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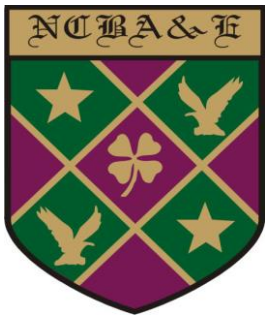

EXPLORING THE ROLE OF RISK MITIGATION STRATEGIES ON SUPPLY CHAIN RESILIENCE. AN ANALYSIS OF PETROLEUM MARKETING AND DISTRIBUTING COMPANIES OF PAKISTAN

BY

HAFIZ MUHAMMAD ALI

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IN
BUSINESS ADMINISTRATION

APRIL, 2022

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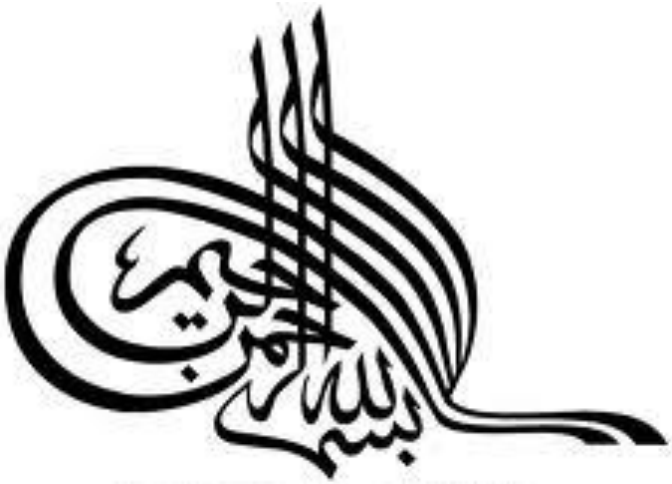

In the name of ALLAH,

The Most Beneficial,

The Most Merciful,

NATIONAL COLLEGE OF BUSINESS ADMINISTRATION & ECONOMICS LAHORE

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Dissertation Committee:

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Chairman

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Member

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Member

_____
Director Research
National College of Business Administration & Economics

DECLARATION

It is to declare that this research work has not been submitted for obtaining similar degree from any other university/college.

Hafiz Muhammad Ali
April, 2021

Dedicated to

Dedicated to my parents and loving wife, & respected supervisor, who supported me throughout my journey and inspired me to keep moving forward no matter the obstacle or challenge. I owe you a debt of gratitude for all that you have done for me.

ACKNOWLEDGEMENT

I am highly thankful to Almighty Allah whose eternal blessings facilitate me to complete this massive task. I feel immense pleasure in expressing my cordial gratitude to my respected supervisor ***Dr. Umar Safdar Kayani,*** for prudent advice, sympathetic attitude, moral support, inspiring comments, and strong motivation to address the problems encountered during my research work. This thesis could not have been finished without his full support, encouragement, and guidance; therefore, I am very thankful to him.

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis entitled **"Exploring the Role of Risk Mitigation Strategies on Supply Chain Resilience. An Analysis of Petroleum Marketing and Distributing Companies of Pakistan"** has been carried out and completed by **Hafiz Muhammad Ali** under my supervision during his **M.Phil. Business Administration** Programme.

(Dr. Umar Safdar Kiyani)
Supervisor

SUMMARY

In the modern globe, Supply Chain is considered a pillar in the growth of the country. Multinational companies are centered on a supply chain that determines the growth of the company. Not only multinational, but national companies are also strengthening their supply chain. The supply chain has become the base for the researcher to recognize their role on the globalization level. This present study is on Supply Chain Resilience (SCR). Supply Chain Resilience (SCR) can improve the organization's performance to get more profit with the help of risk mitigation strategies. Because when Supply Chain Resilience is controlled, other related fields move towards success and enhance the overall performance of the organization. This particular study proposes the exploration of the role of risk mitigation strategies like risk avoidance, risk acceptance, risk reduction, and risk transfer on the supply chain resilience. An analysis of petrol marketing and distributing companies of Pakistan. This study is using Management control policies, rules, and procedures as moderators among risk mitigation strategies and supply chain resilience.

Data were gathered from logistics managers as well as depot managers individually from Pakistan. Cross-sectional time horizons are using and data was collected from respondents with the self-administration survey questionnaire. The present research shows that risk mitigation strategies (risk avoidance, risk acceptance, risk reduction, and risk transfer) are positively associated with supply chain resilience. Management control policies, rules, and procedures moderate positively with the effect of Risk Mitigation Strategies and also the Supply Chain Resilience on Oil Industry in Pakistan. This research also addresses the study limitation and gives directions for new researchers in the future.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Supply chain resilience (SCR) is well-explored as the capacity and inclination to improve operative competence once an event triggering interruptions and capability to repel disturbance, therefore supply chain resilience contains an ability for resistance and regaining ability those are risky but the corresponding system (Adomako et al., 2019; Centobelli et al., 2020). In history, disturbances in the supply chain significantly crushed the routine of businesses (Ivanov & Dolgui, 2020). The most important supply chain disturbances stated worldwide in the previous reports, contain the tidal wave and underground eruption in Tokyo in 2011, the disastrous Bangkok flooding of November 2011, the harmful biochemical fall in Phoenix, Arizona a state in the United States of America in 2013, Storm in South East Asia in June 2014 and Ocean pirates in Somalia and Yemen in 2013 (Barros et al., 2019; Pillai et al., 2020). Due to these prominent disorders, construction of Supply Chains Resilience has been measured as the core means of opposing disturbances and acquiring reasonable improvement (Spruijt-Metz et al., 2010).

SCR and supply chain risk management are corresponding conceptions all pointed towards creating a supply chain structure that can jump back after unwanted actions or risk happening regardless of its reason (Ruel et al., 2021). Risk Management involves risk evaluation, identification, prioritization, and measurement of risks monitored by source arrangement to minimize the risk, to observe and administer chances of happening of the fallouts that the risk might influence and increase the success of prospects. Supply chain risk management's purpose is to make sure that ambiguous incidence on work got never changed, dislocate or curve professional aims (Abu-Rumeileh et al., 2021; Ndolo Muthini et al., 2017). Supply Chain Risk Mitigation consequently includes advancement to eradicate or diminish the causes to support SCR. Risk mitigation strategies were categorized as risk acceptance, risk avoidance, risk transfer, and risk reduction (Béné, 2020). To generate mitigation strategies, organization needs to consider their work outline to safeguard about their supply chain resilience strategy transmits and ties to probable risk (Comas-herrera et al., 2021). (Ivanov & Dolgui, 2020) perceived that resilience is the greatest critical object in today's supply chain management, brainstorming, operational awareness, and regaining from expensive disturbances rely on the

question that how organizations tackles the perception and wherever to finance in the resilience.

1.2 INTERNATIONAL PERCEPTION ON SUPPLY CHAIN RESILIENCE

Supply chain is the key feature of the growth for any country's economy. Transportation is the backbone for ant national and international business to strengthen the trading (Doric & Dimovski, 2018).

After the 2000 century, supply chain management's trends are changing very quickly. Latest technologies are being introduce by the researchers every day of the life to increase the performance of the overall businesses like, re-engineering, increment in the outsourcing, computer bases structures, clouding, and more focus on the health of the environment (Alvarez et al., 2016; Carvalho et al., 2014). Reason behind all these innovations is to increase the entire productivity of the organizations to grow globally by getting the perfection (Lambaino, 2019). The researchers are working on the trends day and night but they can't beat the instability of a country's politics, violence, and strikes that can completely jam a country for a day or two (Correa & Montero, 2013). (Atabani et al., 2012) explains the fact that the international supply chain will losing the $36 billion by 2016 in the form of climate change, and terrorism blatantly.

Ho et al., (2015) talks about the inevitable phenomenon about the supply chain resilience that the incidents those leaves us abandoned can't be ignored and rely on the present research. Creation of the most resilient supply chain is the never ending procedure, according to the continuous expansion of the complications around the world. The addition of risky elements made the broadcast companies to empower the fact that the significant amount of work is needed to be done in the field (Tukamuhabwa et al., 2015). To work around the globe, company's primary goal is to get the expertise in the supply chain and the supply chain resilience to get going into a successful future.

1.3 REGIONAL PERCEPTION ON SUPPLY CHAIN RESILIENCE

Atmosphere of Asian business is a bit wild because of its speedy changings in trends (Cawood & Hawkesworth, 2014). Asian market is very attractive due to the tremendous amount of people living here and that makes it highly diversified market (Cawood & Hawkesworth, 2014). World sharpest market exists in Asia, highly difficult to survive because of its instability,

needs to have huge extent of the understanding about the multi cultures, multi religions, and difficult official structures (Taulo et al., 2015). Globalization, unsound supply chain, e-documentation, technology impact, and bankability are the core challenges and the gaps in the Asian markets (Bimha et al., 2020).

To strengthen the supply chain and to overcome the resilience, Asian countries have to build an organization like European Union that works among the countries to address problems like, policies, frameworks of regulatory authorities, skills exchange, control on corruption, and political issues (Cawood & Hawkesworth, 2014). But unfortunately, Asians countries are failed to do so, that is why companies suffer the great loss in the Asian markets to work efficiently (Ho et al., 2015).

Current arrangements of the South Asian region are a mess for the organization's supply chain volume because of its coherence with the disputes of labors, poor communications setups, highest crime rates in the world, absence of the safekeeping institutes are the keys that destroys the supply chain (Carvalho et al., 2014). To make it completely operational as it should according to the potential we see in South Asian region, every country needs to develop a union or a committee jointly that will embrace each country with the security they need to establish a sustainable and progressive supply chain to improve the overall performance Asian region (Carvalho et al., 2014).

1.4 LOCAL PERSPECTIVE ON SUPPLY CHAIN RESILIENCE

Esfe et al., (2015) discovers the internal reasons that blocks the growth of Pakistan's economy. Non-professional people are the leaders of the organizations that needed the most expert and experience persons. People even don't know how to predict the weather forecasting and poor communications setups makes it even worse that destroys the micro and macroeconomic, hence increases the risks that can collapse the entire supply chain (Esfe et al., 2015). Develop countries have explored the supply chain so adequately but in Pakistan it is yet to be discover (Tukamuhabwa et al., 2015). Authorities in Pakistan now started focusing on the perfection of their supply chain due to the foreign pressures and to make sure that Pakistani supply chain policies meets the international standers (Aslam et al., 2021).

High cost of taxes, energy, and raw materials as well as high price variations are the core problems of Pakistani firms, not to forget the poor transportation networks that throws us back in the international market and stops the firms to go around the globe (Aslam et al., 2021).

A study carried out by Adnan (Sarwar et al., 2021) regarding the problems of Pakistan's supply chain, it shows that unwanted issues those related to supply chain are communication, tools, traders, transportation, human resource, politics, and finance. (Barasa, 2016) point outs that however the struggles we do search and research on the supply chain to overcome the threats that we have being paying in the past, we need to focus on the application and execution of the new ways of the supply chain to overcome the supply chain resilience with the help of cost cutting, better quality, less dependability, and more flexibility.

1.5 REVIEW OF OIL INDUSTRY

Oil industry have a vast impact on the world because human's daily lives are highly dependent on it, and almost all the technologies are linked with the it (Amponsah & Opei, 2017). (Ftiti et al., 2016) and (Rehamn & Sultana, 2009) find out that the biggest users of oil are the countries those are developed and approximate amount of oil consumes per annum is 33 billion barrels.

There are three sections of the oil industry downstream, midstream, and upstream (Tsegha, 2013).

First section deals in investigation and creation of oil, second section involves the transportation, storing, selling and purchasing of oil. Lastly, oil refinery, retailing and distribution (Tsegha, 2013).

