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RISK MANAGEMENT IN SUPPLY CHAIN: CASE OF AUTOMOTIVE INDUSTRY

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Abstract

Supply chains across the world are getting more complex with every passing day. Due to globalization, companies are operating internationally, and so their operations have incorporated a plethora of areas. With great expansion comes great risks as well; therefore, today's supply chain faces great risks when operating on a global scale, and these risks hinder their performance. In this study, we explore the relationship of supply chain risk management, reaction time, and resilience with the performance of the organization and investigate in detail how a better strategy of supply chain risk management can lead to better performances and firms becoming resilient to disruptions and risks. This study is based on Pakistan's automobile sector, and the data was recorded from all the leading automobile industries in Pakistan. The research follows a quantitative model. One hundred questionnaires were filled out by people employed in automotive firms, and the data was analyzed using SPSS. Correlation analyses were performed to see how performance and supply chain risk management, along with other variables – resilience and reactive supply chain- were related to each other. Furthermore, a regression test was applied to understand the impact of structured supply chain risk management on a firm's performance, and the results reveal that supply chain risk management does have a significant influence on the performance of a firm. Future work can be done in this same area by exploring more industries and firms, taking a bigger sample size, and exploring more categories of risks that influence the firms' operations in their ways.

Keywords: Risk Management, Supply Chain, Automotive Industry, Performance

Introduction

The procedure used to proactively cognize, scrutinize, evaluate, and manage events is termed Risk management. It also deals with anticipating or expecting actions that might not have a good result. It also put these in place to reduce the uncertainty. (Jorn-Henrik Thun, 2011).

Worldwide, the use of Risk management and all its strategies is being engulfed heavily in the automotive industry, which will be perceived later in this research (Narasimhan & Talluri, 2009). The Pakistani automobile or automotive industry is, however, procrastinating in this regard and mostly still uses manual procedures. Pakistan has a high reliance on key suppliers because it is more of an assembler than a producer (Childerhouse, 2003). So, the incorporation of risk management and mitigation strategies will help the Pakistani automobile industries cope with all kinds of external factors or impending dangers that come from disasters, which will help them compete with the global giants. (Jorn-Henrik Thun, 2011)

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The automotive industry process is highly reliant on an effective supply chain due to the complexity of its operations. Today, in many developing countries, the automotive industry is assembling rather than producing in a real sense, which means that they are more reliant on their suppliers because it must import things from their suppliers overseas and must manage the customer demand with a cheap, linear, and effective supply chain.

The automotive industry is one hundred and sixty years old. It was pioneered in the year 1860 when horseless carriages were produced. (Geels, 2005). Since 1990, there has been an intense focus on the supply chain of the automotive industry, especially after the incidents of the 9/11 Tsunami, Hurricane Katrina, and the 2008 economic depression, which further intensified. (Jorn-Henrik Thun, 2011) In particular, the catastrophe and its outcome have led to an increase in risk in supply chains in recent years. For example, the delays in the supply of imported parts were suspended when the attack of 9/11, and all the biggest companies stopped their production. (Sheffi, Supply Chain Management under the Threat of International Terrorism, 2001). This fact highlights the growing need to manage risk in the supply chain and helps explain why supply chain race management (SCRM) has become a popular topic in the last decade. (Chad W. Autry, 2008) (Jorn-Henrik Thun, 2011) The purpose of the SCRM is to develop a method for identifying, evaluating, analyzing, and treating loss and risk areas in supply chains (Ceryno P. S., 2014). Which increases the resilience of the supply chain.

Companies pursuing active, reactive supply risk management in groups. The group using the rescue instrument shows greater value in terms of increased flexibility and cost reductions. (Jorn-Henrik Thun, 2011)

Therefore, it is important to understand the factors that can create risks, especially in a competitive market like the automotive industry, and to identify some of its key instruments for rectification.

Variables

- Supply Chain risk management:
- Performance:
- Reactive Supply Chain system:
- Resilience:

Hypotheses

H_1: There is a significant impact of Risk management and Reactive supply chain on performance.

