires were incompletely filled and were discarded for further analysis. This gives a response rate of 20.23% which is not very low for such surveys (Malhotra and Grover, 1998). In most of the cases, the addressee filled the questionnaire on their own but in some cases; some senior executives of the companies also filled the questionnaires on behalf of addressee.

1.7.2 Weighted Interpretive Structural Modelling Technique (W-ISM)

Weighted interpretive structural modelling technique is basically the combination of interpretive structural modelling (ISM) technique and effectiveness index (EI) method. ISM is one of the intelligent administration strategies which help exploration bunches in managing complex issues (Warnfield, 1974; 1987). ISM changes hazy, inadequately explained mental models of a framework into noticeable all around characterized, hierarchal models. It is a no doubt understood strategy for distinguishing and compressing connections among particular elements which characterize an issue or an issue and by which request can be forced on the multifaceted nature of such elements (Mandal and Deshmukh, 1994). Along these lines an arrangement of distinctive and straightforwardly related elements are organized into an exhaustive methodical model. ISM is basically expected presently learning procedure, however people might likewise apply it (Ravi and Shankar, 2005; Faisal et al., 2007; Panahifar et al., 2014). For computing the effectiveness index, the mean score of elements is calculated and rank is decided for each elements. After the rank calculation, inverse rank and weights for each element is to found out. For assigning weights to different elements, the highest and lowest values of five point Likert scale i.e. 5 and 1 are mapped as 100% and 0% respectively. For each of the element of effectiveness a weight is assigned. In this research work, this methodology has been used for qualitatively analysing the operational risks and uncertainty and risk measures in SC.

1.7.3 Analytical Network Process (ANP)

There are numerous multi criteria decision making approaches (MCDM) approaches available in the literature such as Analytical Network Process (ANP), Analytical Hierarchy Process (AHP), Technique for Order Preference by Similarity of Ideal Solutions (TOPSIS), Weighted Sum Method (WSM) etc. Among these models the most widely used method is analytical hierarchy process (AHP) (Saaty, 1980). AHP
can be used but it is not utilized over because of its limitations. Sarkis and Tulluri (2002) have listed out the various advantages of ANP over AHP. Analytical network process (ANP) has the capability to incorporate the relationships which involve multiple factors and relationship may exist between these factors. One factor may affect the other factors and the degree of such relationship may vary between factors. Interdependencies among the elements may be represented by two-way arrows and four-ways arrows between levels, or if within the same level of analysis (Meade and Sarkis, 1998). The hierarchical relationship is allowed within the AHP network model, but the existence of a feedback relationship among the levels is only found in ANP. The ANP approach is capable of handling interdependence among elements by obtaining weights through the development of a ‘supermatrix’ (Hamalainen and Seppalainen, 1986).

ANP (Saaty, 1996) is a extensive decision-making technique that captures the outcome of the dependence and feedback within and between the clusters of elements. Analytical hierarchy process (AHP) serves as the initial stage of ANP. The ANP is a combination of two parts, where the first consists of a control hierarchy or network of criteria and sub-criteria that controls the interactions, while the second part is a network of influences among the elements and clusters. In fact, ANP uses a network without a need to specify levels as in a hierarchy.

In this research work, this methodology has been used for selecting the best alternative (supply chain) by analysing the uncertainty and risk measures in supply chains.

1.7.4 Multi-Objective Optimization by Ratio Analysis (MOORA)

Like other multi criteria decision making (MCDM) tools, multi objectives optimization by ratio analysis (MOORA) method, which was first put forward by Brauers (2004) and Brauers and Zavadskas (2006), is used to prioritise the alternatives on the basis of several criteria or objectives. Multi-objectives optimization on the basis of ratio analysis (MOORA) is also known as multi-criteria or multi-attribute optimization. As proposed by Zavadskas et al., (2009) performance of an alternative on an objective is compared with denominator which is representative for all the alternatives concerning that objective. It is defined as the process of simultaneously optimizing two or more conflicting attributes subject to
some constraints. In the present work, this methodology has been used for selecting the best alternatives (supply chain) by analysing the uncertainty and risk measures.

1.7.5 Graph Theoretical Approach (GTA)

Graph theoretical approach (GTA) is an efficient system for change of subjective factors to quantitative qualities and scientific displaying gives an edge to the proposed procedure over routine routines like reason impact charts, stream outlines and so on. Chart hypothesis serves very moment model of any framework that incorporates multi relations among its constituent components due to its diagrammatic representations and tasteful angles. Graph hypothesis is a subject of combinatorial science and draws a ton from lattice hypothesis. The network representation of the chart forms the issue to make utilization of PCs for different complex operations. It comprises of the digraph representation, the framework representation and the lasting capacity representation. The digraph is the visual representation of the factors and their reliance which influences the kick the bucket execution. The network changes over the digraph into scientific structure. The perpetual capacity is a numerical model that serves to focus file. Diagram theoretical approach has been utilized by numerous specialists i.e. Gandhi and Agrawal, 1996; Testa et al., (2003); Grover et al., (2006); Raj et al., (2010); Dev et al., (2014). In this research work, this methodology has been used for quantitative analysis of risks in SCs.