All the industries are continuously improving their operations to get the maximum output, similarly oil industry is also moving with the current trends to make its daily operations efficiently, especially to discover the new reserves of Gas and Oil to reduce the destructive aspects of hydrocarbons (Ftiti et al., 2016).

Pakistan is highly relying on the import of the petroleum products to fulfil its demand in the country (Sellitto et al., 2015). In Pakistan, the primary carriage of oil are the protected pipelines operating under OGRA into numerous storages planted by the government officials containing the very large amount of oil reserves in Sheikhupura, Shiakrpur, Mehmmod Kot, Keamari, Amangarh (Nadeem, 2013). The reasons behind the shortage oil in the Pakistan includes the following reasons such as, poor refinery tools, bad communication setups, high demands of labors and their strikes, pirates of the oceans, high corruptions, illegal storages of oil by the businessmen, and poor road infrastructures that cases the delay on the supplies (Aslam et al., 2021).

By sharing the knowledge of the supply chain disturbance and execution of the risk mitigation strategies: risk transfer, risk reduction , risk acceptance, and risk avoidance can help us to achieve the resilience to promote the productivity of oil industry in a country (Govindan et al., 2017).

1.6 SIGNIFICANCE OF THE STUDY

This study provides help to the managers of the oil companies especially those working as the logistics head of a depot or a station to prepare themselves in advance by properly understanding the impact and taking care of the risk mitigation strategies, those are risk avoidance, risk transfer, risk reduction, and risk acceptance. The conclusion of the study will also help the future researchers to have prerequisite data regarding the supply chain resilience and mitigation strategies of risk in Pakistan. Study increases the knowledge about the supply chain management, risk, and risk mitigation strategies.

1.7 STATEMENT OF THE PROBLEM

Multinational organizations are facing severe losses due to natural and unnatural catastrophes, financial issues, and manufacturing faults (Lambaino, 2019). The major target of the risk management is to recognize the possible risks and come up with a plan and action to mitigate all the risks (Andersen & Johanna, 2021).

Supply chain resilience is a process in which structure's rate that allows supply chain to endure shocks internally and externally, hence sustaining regular functioning during the calamities and recover from risky situation at acceptable level (Arani et al., 2021; Hosseini et al., 2019; Lambaino, 2019). Ethical values of an organization must be clearly defined and must be transparent by all the members of the organization to maintain a system (Vafadarnikjoo et al., 2020). To improve company's market value, logistics managers can make the businesses highly resilient by focusing on the risk mitigation strategies (Dubey et al., 2020). There are four major sectors of Pakistan in which consumption of oil is very high, those are energy, livestock, transportation, and production of goods and that makes the oil as a top priority raw material in the fiscal growth (Aslam et al., 2021). Highly combined supply network is required in Pakistan because in Pakistan, there are very few oil refineries that can never fulfilled the demand of the country so, Pakistan have to import the oil from different countries like Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and South Africa that makes it even complex supply

chain (Mangina et al., 2020). The oil sector of Pakistan is clearly unexplored as per the complex supply chain system and this system became unreliable and cause disruptions in the overall supply chain of the country. To minimize this problem, we need a platform that shares the real time data of all the transportation of oil in the country. (Shukor et al., 2020; Wanjiku & Mwangangi, Dr, 2019). (Brink et al., 2020) explored that supply chain resilience is a concept yet to be discover especially in the developing countries through research and experience for a better future of the country. This study is highly useful for the managers and future researchers to fill this huge gap from the market and makes the bright future for the petroleum industry in Pakistan.

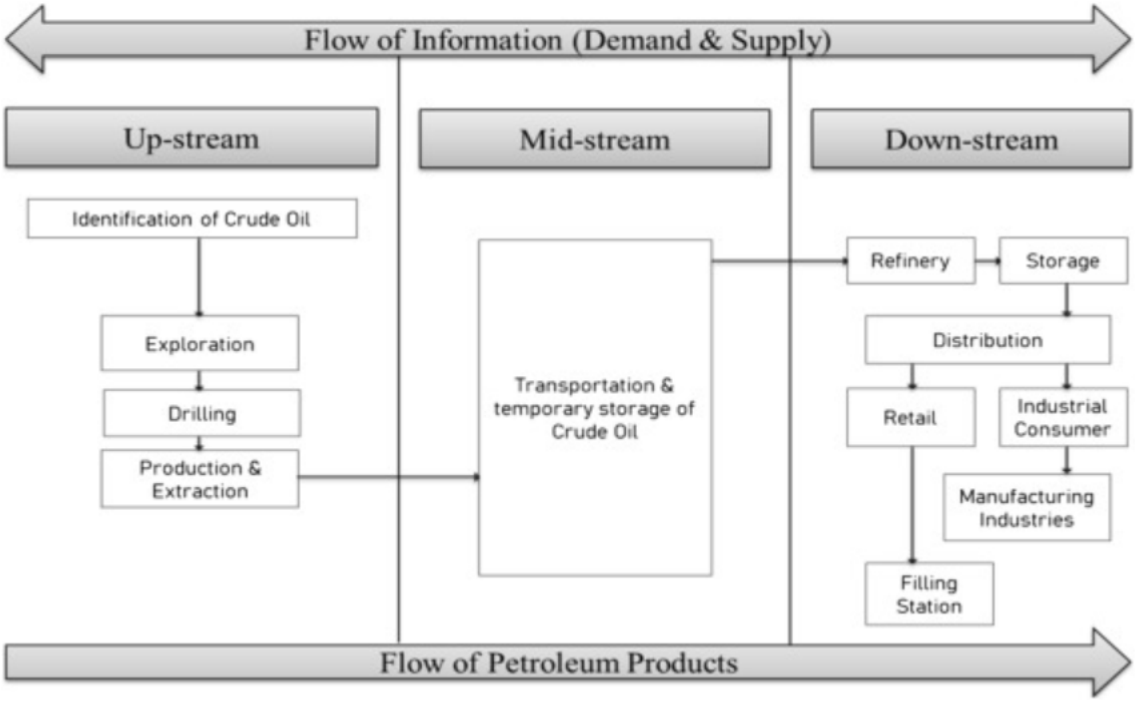


Figure 1.1: Flow of Information (Demand and Supply)

1.8 OBJECTIVES OF THE STUDY

The primary objective of this study is to analyses the influence of risk mitigation strategies on SCR in the Petroleum Industry of Pakistan.

1. To study the impact of Risk Avoidance on SCR in the Oil Industry of Pakistan.

2. To analyze the impact of Risk Acceptance on SCR in the Oil Industry of Pakistan.

3. To establish the impact of Risk Reduction on SCR in the Oil Industry of Pakistan.

4. To study the impact of Risk Transfer on SCR in Oil Industry of Pakistan.

5. To observe moderating influence of Managerial regulatory guidelines, directions, and techniques on the impact of risk migration strategies on SCR in Oil Industry of Pakistan.

1.9 RESEARCH QUESTIONS

1. How Risk Avoidance influence on Supply Chain Resilience in the Petroleum Industry in Pakistan?

2. How Risk Acceptance influence on Supply Chain Resilience in the Petroleum Industry in Pakistan?

3. What is the effect of Risk Reduction on Supply Chain Resilience in the Petroleum Industry in Pakistan?

4. What is the effect of Risk Transfer on Supply Chain Resilience in the Oil Industry in Pakistan?

5. How Managerial regulatory guidelines, directions, and techniques moderates the effect of Risk Mitigation Strategies and SCR in Oil Industry of Pakistan?

1.10 THE SCOPE OF THE STUDY

Scope of the study focuses on the Oil Marketing Firms of Pakistan. The companies which are dealing with strong supply chain are the main focus. Risk mitigation strategies' (risk transfer, risk avoidance, risk acceptance, and risk reduction) impact on supply chain resilience of Pakistan was under observation. Major observations were depot managers, and logistics managers.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Theoretical model of SCR, risk mitigation strategies (risk transfer, risk reduction, risk acceptance, and risk avoidance), and moderating effect of management control polices will be developed. Further, explain the "Network Theory, Contingency Theory, and Resource Dependency Theory (RDT)". This chapter concludes with research gaps.

2.2 THEORETICAL FRAMEWORK

Lynham, (2002) explains that a theory is proposals, expectations, and known facts struggling to deliver a rational and reasonable clarification of cause and its effect relations between a crowd of the experiential sensation. This section involves the supply chain as dependent variable, risk mitigation strategies as independent variable, and moderator as management control policies and procedures.

2.2.1 Network Theory

Soonee et al., (2018). study carried out that the networking contains graphs, those boundaries and knots have values. Networking theory can also be applicable and used in sociology, economy, biology, chemistry, and logistics. (Ding et al., 2013; Habibi et al., 2014). Rutherford Aris was the founder of the Networking Theory in 1966. This theory explains the relationship among buyers, sellers, and consumers, in other words all stakeholders (Langfield & Soramäki, 2016).

It is recognized globally that supply chain is branded as complexed network. (Li, 2014) people involve in a chain are bound in a dense relation, every member depends on the next member in the chain and so on. Their communication needs a single platform that combines all of them (Gidengil et al., 2012; Wang et al., 2013). The concept supply chain came from the networking (Hearnshaw & Wilson, 2013). All the resilient supply chains are similar according to the network theory (Hearnshaw & Wilson, 2013). Network theory emphasis on the extended relations among partners rather than

the relations of the firms. (Gidengil et al., 2012) said that companies have to achieve the competitive edge by arranging a resilient supply chain network.

Network theory is fundamentally applied implication of enhancing and dealing with supply chain network (Li, 2014). Consequently, in extreme situation of the supply chain firms can be bankrupted in case of huge disruptions. Companies need to mitigate their risks by preplanning the alternatives of the usual activities. Managers can get the maximum output by learning from the networking theory and can provide maximum security to their firm's reputation and brand.

2.2.2 Contingency Theory

Pennings, (1975) as per the research, there is no finest method for an organization to manage themselves. Every day is a different day and companies need to find a new solution according to the problem. The theory says that there are no fixed standards to solve a problem, conditions are variable so the organizations have to arrange a flexible system (Wong et al., 2020). Contingent leader is required to cope with the daily life problems of an organization with his knowledge and experience to run the daily routine (Grötsch et al., 2013). To adapt different leadership approaches, the leader must be contingent to mold the policies according to the demand. Whenever companies will face the specific or new emerging problem, the managers will be able to minimize the problem before it became the headache. Theory can demolish the any problem at the initial level because of its flexible system and contingent leader (Hemmat Esfe et al., 2015; Lian et al., 2021).

Enterprise Risk Management (ERM) is also applicable in contingency theory to inform about the possible risk occurrence in future, these are the similar practices and approaches towards mitigation methods grounded with contingency agendas as per the specific needs of an organization (Mikes & Kaplan, 2013). Continuous failure of the supplier's commitments leads the supply chain firm to bankruptcies, researchers are purposing the proactive supply chain to minimize the huge losses as per the contingency theory views (Grötsch et al., 2013). This theory is very important for the Pakistani firms to adopt but there are some limitations of this theory namely it could be very expensive in terms of skills and requires top class technology tools, contingent leaders are very expensive, if an organization trains a leader, he might leave the organization. Once an organization adopts the contingency theory, it almost impossible to beat such organization.