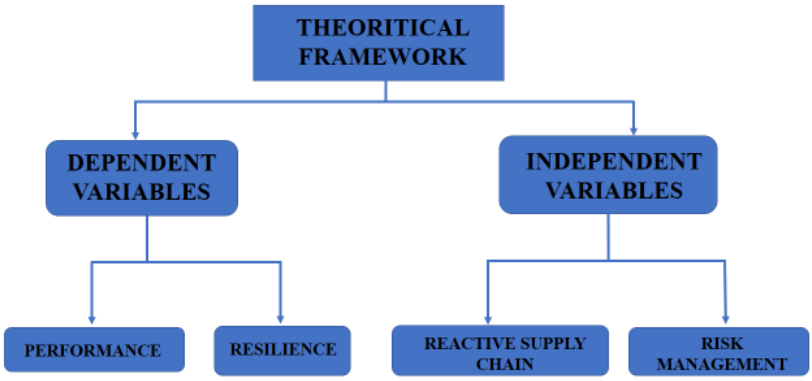
H_2: There is a significant impact of risk management reactive supply chain on resilience.

H_3: There is a meaningful relationship between reactive supply chain management and supply chain risk management.

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H_4: There is a meaningful relationship between Performance and Resilience.

Theoretical Framework



Literature Review

The evaluation of managed supply chains has embellished a distinctive feature of inter-organizational methods of work. In the supply chain study, risk is often considered from a normative and functional perspective. Some reports, which are designed to investigate organizational processes, have been waded through on a case-by-case basis. The anonymous researchers reported here were investigating whether chains of self-help were included in addition to the empirical knowledge of the comments. In these supply chain cases, the risks were considered both risk and performance risks, part of the organizational design for uncertainty. At the same time, the institutional care and social construction perspective understood the position of organizational risks. (Collier, 2007)

This paper has examined the importance of green supply chain management, thus emphasizing more on the concept of sustainability. The critical success factors (CSFs) are studied, and their importance is seen in green supply chain management, considering the case of the automobile industry in India. The studies focus on the importance of automobile industries implementing and incorporating ecological and societal issues in their businesses. The findings of this paper state that the 'regulatory' critical success factor has the most vital role in promoting sustainable practices. The internal management and competitiveness CSFs are vital for the achievement of expected performance outcomes. The authors urge future scientists to understand various green supply chain management implementation issues and to work on improving the practices that lead to sustainability. (Luthra, Garg, & Haleem, 2016)

The main risks are detected through this investigation in the supply chain of the Brazilian automotive industry. Although all have acknowledged the importance of SCRM for the analyzed entities, the lack of preparation regarding risk identification or risk reduction strategies and risk assessment is identified in the results of the study. This study identifies the main risks to which supply chains can be exposed to assist the

supply chain in beginning the SSRM process through the analysis of real-life risk disclosures with real supply chains. (Ceryno P. S., 2014)

The study proves the importance of a smooth flow of information to help in managing and superintending. Transparency and firmness are vital for better management of logistics and distribution. The research paper works on the factors responsible for making supply chains transparent. The data analysis technique used in the research is Partial least squares structural equation modeling (PLS-SEM). The researchers have also given directions to future researchers to work on the benefits of chain specialists in formulating strategies that can improve distribution performance, which will help enhance transparency in supply chain networks. (Ahmed & Omar, 2019)

This study reveals that Risk management in the supply chain has been the focus over the past decade. At the same time, there has been increasing compulsion to consider social issues both internationally and internationally in two supply chains. These problems jeopardize the supply of chains as they may occur, for example. Stock forfeiture can cause stakeholder reactions. Summarizing models is a great benefit for practitioners in purchasing functions of focal companies. It can be a helpful tool to help efficient solutions to social issues along the supply chain. At the same time, their academic support lies in enhancing the sustainability analysis of life through a sustainable (multi-regional) socially enhanced input-output model (SEIO) for social risk assessment in sustainable supply chain management. (Zimmer, 2017)

The study focuses on factors like global advancement, rapid technological innovation, enhancing regional influence and how they impact supply chains. The research is based on Pakistan's automotive sector. The sector is facing many issues because of the major economic shift towards India and China. The study investigates the numerous potential benefits of supply chain collaboration that can achieve better operational performance. The methodology used is an empirical investigation focused on the automotive firms in Pakistan. The authors have urged future researchers to study more reaches and to work on other sites as this study only focuses on the automotive sector. (Doori, 2019)

Engagement has good values about flexibility or safety stocks (Jorn-Henrik Thun, 2011). Companies practice specific risk management to organizations, but there is little evidence of risk management at the supply chain level. Other studies show that only companies have implemented appropriate risk management practices, although they are fully aware of the risk consequences for their supply chain (Tang, 2006).