1.8 ORGANIZATION OF THE THESIS

The present research work has been planned in 11 chapters. The chapter wise organization of the research has been depicted in Figure 1.1. Summary of each chapter have been discussed as below:

**Chapter I:** In this chapter, the proper understanding of supply chain, their need and benefits, uncertainty and risk in supply chain, motivation, gaps in literature, research objectives and methodologies used in the present research have been discussed.

**Chapter II:** As the supply chain management is a global issue and supply chains are being used in the leading industries of the world. A lot of research work has been done and reported in the form of research papers and different leading global journals.
Therefore for the best possible contribution in the present research work a lot of research papers related to supply chain management were studies. Through this literature review general definitions of supply chain, their types and different burning issues with supply chain management mainly risk identification and management were identified and have been presented in this chapter. Some critical barriers and important success factors related to supply chain management are also discussed in this chapter. Some important technique such as W-ISM, ANP, MOORA and GTA which are used in this research work for extracting different models and frameworks are also reported in this chapter.

Chapter III: This chapter covers the development of questionnaire for conducting a national wide survey. The survey was conducted in small-large-medium scale industries. Questionnaire consists of the questions related to the uncertainty and risk issues in supply chain i.e. plan and control risks, procurement risks, process risk, demand risks, natural and social risks, transportation risks, market-related risks, supplier-related risks, financial risks, operations risks, performance measurement risks and other issues and supply chains such as agile supply chain, green supply chain, lean supply chain etc. responses from the industries were collected, analyzed and presented through discussion for different issues.

Chapter IV: In this chapter, operational risks in supply chain have been identified and analysed by using W-ISM technique by developing the ISM model, MICMAC analysis and by calculating the effectiveness index.

Chapter V: In this chapter, uncertainty and risk measures in supply chain have been identified and analysed by using W-ISM technique by developing the ISM model, MICMAC analysis and by calculating the effectiveness index.

Chapter VI: In this chapter, the ANP method is used for risk mitigations in supply chain planning and control to select the best alternative among the traditional, agile, and green supply chain by analysing the plan and control risks, process risks, demand risks and natural and social risks with the dimensions such as disruption, deviation and disasters.

Chapter VII: In this chapter, a comparative study and risk assessment of supply chains with different multi criteria decision making approaches have been done to
find out the best supply chain among the traditional, agile, lean and green supply chain by analysing the transportation risks, operational risks, supplier related risk and market related risk. And the objective was carried out by using the ANP based model which followed by AHP and MOORA method.

**Chapter VIII:** In this chapter, GTA based approach is used for the quantification of risks in supply chain. The risks such as supply risks, process risks, natural and social risks, financial risks, transportation risks and demand risks are used for the analysis. And the most important risks among these that need more attention is found out.

**Chapter IX:** In this chapter, some important risk mitigation techniques have been reported. A step wise procedure has been reported to mitigate the SC risks.

**Chapter X:** In this chapter, the synthesis of research work as mentioned in the previous chapter has been presented. This chapter presents the overall picture of the research work.

**Chapter XI:** In this chapter summary, implications and limitations of this research work have been discussed. Final conclusion of this research and scope of future work have also been presented.
Chapter I  Introduction

Chapter II  Literature Review

Chapter III Questionnaire Administration and Descriptive Statistics

Chapter IV  Analysis of Operational Risks in SC

Chapter V  Analysis of Competitiveness of Uncertainty and Risk Measures in Supply Chain

Chapter VI  Development of ANP Based Framework for Modelling the Risk in SCs

Chapter VII  Comparative Study and Risk Assessment of Different Supply Chains

Chapter VIII Quantitative Analysis of Risks in Supply Chain By Using GTA

Chapter IX  Risk Mitigation Techniques

Chapter X  Synthesis of Research Work

Chapter XI Summary, Key findings, Implications and Scope for Future work

Figure 1.1: Organization of research work
1.9 SUMMARY AND CONCLUSION

The current industries environment of rapidly changing technologies, threats, needs and money have created a need of better understanding the uncertainty and risks in supply chain. The wide range of types of uncertainty and risk associated with supply chain and possible responses to them make cohesive of problem difficult. So there is a need to profile the potential risks associated with the supply chain activity. Also there is a need to mitigate these uncertainty and risks to improve the quality, productivity and to reduce cycle time by identifying the important risk issues. There is a need to develop the hierarchy or network for mitigating the uncertainty and risks. In this chapter, introduction, needs, benefits of SCs, and issues related to uncertainty and risks in supply chain have been discussed. After identifying the gaps in literature regarding uncertainty and risks in SCM, a comprehensive research work was prepared and executed. Different research objectives, methodologies used in the present research work and organization of whole research work has been presented in the chapters.