2.2.3 Resource Dependence Theory (RDT)

Hillman et al., (2009) introduced the RDT to identify the effect of the alliance that organizations made among themselves (Delke, 2015). (Drees Johannes; & Heugens Pursey, 2013) companies made relationships with surrounding companies to minimize the threats of unwanted events and relay on each other to strengthen their supply chain by exchanging knowledge, raw materials, and suppliers. By forming an alliance, companies develop a pool of suppliers, before putting an order, companies can transparently see each other's position so that they all can maintain a sound supply chain and hence reduce the doubts (Ponomarov, 2012). After building the alliance, resource dependency theory emphasis on the group of companies to grow together in order to fully avoid the risks that they may face in future (Drees & Pursey, 2013). (Hillman et al., 2009) stated that in the beginning, organizations were rivalry but it was mandatory for them to share their resources to survive in the market, later on it became their biggest strength and the alliances move them towards mergers or business partners. These were the strategic actions taken by the organizations to operate globally (Malatesta & Smith, 2014).

All the supply management issues can be solved with the help of resource dependency theory (Delke, 2015). Hence, resource dependency theory can highly reduce the strategy of risk transfer, because when you are working in group of organizations, the risk is divided or transferred among other organizations. Fortunately, in Pakistan these resource dependency theory is already in practice by on a very minor scale.

2.2.4 Risk Avoidance with Supply Chain Resilience

Son & Orchard, (2013) forecasts that supply chain practices in oil industry will become core challenge for the developing countries to maintain the oil prices. Supply chain firms will be costing too much for their services. The study also says that while multinational firms will be increasing the challenges and focusing on the skilled labor, oil companies can't move towards new trends because it requires the sustainability in it. Study established the fact that the current trends like e-commerce, e-procurement, just in time delivery, and proactive stock level management are not in fully practice by the oil companies. E-sourcing is the key to success for the oil marketing firms and highly underdeveloped in the developing countries.

Mnla & Onuoha, (2019) research on the topic of information Communication Technology (ICT) regarding the progress of resilience in the

supply chain. This study focuses on the technological progress in the supply chain to form a resilience and minimize the risks. Few strategic instruments are introduced in the study on the basic level, those are lean production, and elastic corporation to gain resilience in the supply chain. Discoveries of the research will be helpful for the companies to manage the risks through normal towards getting back to normal procedures.

Dehkhoda, (2016) developed a ground work to strengthen the prioritization of a supply chain setups according to the purposed diagram. Risks examination was the fundamental purpose of the study, and execution of the risk management techniques. By providing a solid backing to the decisions makers, risks could be diminishing with the proper actions as per the situations. Risk identification and controlling of the risk was described through a theoretical framework. Researcher established a simulation technique headed to notice the doubts and defined the influence on SC threats proceeding the consequences of the company on the other hand an organization's routine was dignified via the vanished consumers. Risk management structure is mandatory to tackle the unwanted risks in future, concluded the author about his research.

2.2.5 Risk Acceptance and Supply Chain Resilience

Supply chain network are pretty complex especially in Pakistan because of its unstructured roads and poor communication setups. Odds are very high that the disruption will happen on any point of the supply chain. Creation of a unique system towards advancement of the supply chain is the finest solution (Darma, 2018; Shukor et al., 2020).

Constant enhancement is suggested for the supply chain business firms to learn from the new ways and keep learning. Manufacturing firms goal is to expand their entire business globally, through approachability, extraordinary monitoring of the inventory system, and reduce the left-overs. These are only possible with the help of execution of the various innovative philosophies. Once the innovative philosophies are implemented, value addition will positively affect the consumer's satisfaction, overall quality, and operative expenses. According to (Chowdhury et al., 2020), execution of multiple approaches, enhance the information regarding the specific approach and later gives the advantage to the firms to use it in disastrous situations. COVID-19 situation is the perfect example to understand the disruption in an SC.

Cabral et al., (2017) found from the study that dominant firms are paying sharp engagement on risk management to stay on the top. SWOT

analysis of the supply chain defines the leverages of the firms against each other and identifies the weaknesses in the current supply chain. According to the quick innovations in the market, to get the maximum output from the supply chain, it needs mandatory risk valuation, identification, exploration, responsiveness, and proper administration. Major aspects baking the supply chain are employee unions, production failures, processing and designing, over promising, and natural calamities. Inclusive business plans need to be explore and execute as soon as possible to remove the disturbance in the supply chain. Huge amount of finance is needed in the research of supply chain enlargement to from a resilient manufacturing plants in the organizations.

Oil industry of Pakistan have adequate influence on the operative functions of a supply chain management. Technological advancement is the key to success in Pakistan, which is integration as knowledge sharing on a real time to enrich the supply chain resilience and its management (Dai et al., 2019; Hasan et al., 2020; Kim & Shin, 2019). As per the researchers, supply chain firms in Pakistan are facing lots of issues in various sectors of officials to permit the new strategies to minimize the risks.

2.2.6 Risk Reduction and Supply Chain Resilience

Moolgavkar et al., (2014) directs that in petroleum industry, risk mitigation sectors are infrastructure of the petroleum supply chain, broad sessions, and collaboration among industrialists to construct more storage rooms in multiple places to develop color coding of imported oil items to control contaminations.

Urciuoli et al., (2014) studied about the resilience in reference of energetic supply chain of petroleum engineering in European with the help of some case studies. This study was for the European Union (EU) to grow their supply chain resilience by decreasing the inner threats and shape serious actions against the disruptions in advance using the energy. Also studied that energy corporations sorted various number of mitigation strategies namely as protected storages, elastic agreements, ability procedures, carriages, and group divergence.

Chari & Ngcamu, (2017) put some light to mitigate on the disturbances derived from the natural catastrophes. His study describes about the fact that natural disasters can completely destroys the entire supply chain operations in few minutes. Approximate actions and reaction of multiple strategies were identified to interact with the active risks. It also notified about numerous approaches to cope with the supply chain issues like emerging vigorous

alliances among all partners, revising of supply chain connections, preservation of practical storages, priority of technological advancement to share real time knowledge, and risk mitigations.

Udbye, (2014) studied in India to calculate the impact of the managerial strategies on the numerous supply chain risks. Study identifies and evaluate the severity and frequency of the mitigations methods those are executed by the Indian firms. Major focus of the study was on midstream supply and demand of oil which are carriages and temporary storages of petroleum products. Lastly, it raised a red flag against the transportation services, extremely poor arrangement of the roads, unskilled employees, corrupt administrations are the key threats, extraordinary high crime rate, natural calamities, shortage of logistics carriers, and not to forget the terrorism.

2.2.7 Risk Transfer and Supply Chain Resilience

Hajmohammad & Vachon, (2016) explored the strategies on which oil marketing companies are relying. According to the investigation, all the oil marketing firms are focusing on the cost cutting strategy. Technical mergers, and outsourcing of all the supply chain as well as the marketing of the entire frim was outsourced to achieve maximum output from their efforts that they may never gain by working individually.

Sellitto et al., (2015) discovered on the side of suppliers and buyers to boost up the resilience on a supply chain. Purpose of the study was to identify a technique for the suppliers and buyers to contribute in the enhancement of the whole supply chain process. Conclusion of the research was to build a perfect supply chain resilience by improving these three vital zones; significant risk controlling rehearses, information procurements, and strong communication between supplier and the buyer.

Kwak, (2014) worldwide container transportation was studied along with the risk and mitigation tactics. Focus group and sound logistics setup can prevent an organization from the numerous risks and can provide a perfect strategy to manage risky situations. Most penetrating risks in the global supply chain are identified as the actions done by the transportations, improper knowledge sharing, language barriers, and other critical operations ignored by the organization. Every country should analyze its international supply chain issues to strengthen their country’s infrastructure of imported goods by providing them the flexible contracts and proper dedicated security they need. Cooperation of both parties on the worldwide logistics can be highly feasible for the entire supply chain.

Ndolo et al., (2017) explore the supply chain threats of National Oil Corporation of Kenya (NOCK), key attention was the value of networks in a supply chain. In order to create efficient and resilient supply chain that is long lasting, organizations have to focus on establishing an unbreakable network of communication, logistics, and real time data sharing platform. In Kenya, the main problems of a supply chain are including the unskilled labor, poor logistics, unstructured roads, lack of communication, and antique tools and techniques to manage the risks occurred in a supply chain.

2.2.8 Moderating Effect of Managerial Regulatory Guidelines, Directions, and Techniques

Managerial regulatory plans and rules are playing the vital role in mitigating the excessive losses in the SC (Sodhi et al., 2012).

Upper management needs to be involve in building a groundwork of an organization. All the supply chain operations must be visible and under continuous observations by the top management and policy makers to make policies according to the demands of the SC (Rezaee et al., 2017). Probable risks on a supply chain can be control by making the lenient policies towards supply chain and execute those policies in favor of logistics otherwise revise the policy by the upper management to meet the resilience and diminishing the risks (Govindan et al., 2017).

Corporate Stability Board (SCB) supervises all the supply chain and delivers the mandatory suggestions to organizations to shape them accordingly in case of emergencies (Dushie, 2014). Corporate Stability Board also focuses on the supply chain setups to make sure that, businesses are matching the standards of risk mitigation strategies. Reaching at the vigorous level in business, company's procedures must be preparing themselves in the case of broad catastrophic event and how to rescue the entire business on the profitable move (Dushie, 2014).

Ireland et al., (2015) elaborates that with the help of systematic communication setup in a company that unifies the whole supply chain to operate under a single command can beat the risks proactively and uninterrupted evaluation of the whole process must be mandatory by the upper management. (Ireland et al., 2015) also says that integration of a supply chain helps to mitigate the risks and as well as enhances the company to operate its everyday disputes innovatively to reduce the overall costs.

Urciuoli et al., (2014) claimed that appropriate forecasting is a mandatory aspect of any supply chain. Forecasting must be monitor by the top management before making the decisions. An active supply chain guarantees the expense saving, service excellence and precise estimation of the required information, and in time transportation (Rwakira, 2015). According to the observation, organizations depending only on the authorized procedures to be execute into their firms are more likely to carry out the constant enlargement towards the perfection of their supply chain sensitivity (Opoku et al., 2021).

Organizations spread awareness among their staff, trade partners, and their clients to perform according to the supply chain's necessary needs and avoid future misconceptions in the whole process (Opoku et al., 2021). Fundamental purpose of the research is to test the moderating influence of Managerial regulatory guidelines, directions, and techniques on the connections among Supply Chain Resilience and risk mitigation strategies on Oil marketing companies of Pakistan.

2.2.9 Supply Chain Resilience

Capability of getting back to normal routine after disruptions in a supply chain is called supply chain resilience, according to the literature (Carvalho, Azevedo, & Cruz-Machado, 2014; Hosseini et al., 2019). Robustness and quickness are the two dominating characteristics of a resilient supply chain. Proactive monitoring and anticipation towards upcoming potential amendments regarding the supply or the demand shortages and after the proper analysis to maintain resilience is referred to the robustness (Hosseini et al., 2019).

Reactive components of a procedure to find out the variations as compared to the normal supply chain and get back to the steady condition without meeting the major loses is referred to the quickness (Ali et al., 2017; Wieland & Wallenburg, 2013). To avoid long distances and malfunctioning of the entire supply chain, companies are investing too much to stay ahead and to build resilience in the supply chain (Ivanov et al., 2017). (Barasa, 2016) illustrated about the numerous empirical researches on the topic of supply chain resilience that the significance of the elasticity, reliability, quality, and budget compensation.

Companies are trying to achieve the above mention techniques with all the assets they already have for their supply chain (Barasa, 2016). Oil marketing firms are proactively exploring the possible risks in order to strengthen their whole supply chain operations in all over the world (Rajesh

et al., 2015). Gaining the maximum market value, excellent commitment in service delivery, and competitive products as per the customer's happiness are the key features of a successful supply chain resilience (Hemmat et al., 2015).