This paper is designed to investigate the supply chain risk management practices employed in the automotive industry in Malaysia. The study states that the current supply chain in the automobile industry faces a lot of risks because the local manufacturers are heavily dependent upon foreign and international producers. Case studies were conducted at two automotive parts manufacturers based on three dimensions of the supply chain risk management framework that incorporate the SCRM process, tools used in SCRM, and techniques that help to reduce risks. The future direction given in the research is to work on the room for improvements in risk

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Volume 1, Issue 1, Page 99-116, June 30, 2021

identification and assessment techniques that can improve supply chain performance. (Hudin, Bakar, & Hamid, 2015)

This research investigates the understanding of carbon footprint by studying the case of automobile supply chain management. The case study approach is used as the method for research. Primary data was collected by means of long interviews with corporates and plant management and through site visits. The study has revealed a couple of findings: Firstly, the identification of direct and indirect carbon footprint is necessary for tackling risks in supply chains. Secondly, setting up a proper system for the measurement of boundaries. Thirdly, there should be a map showing carbon footprint that eases the identification of carbon emissions throughout the supply chains. The keywords used in the study are Carbon footprint, Carbon management, Supply chain management and Automobile industry (Lee K.-H., 2011).

This paper aims to investigate the supply chain risk management strategies used in the Indian automobile industry and to categorize automotive companies based on their supply chain risk management constructs. The study talks about how globalization and outsourcing have put Indian automobile companies at an elevated risk. The methodology used in the research is a survey that was distributed to 79 automobile firms. The findings of the study state that PCA extracted seven factors that are related to control: avoidance, supplier development, flexibility, risk pooling, redundancy, integration, and strategies. The keywords used in the study are competitive strategy, factor analysis, operations management, survey, strategic evaluation, cluster analysis, strategies, and supply chain risk. The future direction of the study is to focus on risk management and how it improves supply chain performance globally because this research only focuses on some aspects of risk management, and that too in a single country and single industry. (Sharma & Bhat, 2014)

There is too much literature available that supports the framework of this study, i.e., how to make better performance and how to identify the risk and the improvement in the supply chain of the automobile industry sector and the diverse ways which are used in the automobile sector. In Pakistan, the automobile sector is not exceptionally large in producing raw materials; the industry has more focus on assembling the vehicles, so in their areas of supply chain network like a warehouse, coordination and import restrictions, there is a need to identify and manage the risk in their complete process.

Also, the previous literature establishes the fact that globalization has been looking for their supply chain to make it easier because it is overly complex, and world firms have taken advantage of it by using modern technology and competing on a global level. In this global competition, the automobile industry looks to lower their costs, such as transportation, and increase the volume to quickly identify the risk to achieve all the contemporary trends and make a strategy for how to make better performance in their supply chain.

Although the existing literature shows the fact that with the use of quickly identifying the risk, the automobile industry can enjoy all the benefits and compete at the global level, every article pointed out in their way is still in need of attention – these are to determine that Pakistani automobile industry gives importance to risk

management and are they make pre-plan for any uncertain conditions that can be implemented so in all processes of supply chain network of automobile industry there is need of identify the internal risk rather than the external risks. With more importance on risk management, firms can improve their productivity and speed up the delivery process.

This study has worked on the future directions that previous researchers highlighted. Performance and resilience are dependent variables, so a test will be run to conclude the significant correlation between the independent and dependent variables and to determine the influence of risk management on performance.

Methodology

This study was conducted quantitatively, and the sample size was 100 respondents who are working in the Automobile industry in Pakistan. These respondents were head managers, middle managers, and non-managerial employees. And who are working in the supply chain department. The independent variables were risk management and reactive supply chain. So, we used the regression test to analyze or find out the influence of RM on P. A correlation test was run to examine the relationship between the variables.

The deductive approach was used because, in this study, the scope of research is narrowed down. We are going from specific to general. In this approach, the hypothesis is established, and all the work is done on the existing theory to conclude.

Empirical analysis is performed to search and look for the gaps in the working of local industries and those operating globally. This research follows a quantitative approach, as all the data tabulated was in numbers. Survey forms were made and dispersed to employees in various automobile firms across the country. The data analysis uses statistical equipment that tests the hypotheses.

The horizon at the time of this research is cross-sectional because the data was collected only once by 100 respondents from the automobile industry in Pakistan. Moreover, the whole data collection process was completed within 2-3 weeks.

The target population of our research was the automotive industry operating in Pakistan. We collected data from the representatives, managers and employees of Toyota Motors, Crown Group of companies and Honda Atlas.

Convenience sampling, which is a form of non-random sampling, was used. The reason for choosing this method was that we do not have a sample frame available of all the respondents through which we can do random sampling.

The tool that we used for gathering data was a survey. An online questionnaire was sent through WhatsApp and Linked To all the relevant people who are workers in the Pakistani automobile industry to record their responses. The questionnaire consisted of 5 a Likert scale ranging from 1 to 5, with one belonging to disagree strongly, two belonging to disagree, three belonging to neutral, four belonging to Agree, and five belonging to Strongly Agree.

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The unit of analysis was the individuals who are employed in the Pakistani Automobile industry and know their company's supply chain.

The reliability test checks whether the results are consistent. To check this consistency, the Cronbach Alpha value will be considered. The alpha value ranges for each variable/dimension will indicate how consistent or reliable our variables are. If the Cronbach Alpha value lies between 0.1-.03, it will be considered as weak or non-dependable. The values between 0.3 and 0.5 are moderate, while 0.7 to 1.0 is strong and dependable. The validity will measure the accuracy of the measure. Pearson correlation values have been checked for the validity of each variable.

Since the objective of conducting this study was to find out the influence of risk management and reactive supply chain on performance and resilience, therefore we evaluated the hypothesis using correlation to find the forte of the relationship between performance, resilience, risk management and reactive supply chain. Also, a regression test was run to calculate the impact. SPSS calculated all tests.

The only software we used for data analysis was SPSS. Because we are evaluating the primary data, we prefer the SPSS. If there is any error in the data, SPSS software automatically highlights every detail about the data.

We have put our utmost emphasis on keeping ethical standards intact. While making this research paper, we used the data collected from our respondents in its original shape, and no attempts were made to manipulate the data. Moreover, at the time of distributing questionnaires, none of the respondents to our survey were coerced to fill in the form, and everyone participated in it with their consent. Also, the respondents were informed prior about the purpose of this research, how it is being conducted and where it might be published in the future. Lastly, there was no section of name required in the survey form, and neither was there any such question whose answer could help anyone identify the person. The question of adding the company name was also left to the choice of the respondents and was not required. All this was taken care of to ensure our respondents' anonymity was safeguarded.

This study follows the quantitative model of research, and it is deductive because it works on the literature that has already been worked upon. The foremost aim of this paper was to explore the consequence of independent dimensions on the dependent ones and to establish the relationship among these dimensions. To do this, we gleaned ample data through previous studies and relevant research. The literature review shows the methodologies, research objective, key variables and future directions pointed out in that research, which helped us deduce the objective of this research. Primary data was gathered, for one time only, from 100 people working in Pakistan's automobile firms. The constructs considered in this paper that are studied and evaluated are extracted from several books and articles.

Analysis of Data

To evaluate the objective of this study, a survey questionnaire was made and distributed to people working in Automobile firms. One hundred responses were collected by top-level managers, middle managers, and non-managerial managers, and

tests were run on them using SPSS software. The research conducted a regression test and correlation test to examine the hypothesis.

Table 1: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Job Title	100	2	1	3	2.10	0.689	0.475
No of Employees	100	4	1	5	3.15	1.175	1.381
Working Experience	100	3	1	4	1.92	0.939	0.882
Valid N (listwise)	100						

Table 2: Job Title

Job Title	Percent
Manager	52.0
Other	29.0
Top Level Manager	19.0
Total	100.0

Table 3: Working Experience

Years of Work Experience	Percent
1-5	42.0
10-15	22.0
5-10	30.0
more than 15 years	6.0
Total	100.0

ISSN (Print): 2790-7848 ISSN (Online): 2790-7856
Volume 1, Issue 1, Page 99-116, June 30, 2021

Table 4: No of Employees	
No of Employees	Percent
1-100	6.0
100-200	25.0
200-500	36.0
500-1000	14.0
more than 1000	19.0
Total	100.0

Table 6: Crosstab analysis Job title and Work Experience					
Job Title	Working Experience				Total
	1-5	10-15	5-10	more than 15 years	
Manager	16	13	20	3	52
Other	25	0	4	0	29
Top Level Manager	1	9	6	3	19
Total	42	22	30	6	100

- 100 respondents collected the data from different industries, so the results show that.

- There is a total of 100 respondents, of which only 19% are at the top level, only 3% have more than 15 years of working experience, 6% have 5-10 years, and 9% of people in top management have 10-15% working experience.

- This survey is filled by 52 managers of different automobile industries, of which 20% had the experience of 5-10 years, the rest had 1-5, 10-15, and more than years, 16%, 13% and 3%, respectively.

- The SPSS output, above table also shows that the 29 lower-level workers of the automobile industry filled out this survey form. Some have more than 15 years of experience, 4% have 5-10 years of experience, 25% have 1-5 years of working experience in their respective department and organization.