Rwakira, (2015) to attain the competitive advantage against the competitors, creation of a resilient SC is the key. Company's growth can be examined by the level of client's satisfactions, that will be only gain if we know the expectations of our customers. The amount of goods sold in the market is the ultimate indicator of the fulfilment of the customer's need (Nobre & Silva, 2014). Placement, price, product, promotion, positioning, and packaging are the aspects fluctuate among the customer's satisfaction (Hossain et al., 2020).

Bimha et al., (2020) Empirical researches connects the dots about customer satisfaction in terms of financial benefits, customer retention, and the loyalty. Needs and wants of the customers are the key characteristics of the goods and services. (Iskandar et al., 2022) studied about the behavior of the specific customer satisfaction, stated that beyond or under expectations will determine the overall satisfaction.

Barasa, (2016) explore that there is a positive significant relationship among organizational performance and excellence of a supply chain. Insignificant amount of sale can reflect the entire sales probability and that will be the fundamental factor of a firm's share in the market (Fernandes et al., 2022). With the growth in the market by selling more goods reflects the excellence of the company. A company must have to achieve the advantages against the giant firms to survive in the market. Other firms may look into the other directions (Fernandes et al., 2022). Note down that, the market shares and the customer satisfaction is an ordinary unit of competitiveness and organizational routine operations.

2.3 DEFINITIONS OF THE CONSTRUCTS

Table 2.1
Definitions of the Constructs

Risk Acceptance:	Risk acceptance is a reactive strategy where the risk is simply retained without any action into the risk situation other than budgeting allocation for control and contingency plans to deal with risk events if it occurs.	(Sodhi et al., 2012)
Risk Avoidance:	Risk avoidance is a strategy that entails eradicating of possible risks by avoiding or retracting from the risky situation. It is therefore designed to move the source of risk likelihood to zero which is attained through avoidance or eliminating the source of risk.	(Hajmohammad & Vachon, 2016)
Risk Management:	It is an approach that entails risk identification, evaluation, measurement and prioritization of risks followed by resource deployment to reduce or eliminate the risk, then monitor and control possibility of occurrence and or the consequences that the risk may cause and enhance achievement of opportunities.	(Antunes & Gonzalez, 2015; Wanjiru, 2013).
Risk Mitigation:	Risk Mitigation is a strategy that involves putting in requisite necessary steps to remove or minimize the undesirable impact of risks which can be done through risk avoidance, risk acceptance, risk transfer and risk reduction.	(Talluri et al., 2013)
Risk Reduction:	Risk reduction means either relative or total risk reduction and may entail strategies that include Disaster Risk Reduction, collaboration, Safety Integrity Level and diversification.	(Menoni et al., 2012)
Risk Transfer:	Risk Transfer is changing the burden of risk of an entity responsible of managing risk to another party who may either be in a better position to manage the risk or proper owner of the risk.	(Carletti, 2005)
Risk:	Risk is the probability of occurrence of harm, injury, loss, hazard, threat, damage or any other adverse event.	(Neal & Griffin, 2006)
Supply Chain Resilience:	Supply Chain Resilience involves ensuring prompt, effective response and regaining from risk event to a desired level or a better operational performance level.	(Carvalho, Azevedo, & Machado, 2014)

2.4 RESEARCH GAPS

Pakistan have very few oil refineries and those refineries can't fulfil the needs of the whole country. Pakistan have to import the oil from different countries like Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and South Africa. The total petroleum import budget of 2021 to 2022 was 610 Billion RS. Total amount of oil imported in 2020 was 7.86 Million barrels of petroleum per day including the crude oil (Yaqoob et al., 2021). The oil sector of developing countries is clearly unexplored as per the complex supply chain system and this system became unreliable and cause disruptions in the overall supply chain of the country (Ellram, 2013; Robertson, 2016; Rwakira, 2015). Unluckily, Pakistan is unsuccessful towards executing the technological advancement to consume the substitute energies. Very few projects of solar energy producers are fitted in the multiple areas of the country (Rafique & Bahaidarah, 2019), wind (Yaqoob et al., 2020), and biomass (Atabani et al., 2012). Developing countries have very low standards against the consumption of petroleum goods, that is the reason too much oil and gas is being used as per the European Union (EU) recommendations and that badly destroys the atmosphere and living standards of a country. (Migliori et al., 2018) Authoritative research on management of risk strategies usefulness in the upstream oil sector of Pakistani supply chain was supported. Manufacturing and investigation of the oil is referred to the upstream petroleum section.

2.5 CONCEPTUAL FRAMEWORK

Graphical representation of the variables under study by the researcher is called conceptual framework. It shows the relations of each other variable and identifies the independent variables, dependent variables, mediating variables, and moderating variables. The framework demonstrations is mandatory to understand the whole concept of the model (Kovács & Spens, 2005). Under observed variables and constructs are revised through practical literature and theories to develop a conceptual framework. Different stages of the risks are analyzed to prepare an organization in advance to execute the mitigating strategies to oppose the future risks (Comas-herrera et al., 2021). Study pursued that the influence of risk transfer, risk avoidance, risk acceptance, and risk reduction disturbs the SCR. Second pursuit of the study was to test the moderation of managerial regulatory, guidelines, and actions on the connection between SCR and risk mitigation strategies. Conceptual framework and the relations are shown below.

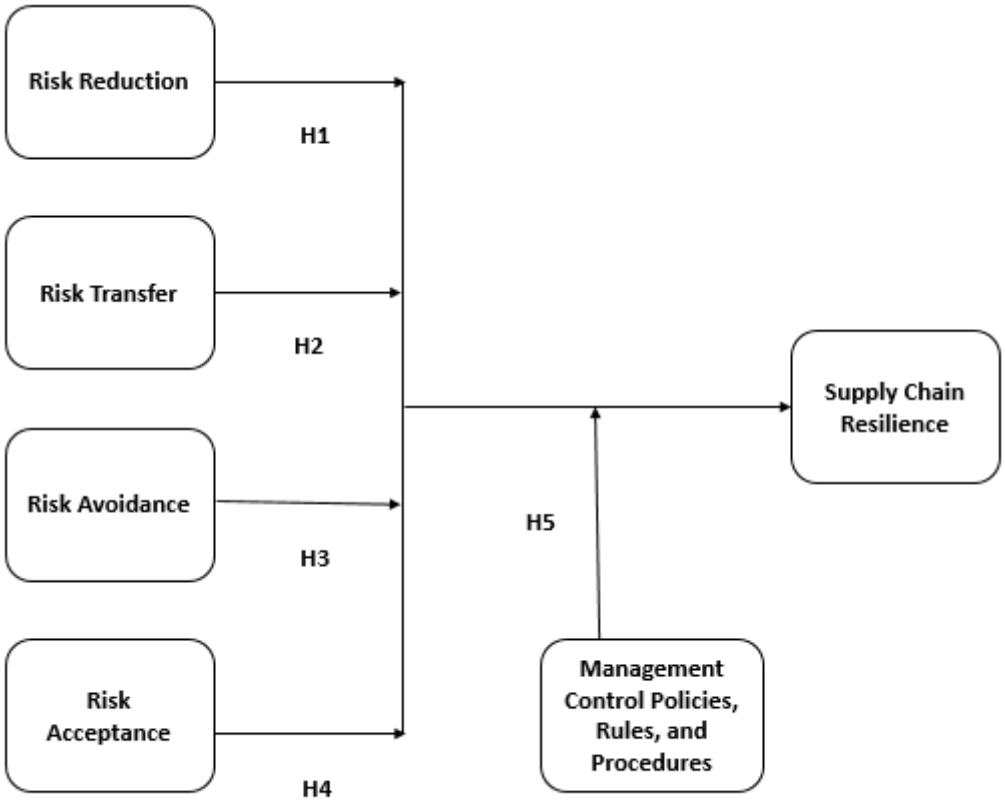


Figure 2.1: Model

2.6 RESEARCH HYPOTHESES

H1: Risk Avoidance contains a positive effect on SCR in the Oil Business of Pakistan.

H2: Risk Acceptance contains a positive effect on SCR in the oil Business of Pakistan.

H3: Risk Reduction contains a positive effect on SCR in the oil Business of Pakistan.

H4: Risk Transfer contains a positive effect on SCR in the oil Business of Pakistan.

H5: Managerial regulatory guidelines, directions, and techniques moderates positively the influence of Risk Mitigation Strategies and SCR in oil business of Pakistan.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Current section describes the methodological techniques utilized during the whole research process. Structure of the research, population targeted for the research, methods of sampling, and philosophies. This part also focuses on the research onion, data collections, data analyses, instrument, reliability and validity of the instrument, testing of hypothesis, and in the end the presentation of data gathered.

3.2 RESEARCH ONION

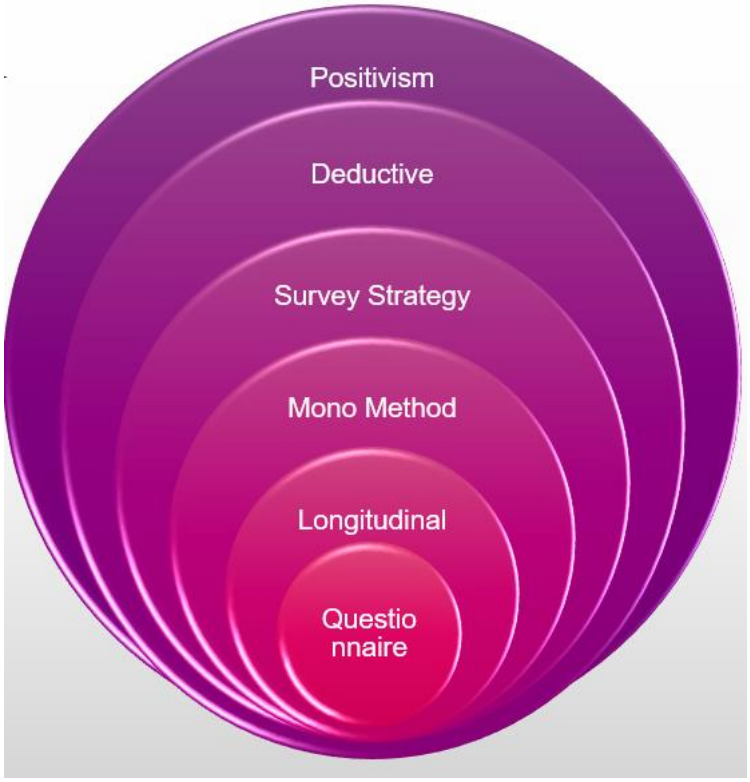


Figure 3.1: Research Onion

3.3 RESEARCH APPROACHES

In the second layer of the research onion, there are two types of approaches; first is deductive approach and the second one is inductive

approaches. The deductive approach deals with theories extract from theory evaluating the hypothesis, and them making inference by examining the findings of the tested theory. An inductive analysis follows a step-by-step process that includes observation, sequence, tentative conclusion, and eventually theory. According (Kovács & Spens, 2005) an inductive approach is linked with "intuitive" approaches in future research, whereas deductive reasoning, regarding physical arguments, is meant to regulate processes and direct information. In this research, the deductive approach is used. Whereas a conceptual model is built with the support of literature reviews and hypotheses, the development research framework is put to the test using primary data and methodological techniques.

3.4 RESEARCH DESIGN

Comprehensive report of the explored area of research is referred to be as the research design. Writing the final report of the entire research, procedure regarding the data collections, and handling of the selected instrument are the key features of the research design (Nassaji, 2015). Correlation was the most accurate way to study the variables with the support of descriptive research design. A technique used to unfold the connections and nature of the constructs in multiple settings (Nassaji, 2015).