- Top-level managers filled in the data, and the maximum filled by lower-level managers whose working experience is 5-10 years. Moreover, each firm has a minimum of 100-200 employees and a maximum of more than 1000 employees,

so the above result average is 200-500 employees in each firm. Also shows that the average, mostly middle manager fills the data.

- We have a higher number of people who have one to five years of experience, and the rest of the employees have more than 15 years of experience because managers fill in the maximum data. 42% of employees have 1-5 years of experience, 22% have 10- 15 years of experience, 30% have 5-10 years of experience, and 6% have more than 15 years of experience.

- Most companies have 200-500 employees, which is 36% of the respondents, and 19% of the respondents have more than 1000 employees; the rest of the companies have 1-100 employees, 500-1000 employees and 100-200 employees, which is 6%, 14% and 25% respectively.

The reliability table shows Cronbach's values, which are 0.695, 0.630, 0.737 and 0.633. It means the internal 14, 5, 6, and 10 items for performance, reactive supply chain, resilience, and risk management are positive and moderate, respectively, so we can say that for the study, the internal items are accurate.

A correlation test has been executed to check the strength and level of association between the dependent and independent constructs. The correlation value ranges from -1 to +1. If the result value ranges from 0 to 1, then the relationship is positive, and, if closer to 1, implies a stronger relation between variables, whereas closer to 0 exhibits a weaker relation. Similarly, if the value ranges from -1 to 0, the relationship is said to be negative. The coefficient of correlation indicates the strength and way between variables. Meanwhile, the Pearson value is a scale of linear relation between constructs.

Table 6: Correlations

		Performance	**Resilience**	**Reactive Supply Chain**	**Risk management**
Performance	Pearson Correlation	1	0.303	0.542	0.952
	Sig. (2-tailed)		0.002	0.000	0.000
Resilience	Pearson Correlation	0.303	1	0.098	0.22
	Sig. (2-tailed)	0.002		0.330	0.024
Reactive Supply Chain	Pearson Correlation	0.542	0.098	1	0.543
	Sig. (2-tailed)	0.000	0.330		0.000
Risk management	Pearson Correlation	0.952	0.225	0.543	1
	Sig. (2-tailed)	0.000	0.024	0.000	
	N	100	100	100	100
**. Correlation is significant at 0.01 a level a(2-tailed).					
*. Correlation is a significant smart at the 0.05 a level (2-tailed).					

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Volume 1, Issue 1, Page 99-116, June 30, 2021

The Correlation table shows the values of sample size, two-tailed significance, and correlation coefficient of every variable. So, the table showing the Pearson Correlation value between Performance and Resilience is 0.303, which means there is a weak and positive relationship between these two variables, and the significant value is 0.002, which is less than the 0.05 Alpha value, so we can say that there is a significant relationship between performance and resilience.

Performance and Reactive supply chain management are 0.542, which means that there is a positive and moderate relationship between these two variables, and the significant value is 0.000, which is less than the Alpha value of 0.05. Therefore, we reject the null hypothesis and conclude that there is a meaningful relationship between Performance and Reactive Supply Chain Management.

Performance and Risk management are 0.952, which indicates that there is a positive and strong relationship between these two variables, and the significant value is 0.000, which is less than the Alpha value of 0.05, so we can say that there is a meaningful relationship between Risk management and Performance.

Resilience and Reactive Supply Chain, which is 0.098, means there is a weak relationship between them, and the significant value is 0.330, which is greater than the Alpha value of 0.05, so it means there is no significant relation between resilience and reactive supply chain management.

Resilience and Risk management are 0.225, and the significant value is 0.024, which is less than the 0.05 Alpha value, so we can say that there is a weak relationship between these two variables. There is a meaningful relationship between Resilience and Risk management.

Risk management and Reactive Supply Chain Management is 0.543, which indicates that there is a positive and moderate relation between these two variables. The significant value between the two variables is 0.000, which is less than the Alpha value of 0.05, so we can say that we will reject the (H_0) and conclude that there is a meaningful relationship between them.

H_{o1}: There is no impact of risk management and reactive supply chain on resilience.

H_1: There is an impact of risk management and reactive supply chain on resilience.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.227	0.051	0.032	0.65433

a. Predictors: (Constant), Risk management, Reactive_ Supply Chain

In the model summary, the iiR2 value is 10.51, which is 51% of the impact of risk management and reactive supply chain on the resilience of the Pakistani automobile industry.

Table 8: Analysis of Variance Analysis						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	2.253	2	1.127	2.631	0.077b
	Residual	41.530	97	0.428		
	Total	43.783	99			
a. Dependent Variable: Resilience						
b. Predictors: (Constant), Risk management, Reactive _Supply Chain						

The ANOVA value is 0.077, whereas the Alpha value is 0.05, which means it is greater than the Alpha value. Since the significance value does not lie under the alpha value, we accept that (H_0) that there is no considerable influence of risk management and reactive supply chain on resilience.

Table 9: Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.408	0.536		4.492	0.000
	Reactive _Supply Chain	0.040	0.138	0.034	0.287	0.775
	Risk management	0.323	0.156	0.243	2.067	0.041
a. Dependent Variable: Resilience						

Resilience = B1(Reactive Supply Chain) + B2(Risk Management) + constant

The above table shows the coefficient values and significant values of constant, Reactive supply chain (independent variable) and another independent variable, Risk management.

From the above analysis table, the constant number is 2.408, and it is significant because, in the output, the Alpha value is 0.05 and sig. The number is 0.000.

H_{o2}: There is no significant impact of a reactive supply chain on resilience.

SPSS result of our study data shows the coefficient number for (RSC) is -0.40, and its considerable number is 0.775, which is greater than 0.005, so we will accept the (H_{o2}). In conclusion, reactive supply chains have an impact on resilience.

H_{o3}: There is no significant impact of risk management on resilience.

The SPSS result of our study data shows the coefficient number for (RM) is 0.323, and its considerable number is 0.041, so the Alpha value is 0.05, which is greater, so we will reject the (H_0). In conclusion, risk management has an impact on

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resilience cadence cadence cadence capence$Resilience = (-0.40)Repply\ chain + (0.323)(Risk\ Management) + 2.408$

Hence, we can conclude that,

There is a significant impact of risk management on resilience, and we can accept the alternative hypothesis (H_A). Therefore, the Pakistani automobile industry knows about the importance of risk management. They have enough resources, but they are always trying to build resilience. Moreover, many companies have provided us that they can recover if in case they face any uncertain loss. In this question, many of them. Selected Agree. From 5 Likert scale.

H_0: There is no significant impact of risk management and reactive supply chain on performance.

Ha: There is a significant impact of risk management and reactive supply chain on performance.

Table 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.952a	0.906	0.904	0.144

a. Predictors: (Constant), Risk management, Reactive Supply Chain

The model summary table shows the R^2 value is 0.906, which means 90.6% impact of risk management and reactive supply chain on performance. It is remarkably close to 100%, which means the performance is explained by risk management and reactive supply chain.

Table 10: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.491	2	9.746	469.367	0.000
	Residual	2.014	97	0.021		
	Total	21.505	99			

a. Dependent Variable: Performance

b. Predictors: (Constant), Risk management, Reactive Supply Chain

The ANOVA significant value is 0.000, and the Alpha value is 0.05, so the sig value is smaller. So, it means the significance value lies under the alpha value. Therefore, we will accept the alternative hypothesis (Ha). And conclude that there is a significant impact of risk management and reactive supply chain on performance.

Table 11: Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.401	0.118		3.394	0.001
	Reactive _Supply Chain	0.029	0.030	0.036	0.960	0.339
	Risk management	0.866	0.034	0.932	25.195	0.000
a. Dependent Variable: Performance						

Performance = B1(Reactive Supply Chain) + B2(Risk Management) + constant

The above table shows the coefficient values and significant values of constant, Reactive supply chain (independent variable) and another independent variable, Risk management.

From the above analysis table, the constant number is 0.0401, and it is significant because, in the output, the significant value is 0.001, which is less than the Alpha value.

H_0: There is no significant impact of a reactive supply chain on performance.

The SPSS result of our study data shows the coefficient number for (RSC) is 0.29, and its considerable number is 0.339, so the Alpha value is 0.05, which is lesser, so we will accept the (H_0). In conclusion, a reactive supply chain has an impact on performance.

H_{o4}: There is no significant impact of risk management on performance.

The SPSS result of our data shows the coefficient number for (RM) is 0.866, and its considerable number is 0.000, so the Alpha value is 0.05, which is greater, so we will reject the (H_{o4}). In conclusion, risk management has an impact on performance balance$Performance = (0.29)(Reactive\ supply\ chain) + (0.866)(Risk\ Management) + 0.401$

Risk management has a significant impact on performance, and a reactive supply chain has no significant impact on performance. That means the Pakistani automobile knows the importance of risk management. Many companies have provided us with information that they try to improve performance by managing uncertain risks. In this question, many of them selected Agree from the 5 Likert scale.