3.5 TIME HORIZON

This study shows time horizon is the time in which the research design to complete research. In the research literature, this concept is divided into two categories longitudinal research, and cross-sectional study

Longitudinal and cross-sectional are the two basic time horizons used by the researchers in all over the world. Cross-sectional techniques collect the data only one time and related to the short term research method and on the other hand, longitudinal technique collects the data multiple time to minimize the biasness and used for the long term research (Neal & Griffin, 2006). Current study used the cross-sectional time horizon because it only collects the data once.

3.6 SCALES TO BE USED

Table 3.1
Scales

Sr.	Variable Names	Variable Type	Scale e.g.	No. of items	Source
1	Risk Reduction	Independent	Supply Chain Collaboration	7	(Saaty, 1994)
2	Risk Transfer	Independent	Creation of Contraction	7	(Saaty, 1994)
3	Risk Avoidance	Independent	Information Technology	9	(Saaty, 1994)
4	Risk Acceptance	Independent	Contingency Plans	7	(Saaty, 1994)
5	Managerial Regulatory, Guidelines, and Actions	Moderator	Business Continuity	6	(Lambaino, 2019)
6	Supply Chain Resilience	Dependent	Customer Retention	9	(Pettit, 2008)

3.7 RESEARCH PHILOSOPHY

It is pattern that shows the foundation of the study and sources of the knowledge to establish a research (Scotland, 2012). Three types of research philosophies are used for the research that are realism, positivism, and interpretivism. The research philosophies refer to different beliefs or the different views about the topic chosen that resolve design, the process, techniques, strategies, techniques of investing the nature of knowledge on the construct (Lupton, 2017). This study used the positivism philosophical world view because the study is on a business problem, and the method used for the research is quantitative.

3.8 TARGET POPULATION

Table 3.2
Target Population

Country Wide Retail Outlets				
Sr. No	**OMC**	**FY-19**	**FY-20**	**Per% Share-FY20**
1	PSO	3,468	3,500	40.7%
2	Shell	784	700	8.1%
3	Total	793	800	9.3%
4	Hascol	700	571	6.6%
5	Attock	672	702	8.2%
6	G&O	500	600	7.0%
7	Puma	470	470	5.5%
8	Askar	394	394	4.6%
9	Byco	377	393	4.6%
10	BE	337	350	4.1%
11	Zoom	43	43	0.5%
12	Q1	33	30	0.3%
13	Al-Noor	17	17	0.2%
14	Exceed	13	13	0.2%
15	Horizon	11	11	0.1%
	Total Petrol Stations	**8,612**	**8,594**	100%

Those objects having homogeneous qualities can be selected for a specific research (Gidengil et al., 2012). Only the registered Oil marketing firms of Pakistan was the target and in particular, supply chain logistics officers, and depot managers having the vigorous knowledge of the petroleum supply chain.

3.9 SAMPLING

3.9.1 Sampling Frame

All the suitable objects that the researcher can utilize for his research are referred as the sampling frame (Fuller et al., 2016). This particular research was targeting only the registered oil marketing firms in Pakistan, those are only fifteen.

3.9.2 Sample Size

Number of objects in the sample are referred as sample size. These objects must be selected without any biasedness for the better results (Hemmat et al., 2015). (Bryman, 2011) explored that vast amount of sample size is certainly not the sign of accuracy. Highly complex data in nature needs minimum of 200 sample size and to gain the assurance on the data, adequate size of data must be gathered (Kothari, 2004).

Table 3.3
Sample Size

Oil Marketing Companies	Oil Marketing Company's Respondents	Total target respondents (Depot Managers and SC/Logistics Managers)
15	**15**	**225**

3.9.3 Sampling Technique

Hafizah et al., (2014) Nearly all the exploratory researches practice the convenience sampling. Convenience sampling is very easy for the researcher to reach out to the respondents and have the questionnaires filled very quickly, and extremely inexpensive (Khalid et al., 2012). This study also used the convenience sampling.

3.10 DATA COLLECTION INSTRUMENTS

To get the answers of the research questions, a researcher needs a technique such as tests, questionnaire, interviews, and or others (Lawal et al., 2013). All the details of the data collection settings are predefined for the better results of the research (Choy, 2014). Questionnaire is favorable in most of the exploratory researches because it allows the researchers to obtain first hand data to meet the competence in the research (Boone, 2012).

3.11 DATA COLLECTION PROCEDURES

An organized technique to gather the data from the respondents to achieve the overall purpose of the research is referred to as data collection procedure (Choy, 2014).

The questionnaires were presented with the permission letter of the university. Another letter was also presented before the questionnaire, stating the whole purpose of the research and explanation regarding the questionnaire. Data confidentiality was promised and field work was led with the help of an assistant, the assistant was also a research student.

3.12 VALIDITY OF RESEARCH INSTRUMENTS

Preciseness of the model in a qualitative study is referred to as validity of the research instrument (Heale & Twycross, 2015).

Types of validities are construct validity, content validity, and criterion validity. It is an assessment of the instrument that what exactly we need to explore and is the instrument matches our need or not. There are three kinds of validities, those are Criterion validity, it determines the future of the instrument by checking into the similar situations and gain the similar results, construct validity, it determines the implications of the instrument by checking the test scores obtained through the instrument, and content validity, it determines the consummations of the instrument by checking the fundamentals that whether it contain all the characteristics of the hypothesis under study (Heale & Twycross, 2015).

3.13 ETHICAL CONCERNS

All organizations involved authorities were asked for approval in advance. The respondent’s approval was obtained in the future before they answered the survey. The research attempted to protect the privacy and secrecy of the respondents. The gathered information was not manipulated.

CHAPTER 4

DATA ANALYSIS

4.1 INTRODUCTION

This section aims to provide the data analysis conducted with the statistical package of social sciences (SPSS) and analysis of moment structure (AMOS), to test the entire concept under discussion. The use of basic advancement for examination to perform, such as data screening, treatment and identifying missing values, multivariate abnormalities, section profile of the exploration members, and correlation relation. Structural equation modeling (SEM) is also used to determine the reliability of variables. This section also includes structural modeling and model suitability for research.

4.2 DATA ANALYSIS TECHNIQUES

Table 4.1
Analysis Techniques

Objective	Data Analysis Techniques
Normality Test for Data	Normal Curve Distribution
Data Reliability Test	Cronbach Alpha
Outlier Test	Skewness and Kurtosis
	Regression
Correlation Analysis	Pearson Correlation Coefficient
Data trend, Mean, Standard Deviation Hypothesis Testing	Descriptive Statistics

4.3 DESCRIPTIVE STATISTICS OF STUDY VARIABLES

Descriptive of this study shows minimum, maximum values, mean and standard deviation of constructs under this study.

Table 4.2
Descriptive Statistics

Constructs	N	Minimum	Maximum	Mean	Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic
M_RA	255	1	4.75	3.071	0.77623	0.603
M_RAC	255	1	4.5	3.228	0.76503	0.585
M_RR	255	1	4.71	3.4001	0.75851	0.575
M_RT	255	1	4.43	3.2479	0.71308	0.508
M_ME	255	1	4.67	3.1303	0.87427	0.764
M_SCR	255	1	4.11	2.6441	0.7722	0.596
Valid N (list wise)	255					

4.4 FREQUENCY ANALYSIS OF DEMOGRAPHIC VARIABLE

Frequency analysis was used to examine the demographic features of respondents, such as experience, education, and job designation. Out of 255 respondents, the majority 31.8% were between 11-15 years of experienced, 23.5% were less than 5 years of experienced, 28.6% were between 6-10 years of experienced, whereas 16 years and above experienced were only 16.1%, according to the frequency analysis. 30.2% of respondents had Matric's degree, 14.1% had Intermediate's degree, 28.2% had Bachelor's degree, 13.3% had Master's degree, and only 7.1% respondents had PHD and Professional Qualification. 18.4 % of respondents were working as logistics manager, 33.7% were depot manager, 27.1% were supply chain manager, and 20.8% were belongs to the similar departments, out of 255 respondents. 70% data was gathered from highly educated respondents.

4.4.1 Experience

Table 4.3
Experience

Category	Frequency	Percent
Less than 5 Years	60	23.5
6-10 Years	73	28.6
11-15 Years	81	31.8
16 Years and Above	41	16.1
Total	**255**	**100.0**

4.4.2 Education

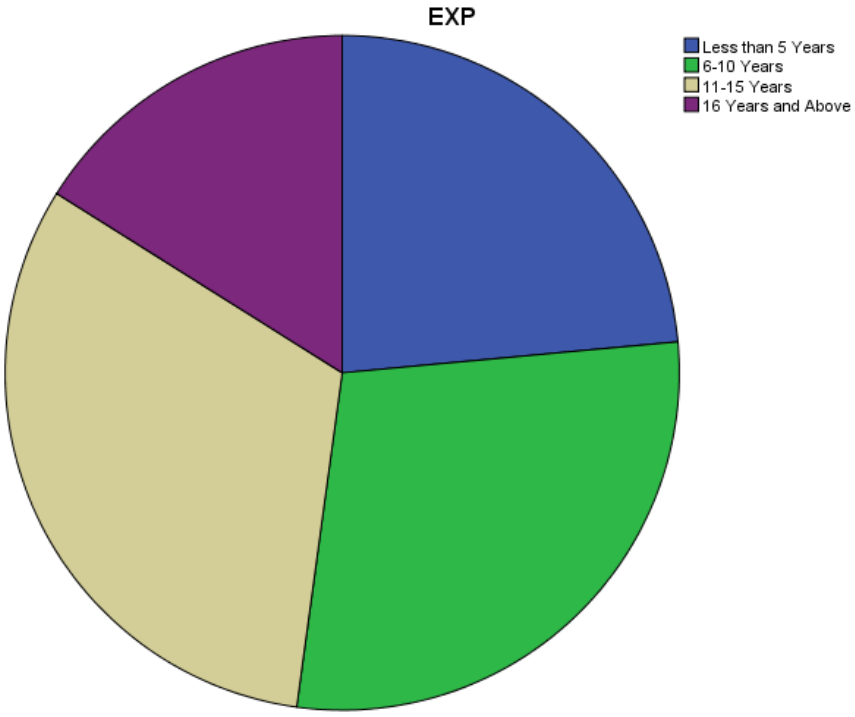
Table 4.4
Education

Category	Frequency	Percent
Matric	77	30.2
Intermediate	36	14.1
Bachelor	72	28.2
Masters	34	13.3
PhD	18	7.1
Professional Qualification	18	7.1
Total	**255**	**100.0**

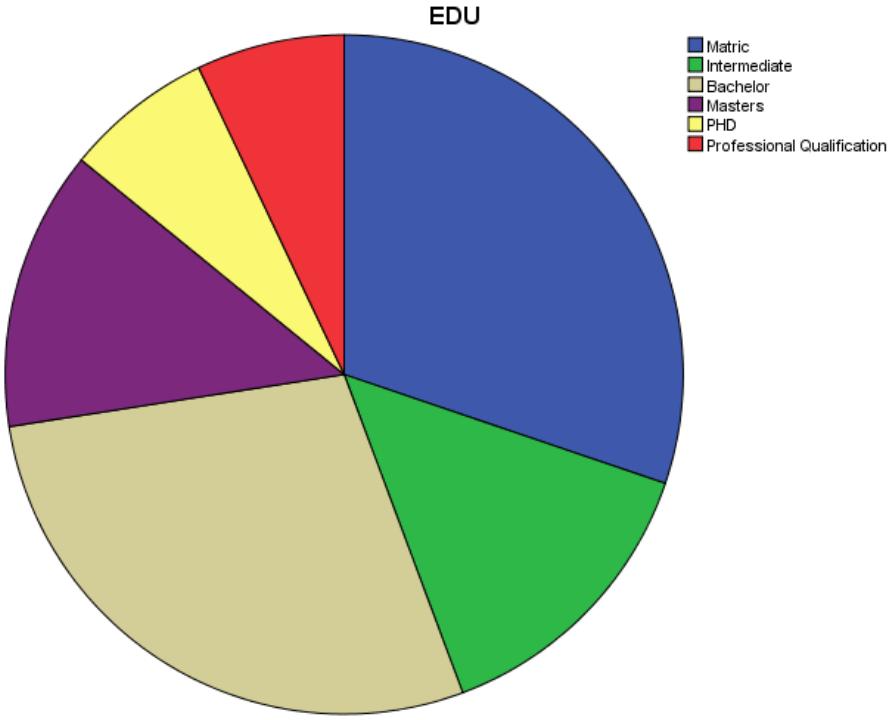
4.4.3 Designation

Table 4.5
Designation

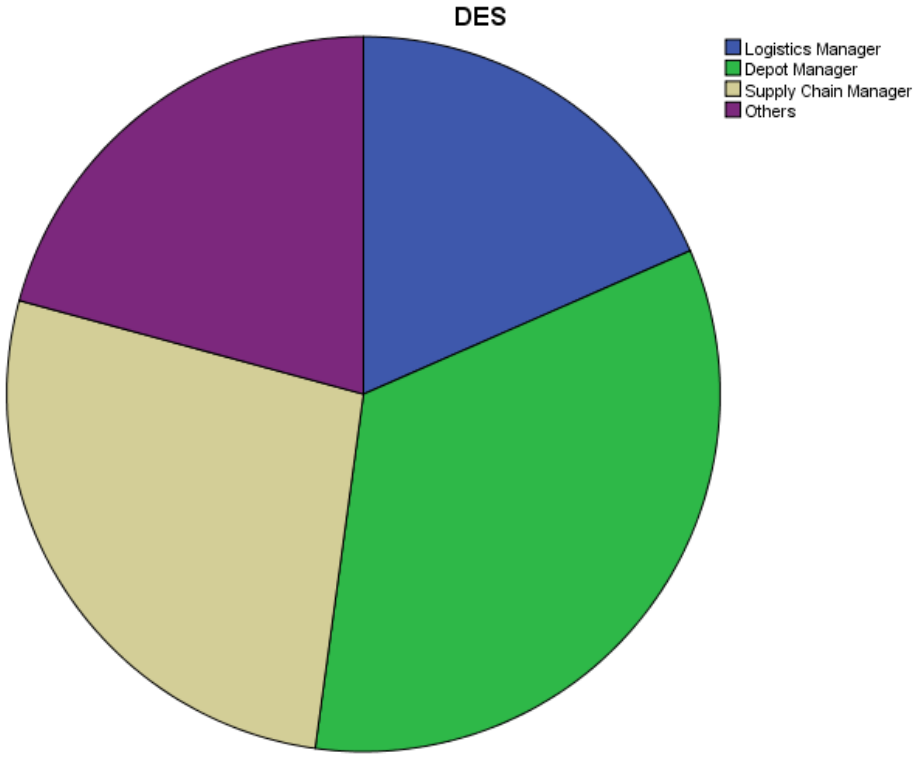
Category	Frequency	Percent
Logistics Manager	47	18.4
Depot Manager	86	33.7
Supply Chain Manager	69	27.1
Others	53	20.8
Total	**255**	**100.0**



Graph 1: Experience



Graph 2: Education



Graph 3: Designation

4.5 MULTIVARIATE OUTLIERS

Identification and treatment of outliers are necessary when examining distinct statistical findings to prevent their influence on the variables, such as standard errors and model fit. Irregularities are typically predicated in big sample sizes; therefore, extreme caution should be exercised while running datasets. To find outliers, utilize the Mahalanobis separation test. It expressed the distance between a data point and the center, which is computed in a variety of contexts, with the data point being the mean of the components being evaluated. The use of the Mahalanobis test found zero value, indicating that the data size was too short. After the test, remove 0 items, the 255 responses were assessed for further study.

4.6 RELIABILITY ANALYSIS

Reliability analysis analyzed the internal coherence of risk avoidance, risk acceptance, risk reduction, and risk transfer. Moderator as management control policies, rules, and procedures. Dependent as supply chain resilience. The value of Cronbach's alpha is rated as "outstanding" as mentioned in (Kline et al., 1998) if equal to or above 0.90. An Alpha-value of 0.80 is considered "very good" whereas an alpha value of about 0.70 is considered "sufficient". Table showed that all variables are in acceptable range had the alpha value of 0.70. An alpha value of all variables in the risk avoidance α= .801, risk acceptance α= .727, risk reduction α= .873, risk transfer α=.731, Moderator (management control policies, rules, and procedures) α=.866, Dependent (supply chain resilience) α=.894.

Table 4.6
Reliability Analysis

Constructs	No. of Items	Cronbach's Alpha	Level of Reliability
RA	8	0.801	Good
RAC	6	0.727	Acceptable
RR	7	0.873	Good
RT	7	0.731	Acceptable
ME	6	0.866	Good
SCR	9	0.894	Good

(Gliem, 2003) highlighted the ranges of reliability e.g, >=.9 excellent, >=.8 Good, >.7 Acceptable, >=.6 Questionable, >=.5 Poor, <= .5 Unacceptable.

4.7 CORRELATION OF VARIABLES

Bivariate Pearson correlation analysis between major variables like risk avoidance, risk acceptance, risk reduction, and risk transfer. Moderator as Managerial regulatory guidelines, directions, and techniques. Dependent as SCR. The demographic features of participants including experience, education, and designation were measured before hypothesis testing. Table shows the correlation measurement of all the variables using SPSS 24. The measured values indicated all of the variables have a significant relationship because all values are statistically significant at the level of 0.001. Additionally, in the correlation matrix if a variable has negative relation it indicates one variable value increases so the opposite variable value will be decreased. On the other hand, if the relationship is positive significant which means if one variable value increases the other also increases. The correlation study showed that the connection of in line with our hypothesis proposals.

Table 4.7
Correlation of Variables

Sr.		1	2	3	4	5	6
1	Risk Avoidance	1					
2	Risk Acceptance	.575**	1				
3	Risk Reduction	.289**	.466**	1			
4	Risk Transfer	.621**	.455**	.201**	1		
5	Management control, Policies, Rules, and Procedures	.480**	.722**	.591**	.335**	1	
6	Supply Chain Resilience	.401**	.573**	.325**	.338**	.479**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Above table 4 shows the correlations results of the variables under study.

There is a significant positive correlation between risk avoidance and supply chain resilience (.401**).

There is a significant positive correlation between risk acceptance and supply chain resilience (.573**).

There is a significant positive correlation between risk reduction and supply chain resilience (.325**).

There is a significant positive correlation between risk transfer and supply chain resilience (.338**).

There is a significant positive correlation between Managerial regulatory guidelines, instructions, and actions and supply chain resilience (.479**).

4.7.1 With Moderator

There is a significant positive correlation between risk avoidance and Managerial regulatory guidelines, instructions, and actions (.480**).

There is a significant positive correlation between risk acceptance and Managerial regulatory guidelines, instructions, and actions (.722**).

There is a significant positive correlation between risk reduction and Managerial regulatory guidelines, instructions, and actions (.591**).

There is a significant positive correlation between risk transfer and Managerial regulatory guidelines, instructions, and actions (.335**).

4.8 FACTOR ANALYSIS:

4.8.1 Measure of Sampling Adequacy

KMO and Bartlett's Test

PCA (principal component analysis) with varimax was used to perform factor analysis on data gathered from 255 respondents. To assess the suitability of variables, KMO and Bartlett’s tests were used. The KMO value is .804, show in Table which exceeds the necessary value of 0.60 as advised by (Kaiser & Derflinger, 1990).

4.8.2 KMO and Bartlett's Test

Table 4.8
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.804
Bartlett's Test of Sphericity	Approx. Chi-Square	634.391
	Df	15
	Sig.	.000

4.8.3 Communalities Analysis

Table 4.9
Communalities Analysis

Items	Factor Loadings	Cronbach's Alpha (α)
Risk Avoidance		
RA1	0.895	0.801
RA2	0.815	
RA3	0.693	
RA4	0.656	
RA5	0.456	
RA6	0.553	
RA7	0.895	
RA8	0.815	
Risk Acceptance		
RAC1	0.469	0.727
RAC2	0.607	
RAC3	0.72	
RAC4	0.952	
RAC5	0.72	
RAC6	0.952	
Risk Reduction		
RR1	0.861	0.873
RR2	0.743	
RR3	0.648	
RR4	0.861	
RR5	0.778	
RR6	0.648	
RR7	0.831	
Risk Transfer		
RT1	0.696	0.731
RT2	0.495	
RT3	0.347	
RT4	0.251	
RT5	0.395	
RT6	0.617	
RT7	0.76	
Management Control Policies and Procedure		
ME1	0.814	0.866
ME2	0.841	
ME3	0.952	
ME4	0.814	
ME5	0.841	
ME6	0.952	

Items	Factor Loadings	Cronbach's Alpha (α)
Supply Chain Resilience		
SCR1	0.685	0.894
SCR2	0.772	
SCR3	0.621	
SCR4	0.72	
SCR5	0.605	
SCR6	0.685	
SCR7	0.772	
SCR8	0.621	
SCR9	0.72	

The study needs to investigate the reliability and the validity of all the scales used in the study (Spruijt-Metz et al., 2010). In order to examine the reliability and validity, Coronbach's alpha was used. Furthermore, this study's constructs reliability was examined through Coronbach's Alpha value and CFA. According to the (Gliem, 2003) rule of thumb that Coronbach's Alpha value "≥ 0.9 – Excellent, ≥ 0.8 – Good, ≥ 0.7 – Acceptable, ≥ 0.6 – Questionable, ≥ 0.5 – Poor, and ≤ Unacceptable". By considering the above defined rule of thumb, the Coronbach's alpha values of all study's instrument were "good" for RA, RAC, RR, RT, ME, and SCR (as shown in the Table)

4.9 STRUCTURAL EQUATION MODEL (SEM)

4.9.1 Measurement Model

The measurement model provides the facility to the participant to measure the relationship between the constructs and the observed variables. After developing a measurement model, the values of its fit summary are needed to be explained in its parameter list; this section shows the goodness of fit values and their recommended values. After testing the measurement model another model (structural equation model) is developed to test the hypothesis. This study sketched that model by using AMOS v24 software. SEM presents the structural relationships among risk mitigation strategies and SCR. The study structural equation model is given below.

The validity construct and CFA were used to examine the measuring model (Srivastava, 2020) evaluate model demonstrated how observable components are dependent on composite and unobserved variables. Furthermore, (Sarstedt, 2018) defined a model as an example in which all measurements are loaded on a single variable. As a result, the model is estimated in two stages, the first using the multi-dimensionality of research

variables through CFA and the second utilizing validity and reliability examination.

The standard values for model fitness are presented by previous scholars such as (Septiani et al., 2017) recommended that if CFI value is high then it reflects better results for the model fit, and for GFI and AGFI the values must be either equal to 0.90 or must be greater than 0.90 and RMSEA value must be less than 0.08. They further argued that Normed Fit Index (NFI) value must be equal to or greater than 0.90 and Chi-square/df (x/df) value must be less than 5.