Discussions

The findings of this study are extracted with the help of two tests from SPSS: Correlation analysis and regression. The correlation analysis was done to find the association among the variables in the study, while regression analysis helped find the impact of independent variables on the dependent variables. The tests reveal that the null hypotheses are rejected, and the impact of independent variables on the dependent ones is proven. The test results show that there is a noteworthy association between all

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Volume 1, Issue 1, Page 99-116, June 30, 2021

the variables, including – Supply chain risk management, performance, resilience, and reactive supply chains. The research further implies that by implementing strategies of supply chain risk management, the firm's performances improve greatly. This is also backed by the existing literature on the topic that talks in detail about how automobile industries that are operating on a global level have outdone their counterparts and thrived because they are working every day on incorporating risk management strategies. Moreover, the literature also discusses how reactive and proactive supply chains that deal with risks and problems promptly get their supply chains to be resilient and robust. Therefore, the results established by this paper are in line with the previous research and prove that all results extracted are valid and dependable.

The past studies provide vast details on different tactics for risk management and having a reactive supply chain network works in firms that have their roots established all over the world. These firms are even more vulnerable to risks and threats because the external factors are numerous. The only defense for these problems is to work with the department of risk management. Studies also show that employing a wholesome risk management department may be costly, because it requires experts in the field, analysts, software programs like ERP, artificial intelligence and expert systems that can easily predict the problems that are impending and help the management in decision making accordingly. Although the costs may be high, the benefits always overshadow them because they save the firms from future losses and strengthen their supply chain management, making them resilient.

However, past literature gives much evidence of how organizations all over the world have improved upon their risk management techniques and thrived. However, there is little, or no study conducted on automobile firms in Pakistan. Research shows that Pakistan's automobile sector lags in competition with its global counterparts because its production outputs are exceptionally low for a plethora of reasons. One of the foremost reasons is that the companies located in Pakistan are unable to tackle and anticipate the problems that come. At the same time, operating and trading at a global level, and consequently, they fall short.

This research has extracted responses from the employees of automobile industries in Pakistan and, in the end, provides empirical evidence on how risk management can enhance the performance of firms while backing these results with previous literature on successful global companies. Our research shows that Contingency planning and preparations improve the ability to address disasters and risks associated with business. For example, Sops and steps taken in advance for firefighting improve the ability to safeguard plant assets, whereas risk management improves performance. Risk management enables organizations to increase performance. For example, risk management will enable organizations to cope with increasing inflation, currency devaluation, and other financial problems, which will improve their overall performance of business. If organizations are financially doing well, they can increase the remuneration of employees, staff more qualified employees, and satisfy them with better remuneration. This can increase the number of more competent and satisfied employees, which is another factor in companies' performance. This study can be of wonderful use to automotive companies in Pakistan.

The goal of this study is to add to the existing works by finding the importance of risk management in the supply chain of the Pakistani automobile industry. This research shows that the result testifies to part of our research objective and the research questions that we have formulated. We conclude that risk management has a significant impact on performance.

According to the result analysis of our research, risk management has a significant impact on performance. To improve performance in the supply chain, managing risk is important for every organization. These results can help the firm to determine whether their organization is fulfilling or managing the risk properly or has made any plan for any risk that can influence our supply chain. Doing so can help firms improve their business and build a good image for new businesses that enter the market, keeping the importance of risk in mind. Pakistani automobile companies should understand risk management and try to perform better performance in their supply chain so that they can meet with global firms and fill the value gap.

The sample frame, as compared to other research, was small and included only a hundred people. This was due to a shortage of time since the study had to be completed within two months, and there was a lockdown in Pakistan, so we faced many difficulties in collecting the data due to COVID-19.

The Study examined the importance of risk management in Pakistani automobile industries, and we have not been able to specify individual risks for this industry in Pakistan. Future work can be done in this same area by exploring more industries and firms, taking a bigger sample size, and exploring more categories of risks that influence the firm’s operations in their ways. Also, future researchers can work on government policies that influence Pakistan's automobile industry.

Conclusion

The drive of this study was to find the impact of risk management and reactive supply chains on performance and resilience. To conduct the research, a survey of 100 respondents was conducted from those employed in the automobile industry in Pakistan. The results showed that risk management and reactive supply chains have a significant impact on performance. At the same time, there is no significant impact of a reactive supply chain on resilience and performance in Pakistan's automobile industry, so it means the Pakistani automobile industry does not work when the incident occurs. The owner and worker have pre-planned for any sudden disasters or any harmful impact, and they also know that by managing the risk well, they will perform better in the whole supply chain cycle or every loop of the supply chain. There is always a need to manage risk. Moreover, the Pakistani automobile industry does have the ability to recover from the loss or damages because our results show that they have plans and other alternative routes.

Reference

Ahmed, W., & Omar, M. (2019). Drivers of supply chain transparency and its effects on performance measures in the automotive industry: the case of a developing country. *International Journal of Services and Operational Management, 33(2).*

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Volume 1, Issue 1, Page 99-116, June 30, 2021

Ceryno, P. S. (2014). Supply chain risk: empirical research in. *Journal of risk research*, 1145-1164.

Ceryno, P. S. (2014). Supply chain risk: empirical research in the automotive industry. *Journal of Risk Research*, 1145-1164.

Chad W. Autry, L. M. (2008). Supply chain security orientation: conceptual development and a proposed framework. *International Journal of Logistics Management, The*, pp. 42–64.

Childerhouse, P. H.-J. (2003). Information flow in automotive supply chains – present industrial practice. *Industrial Management & Data Systems, Vol. 103*, 137-149.

Collier, A. J. (2007). Risk in supply chains: exploratory case studies in the automotive industry. *International Journal of Risk Assessment and Management*.

Doori, J. A. (2019). The impact of supply chain collaboration on performance in the automotive industry: Empirical evidence. *Journal of Industrial Engineering and Management, 12(2)*.

Geels, D. I. (2005). The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860–1930). *Technology Analysis & Strategic Management*, 445–476.

(n.d.). *https://www.plslogistics.com/blog/supply-chain-management-best-practices-resilience/*.

Hudin, N. S., Bakar, A., & Hamid, A. (2015). Supply Chain Risk Management in Automotive Small and Medium Enterprises in Malaysia. *Applied Mechanics and Materials, 773*, 799-803.

Jorn-Henrik Thun, D. H. (2011). An empirical analysis of supply chain risk management in Germany. *International Journal of Production Economics*, 242-249.

Jörn-Henrik THUN, R. P.-C. (2007). A Conceptual Framework and Empirical Results of the Risk and Potential of Just in Sequence - A Study of the German Automotive Industry. *Journal of Operations and Logistics, 1*(2).

Juttner, U. (2005). Supply chain risk management ¨ —understanding the business requirements from a practitioner perspective. *The International Journal of Logistics Management*, pp. 120–141.

Lavastre, O. A. (2012). Supply Chain Risk Management in French companies. *Decision Support Systems*, 828-838.

Lee, H. L. (2004). *The Triple-A Supply.* Harvard Business Review.

Lee, K.-H. (2011). Integrating carbon footprint into supply chain management: the case of Hyundai Motor Company(HMC) in the automobile industry. *Journal of Cleaner Production, 19(11),* 1216–1223.

Luthra, S., Garg, D., & Haleem, A. (2016). The impacts of critical success factors for implementing green supply chain management towards sustainability: an empirical investigation of the Indian automobile industry. *Journal of Cleaner Production, pp. 121,* 142–158.

Michelman, P. (2007). Building a Resilient Supply Chain. *Harvard Business Review Home*.

Narasimhan, R., & Talluri, S. (2009). Perspectives on risk management in supply chains. *Journal Of Operations Management*, 114-118.

Peck, H. (2005). Drivers of supply chain vulnerability: an integrated framework. *International Journal of Physical Distribution & Logistics Management, pp. 35,* 210–232.

RICE, J. B. (2003). Building A Secure and Resilient Supply Network. *Supply Chain Management Review*, 22-30.

Sharma, S. K., & Bhat, A. (2014). Supply chain risk management dimensions in Indian automobile industry: A cluster analysis approach. *Benchmarking: An International Journal, 21(6)*, 1023–1040.

Sheffi, Y. (2001). Supply chain management. *The International Journal Of Logistics Management, 12(2)*, 1–11.

Sheffi, Y. (2001). Supply Chain Management under the Threat of International Terrorism. *The International Journal of Logistics Management, 12*(2), 1–11.

Svensson, G. (2004). Key areas, causes and contingency planning of corporate vulnerability in supply chains: A qualitative approach. *International Journal Of Physical Distribution & Logistics Management*, pp. 728–748.

Tang, C. S. (2006). Robust strategies for mitigating supply chain disruptions. *International Journal of Logistics Research and Applications*, pp. 33–45.

Uta Jüttner, H. P. (2003). Supply chain risk management: outlining an agenda for future research. *International Journal of Logistics Research and Applications*, 197-210.

Zimmer, K. F. (2017). Assessing social risks of global supply chains: A quantitative analytical approach and its application to supplier selection in the German automotive industry. *Journal of Cleaner Production*, 96-109.