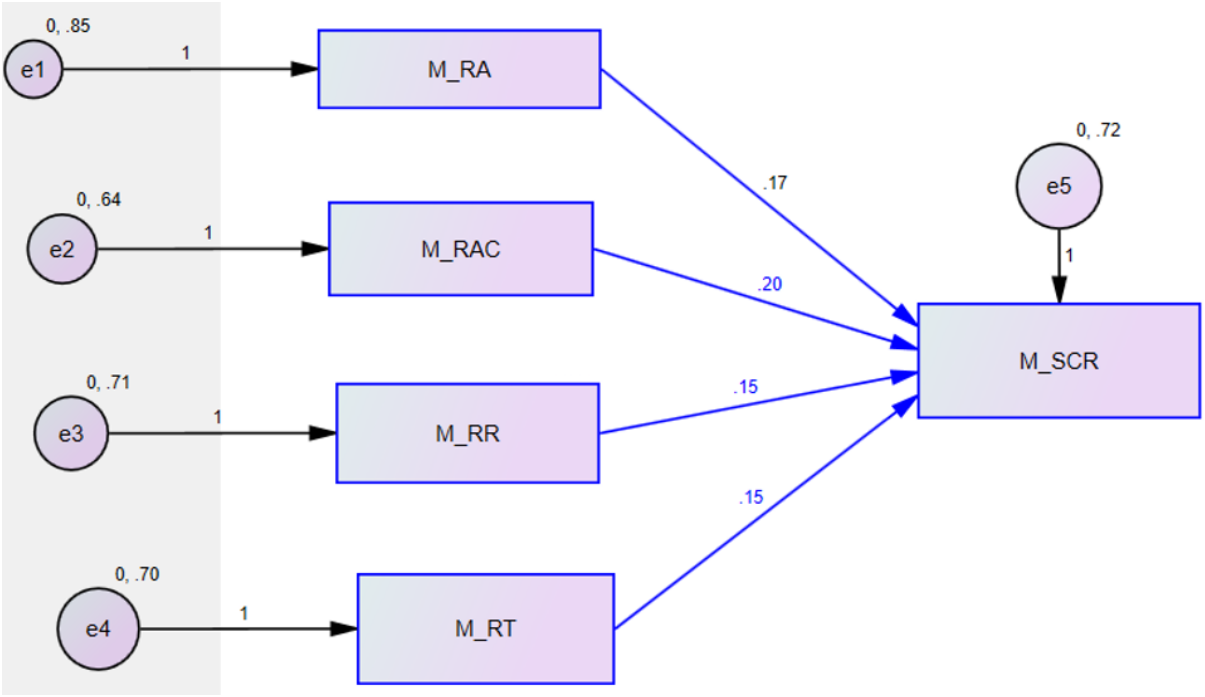


Figure 4.1: Structural Equation Model

The measurement model is fit or not it's come to know from model fit values i.e (CFI, GFI, AGFI, X2/d.f, RMSEA, RMR, NFR, PClOSE, etc). Following Table, the scores have shown about resulting values of the measurement model regarding this study of recommended values.

4.9.2 Model Fit Summary for Structural Equation Model

Table 4.10
Model Fit Summary

Model Fit Summary for Structural Equation Model

Fit indices	Recommended value	Result
X^2/d.f.	< 5	3.399
GFI (goodness of fit index)	> 0.9	0.998
AGFI (adjusted goodness of fit index)	> 0.80	.957
RMSEA (root mean square error of approximation)	< 0.08	0.062
RMR (root mean square residual)	< 0.08	0.001
NFI (normed fit index)	> 0.90	0.998
CFI (comparative fit index)	> 0.95	0.999

Table shows all of the resulting values are significant and indicate that the model is well-fit (Kline, 2015).

4.9.3 Standardized Regression Weight for Structural Equation Model

Table shows the regression weight for constructs and that are significant for all the theoretical relationships. It is important to note that the path in the structural equation model is significant for all the relationships because the resulting p-value for all the constructs is less than 0.05.

Table 4.11
Standardized Regression

Path of Variables			Estimate	p-value
M_SCR.	<---	M_RA	.173	***
M_SCR.	<---	M_RAC	.207	***
M_SCR.	<---	M_RR	.150	.006
M_SCR.	<---	M_RT	.150	.007

4.10 MODERATION ANALYSIS

In order to analyze the moderator's effect, it is examined that whether the regression of X on Y differs across variable Z, through evaluating that the regression product (XZ) is significantly different from zero (Preacher et al., 2016). This interaction is created by multiplying the IV (independent variables) and MV (moderator variable) together after both have been centered to have a mean of zero (0). If results shown a significant interaction, the moderator is supported. It can be confirmed by using regression analysis (using interaction term). Table reflects the status of the hypotheses depicting moderation analysis.

4.10.1 Regression Weights for Moderation

Table 4.12
Regression Weights for Moderation

Path of Variables			Estimate	p-value	Supported
M_SCR.	<---	M_MExM_RA	.037	.007	Yes
M_SCR.	<---	M_MExM_RAC	.076	***	Yes
M_SCR.	<---	M_MExM_RR	.042	.002	Yes
M_SCR.	<---	M_MExM_RT	.079	***	Yes

Table shows different values of (β and p) to test the moderation effect of risk mitigation strategies (risk avoidance, risk acceptance, risk transfer, and risk reduction) on SCR. M_MExM_RA --------> M_SCR (β = 0.037 and p = 0.007), M_MExM_RAC ----> M_SCR (β = 0.76 and p = 0.000), M_MExM_RR-----> M_SCR (β = 0.042 and p = 0.002), and M_MExM_RT----> M_SCR (β = 0.079 and p = 0.000). From the above values, the β value is positive, and the p value is significant for moderator variable. So, results show that risk mitigation strategies are positively moderates the supply chain resilience.

4.11 MODERATION BETWEEN RISK AVOIDANCE AND SUPPLY CHAIN RESILIENCE

4.11.1 Moderation between Risk Avoidance and Supply Chain Resilience

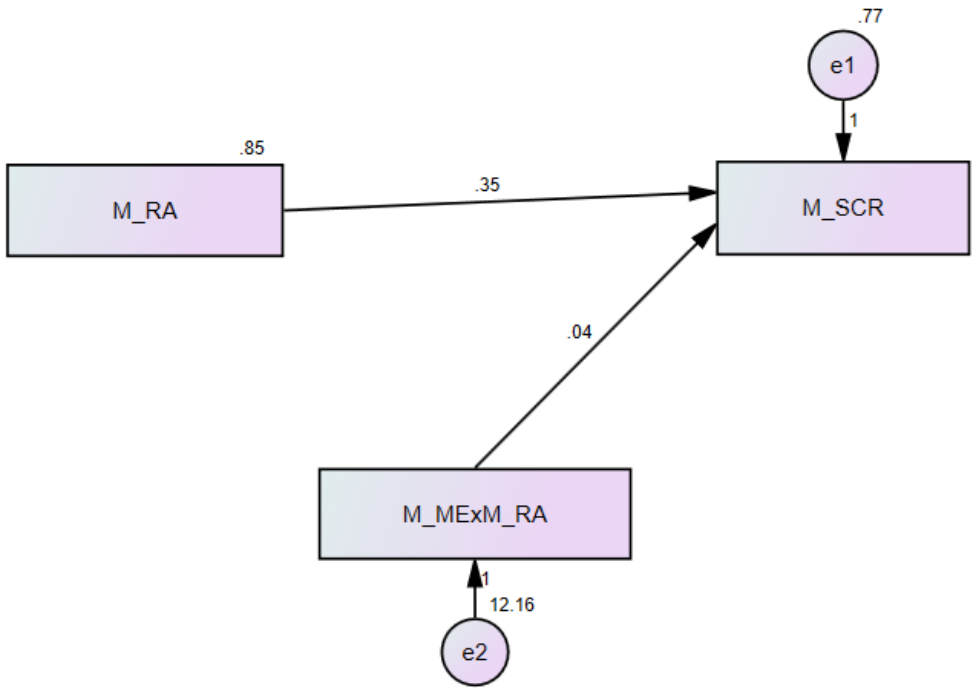


Figure 4.2: Risk Avoidance with Supply Chain Resilience

Table 4.13
Risk Avoidance and Supply Chain Resilience

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
M_SCR	<---	M_RA	.352	.051	6.857	***	
M_SCR	<---	M_MExM_RA	.037	.014	2.710	.007	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
M_RA	.848	.065	13.115	***	
e2	12.158	.927	13.115	***	
e1	.767	.059	13.115	***	

4.11.2 Moderation between Risk Acceptance and Supply Chain Resilience

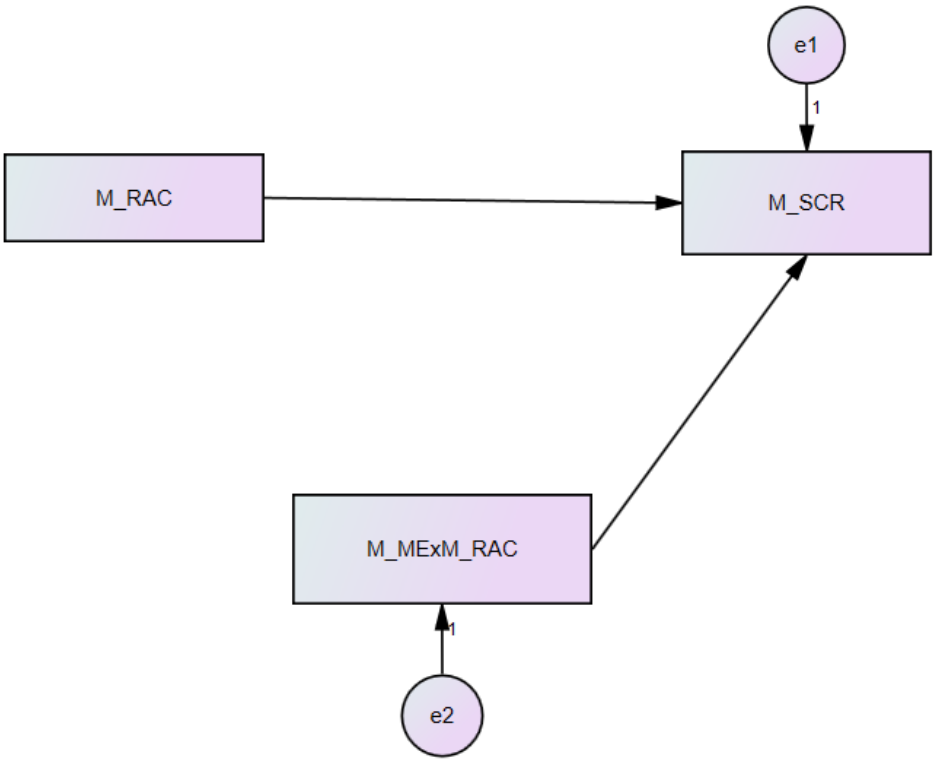


Figure 4.3: Risk Acceptance and Supply Chain Resilience

Table 4.14
Risk Acceptance and Supply Chain Resilience

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
M_SCR	<---	M_RAC	.360	.057	6.282	***	
M_SCR	<---	M_MExM_RAC	.076	.013	5.817	***	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
M_RAC	.642	.049	13.115	***	
e2	12.244	.934	13.115	***	
e1	.726	.055	13.115	***	

4.11.3 Moderation between Risk Reduction and SCR

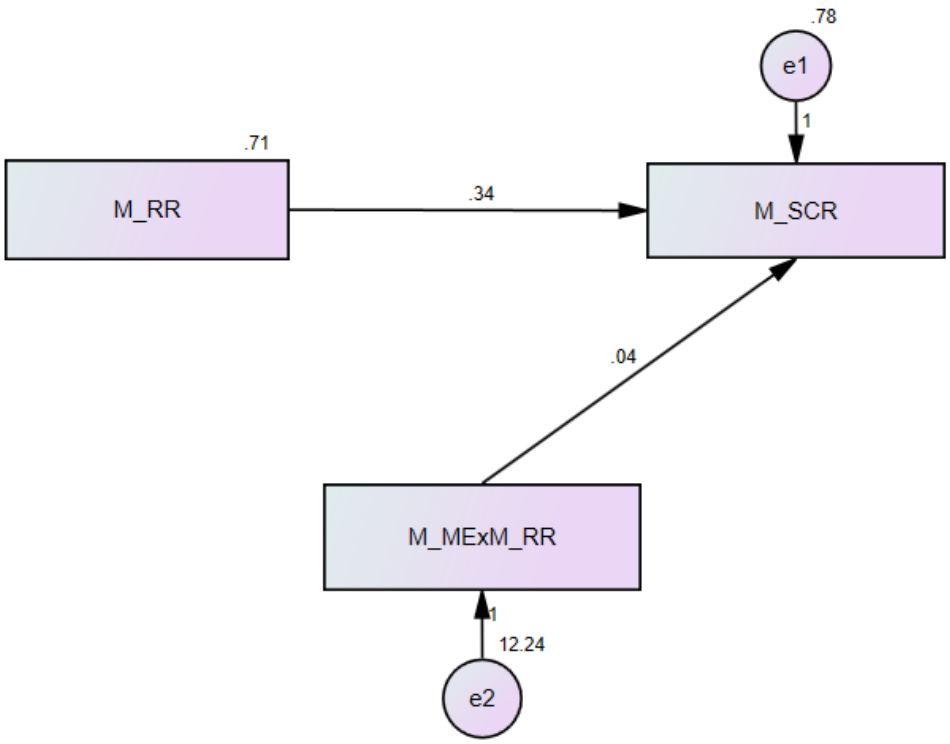


Figure 4.4: Risk Reduction and Supply Chain Resilience

Table 4.15
Risk Reduction and Supply Chain Resilience

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
M_SCR	<---	M_RR	.342	.056	6.057	***	
M_SCR	<---	M_MExM_RR	.042	.014	3.086	.002	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
M_RR	.711	.054	13.115	***	
e2	12.244	.934	13.115	***	
e1	.778	.059	13.115	***	

4.11.4 Moderation between Risk Transfer and SCR

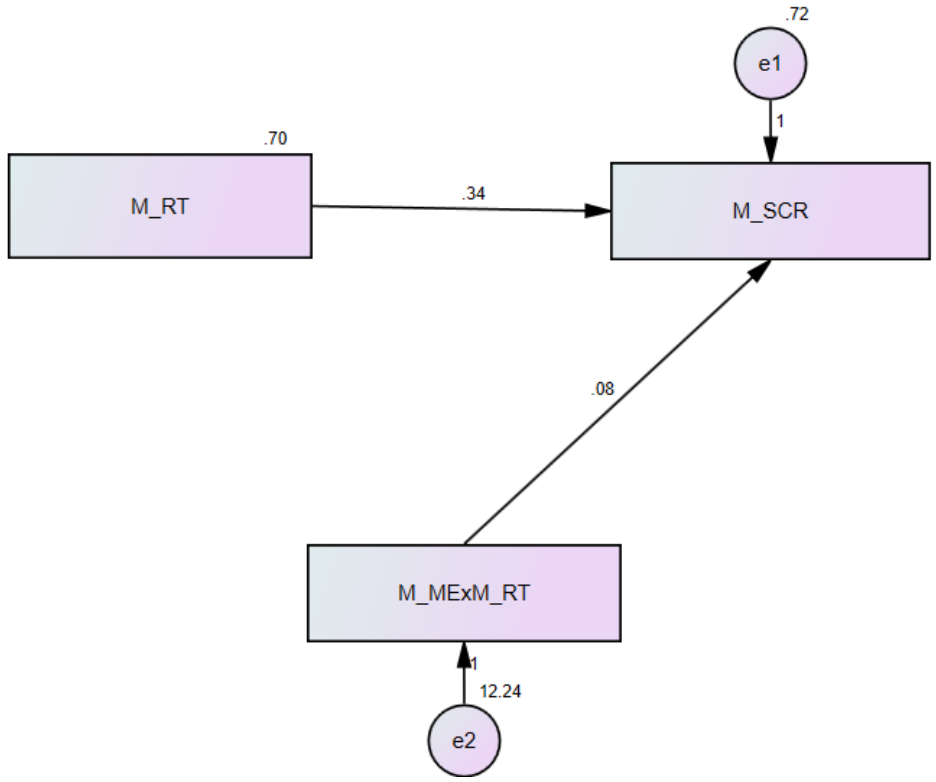


Figure 4.5: Risk Transfer with SCR

Table 4.16
Risk Transfer and Supply Chain Resilience

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
M_SCR	<---	M_RT	.345	.055	6.288	***	
M_SCR	<---	M_MExM_RT	.079	.013	6.017	***	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
M_RT	.700	.053	13.115	***	
e2	12.244	.934	13.115	***	
e1	.724	.055	13.115	***	

4.12 CONCLUSION OF THE HYPOTHESES TESTED

Table 4.17
Hypotheses Tested

Hypothesis	Rule	Results	Decision
H1: Risk Avoidance contains a positive impact on SCR in oil companies of Pakistan.	Reject H1 if P value >0.05	β= .173*; P is 0.000*	Accepted
H2: Risk Acceptance contains a positive impact on SCR in oil companies of Pakistan.	Reject H2 if P value >0.05	β= .197*; P is 0.000*	Accepted
H3: Risk Reduction Contains a positive impact on SCR in oil companies of Pakistan.	Reject H3 if P value >0.05	β= .148*; P is 0.006*	Accepted
H4: Risk Transfer Contains a positive impact on SSCR in oil companies of Pakistan.	Reject H4 if P value >0.05	β= .147*; P is 0.007*	Accepted
H5: Managerial regulatory guidelines, instructions, and actions moderates positively the influence of Risk Mitigation Strategies and SCR in Petroleum Industry in Pakistan.	Reject H5 if P value >0.05	I: β= .037*; P is 0.007* ii: β= .076*; P is 0.000* iii: β= .042*; P is 0.002* iv: β= .079*; P is 0.000*	Accepted

CHAPTER 5

DISCUSSION

5.1 DISCUSSION OF FINDINGS

The research focuses on the impact of the risk mitigation strategies on SCR, risk mitigation strategies are risk transfer, risk reduction, risk avoidance, and risk acceptance. Moreover, it discovers the moderating influence of managerial regulatory guidelines, instructions, and actions among the supply chain resilience and risk mitigation strategies. Furthermore, the outcomes direct that managerial regulatory guidelines, instructions, and actions positively impacts on the SCR and risk mitigation strategies. Research demonstrates the moderation of managerial regulatory guidelines, instructions, and actions occur among the supply chain resilience and risk mitigation strategies. Risk mitigation strategies are connected with managerial regulatory guidelines, instructions, and actions. Risk mitigation strategies are also connected to the SCR.

5.2 THEORETICAL CONTRIBUTION

Given below endorsements were only possible after the results and decisions:

Research found out that the risk avoidance is meaningless for the oil marketing firms operating in Pakistan. The amount of risk, firms are ignoring today might become the massive risk in future. To minimize huge loses, these minor risks shouldn't be avoiding by any firms. Hence, study concludes that firms should find other mitigation techniques rather than avoiding the risk at the moment. Findings suggest that immense amount of maintenance is required in the entire industry to minimize the risks because it is vital threat for the economy of Pakistan.

Research finds that the risk acceptance is the best strategy to avoid immense size of disasters in the future because the risks we bear all the time can hit us too hard so, why not accept it and manage our supply chains accordingly. Just accepting the risk is not enough, until unless there is a proper arrangement to mitigate the risk from the groundwork. The slightest leakage in the supply chain shouldn't be ignored by the managers, and must have the appropriate actions against it. Mandatory actions are required to guide the productiveness of the contingency management theory to all the dominating

players in the market through perceptions and backing to turn up the administration methods, risk observing, and vast risk mitigation tactics.

Risk reduction and risk transfer strategies are more empowered as compared to the risk acceptance and risk avoidance, as per the study results. Risk reduction is a strategy that brings new challenges everyday on the supply chain, whereas risk transfer referred to the technique in which group of organizations are involved and chances of loses are minimal. According to the study, these to strategies should be the top priority of all the oil marketing firms to mitigate the risks. According to the results, all the oil marketing firms have to establish a platform that shares the real time data transparently shared among every member of a supply chain can highly mitigate the risks, and this technique referred towards risk reduction and risk transfer. Significant level of reduction of the overall risks can be achieved with the help of subcontracting, and mergers to make sure that disruptions are totally vanished from the supply chain.

About the moderation influence of managerial regulatory guidelines, instructions, and actions, the research established that existence of significant regulatory guidelines, instructions, and actions has positive impact on the connection among the usual supply chain routine and risk mitigation strategies. Study suggests the top management to implement the guidelines, and instructions that they delivered towards lower management in order to mitigate the risks to occurred again. Upper management needs to break the chain of command to understand the problem from the ground level, and on that basis management can understand the key reasons of the disruptions and after that establish new policies and guidelines to mitigate the risks.

5.3 CONCLUSION

Generic conclusion can be stated as; risk mitigation techniques have a positive significant impact on the SCR and managerial regulatory guidelines, instructions, and actions have a positive influence on the relationship among supply chain resilience and risk mitigation strategies. Oil marketing firms have to target towards execution of the related risk mitigation strategies assisted by the suitable managerial regulatory guidelines, instructions, and actions to realize resilient supply chain agendas. Resilience in the SC was the basic purpose of the research and hypotheses.

Statistical results showed that risk avoidance has a significant positive impact on the supply chain resilience in the oil marketing firms of Pakistan and that referred to as the hypothesis number one.

Statistical results showed that risk acceptance has a significant positive impact on the supply chain resilience in the oil marketing firms of Pakistan and that referred to as the hypothesis number two.

Statistical results showed that risk reduction has a significant positive impact on the supply chain resilience in the oil marketing firms of Pakistan and that referred to as the hypothesis number three.

Statistical results showed that risk transfer has a significant positive impact on the supply chain resilience in the oil marketing firms of Pakistan and that referred to as the hypothesis number four.

Hence, risk mitigation strategies strengthen the resilience of the supply chain. Firms have to put all of their efforts on the actions that minimizes the risks on a supply chain. If the firms believe that with the help of strategic alliances with others, they can reduce their overall loss that both firms have to pay, they must merge their supply chain services. Study demonstrates that firms with completely outsourced supply chain have extraordinary responsive and robust. If a firm have a very risky supply chain, all the concentration of the firm will be on risks rather than the innovation, product, and service. Last hypothesis recognized about attachment of managerial regulatory guidelines, instructions, and actions as a moderator triggered both R and R-Square towards growth. Likewise, the p-values for many variables reduced and that expands their significance in the model.

5.4 ZONES FOR ADVANCE STUDY

Study was limited on the risk mitigation strategy's effect on the supply chain resilience in the oil marketing firms of Pakistan.

Future researchers can study the risks drivers disturbing the industry. Upcoming researches might, emphasis on drivers of oil supply chain weakness in the perspective of emerging nations like Pakistan. Vulnerabilities of the supply chain is yet to be explored in the perspectives of managers to enhances the supply chain resilience. Future research could also be on drivers for a vulnerability in the opinion of firm's setups, product or service assessment, structural needs, and the natural and collective atmosphere. Adequate data and appropriate actions on vulnerabilities to strengthen the entire supply chain resilience. Lastly, researches can explore the global terrorism in reference to the disturbance in the supply chain.

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