

Are the Current Supply Chain Management Practices Enough for Innovation?

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Abstract

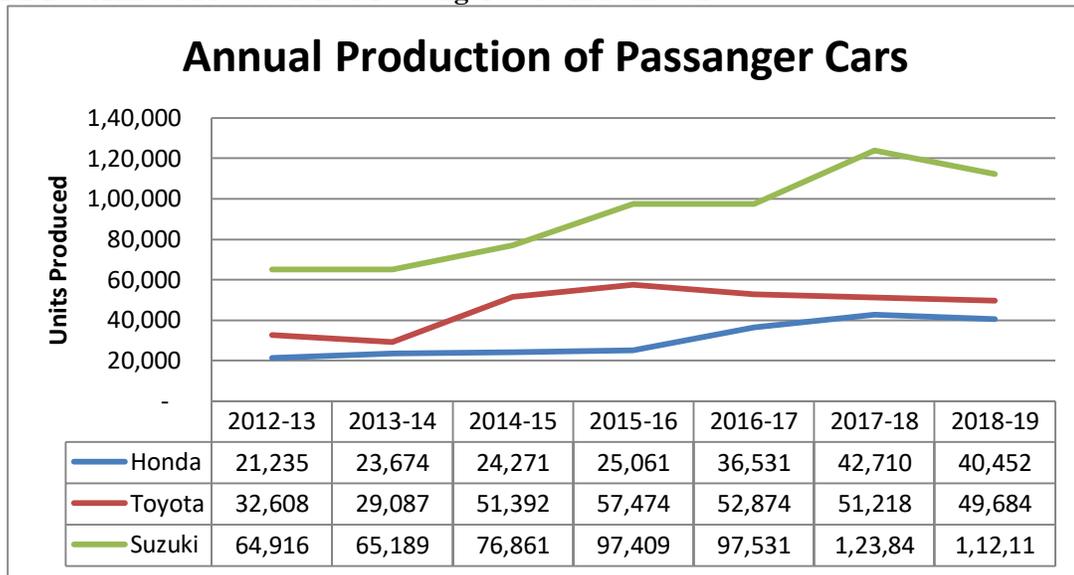
This study focuses on the automobile manufacturing industry in Pakistan. Pakistan's main GDP contribution still comes from the manufacturing sector. A recent drop-down in the sale of the automobile sector has led us to find out the reasons for this unusual drop which previously shows very impressive growth. This is a matter of huge concern as most of the workforce in Pakistan is dependent on the manufacturing industry, and almost half the Pakistani population lives in rural areas. Pakistan's economy is highly affected by the government tough policies which adversely affect the manufacturing sector especially the organizations which are export-based manufacturing organizations and the investor is shifting their business to the low-cost countries to remain competitive. In order to ensure they remain competitive, Pakistani firms need to better manage their supply chains and bring innovation in their industries. The aim of this paper is to find out the impact of SCM practices on a firm's innovation performance in the Pakistani automobile industry. The research is quantitative in nature, 350 questionnaire is distributed among the professionals of automobile industry and the users to confirm the facts that Supply chain practices i.e Leadership, customer focus, information analysis, internal lean practices, and supplier relationship has significant impact on product innovation in automobile industry. The result of the study shows that Customer focus, internal lean practices, quality information analysis and supplier relationship have a positive impact on product innovation whereas leadership does not contribute positively to product innovation the final analysis and will be useful for the automobiles industry, Pakistan automobile manufacturing association, researchers and for the overall industry that SCM practices enhance the organization performance and product innovation. This research is only focused on passenger cars due to the limited time frame and budget whereas the future researcher can widen their scope and can consider the entire automobile industry.

1. Introduction

The increased global competition has triggered the organization to move with the global pace which enables them to face new problems and, supply chain challenges. These consist of a requirement for decreasing costs, increase product quality, and enhance customer services and ensuring the stability of supplies (Goebel et al., 2003; Pearson et al., 1996). The SCM environment is considered by the aid of globalization, frequent responsiveness of customer, channel partnership and advances in information and communication technologies that enable the Organizations to review their chain structure and required to reorganize and re-design their system to fulfill customer's dynamic requirements. This recognition requires firms to review their organizational boundaries and consider how the assets and skills of suppliers and clients can be utilized to create drastic value. Businesses with a unique supply chain approach require innovation, which in flip demand aligned objectives, open communication, sharing of resources, risks, and rewards. Firms build new skills by reflecting on the value of the task performed and

making use of innovative ideas that enable more than one process to be synchronized (Soosay and Sloan, 2005). Accordingly, part of this approach entails organization comparison and developing relationships with suppliers, which adjustments in financial and overall performance (Carr and Pearson, 1999). Similarly, inter-organizational coordination has ended up greater coordination and more importantly successful in commercial business activities and aggressive advantage of customer satisfaction. The antecedent of innovation suggests that advantage are formed when there is leverage from the competencies and knowledge of each accomplice Collaboration in furnish chains is important for innovation as partners understand the number of benefits of innovation such as high quality, lower costs, more well-timed delivery, efficient operations and nice coordination of activities. The following charts show the declining sale of passenger cars in Pakistan.

1.1.1 Annual Production of Passenger Cars in Pakistan



Data Source: PAMA, 2019

Due to global trends, Pakistan's auto business has seen significant growth over the years analyzed. Development has been facilitated by good government agreements during this period and the obligation to reduce import requirements on commodity and medium-sized sources of information. The rapid growth of the segment has contributed to the growth of the car market, which has been stimulated by car rental facilities and the advancement of banks and low-cost leasing organizations. The expansion of this segment, in addition to increasing the country's mechanical productivity, has created additional direct employment and large reductions (Ahmed and Batul, 2017). In recent years, vehicle advertising has experienced a high growth rate of over 40% annually. Development declined sharply in 2008 and 2009, mainly due to the rapid decline in costs and rent financing, which has become costly for buyers. This miracle is due to Pakistan's devaluation of global monetary currencies and rising advertising/credit costs. The development of the automotive industry trends to give additional power to the integrated auto industry, which is also experiencing problems due to the continuous decline (ChongandOoi, 2008). Despite the difficult growth of automated production in Pakistan over the past two years, Pakistan is still weak in terms of mechanization when comparing all formulas including its neighboring countries. Of course, despite the huge increase in car popularity in the country; Pakistan is still one of the "less mechanized" countries in the world, with 11 cars per 1,000 inhabitants. For example, Iran's neighboring

countries now have 23 cars per 1,000 inhabitants. Car manufacturers must take into account this basic fact that there are still significant holes in the Pakistan car market (Rafique 2011).

This study focuses on the automobile manufacturing industry in Pakistan. Pakistan's main GDP contribution still comes from automobile manufacturing. A recent drop-down in the sale of the automobile sector has led us to find out the reasons for this unusual drop which previously shows very impressive growth. This is a matter of huge concern as most of the workforce in Pakistan is dependent on the manufacturing industry, and almost half the Pakistani population lives in rural areas. Pakistan's economy is highly affected by the government tough policies which adversely affect the manufacturing sector especially the organizations which are export-based manufacturing organizations and the investor is shifting their business to the low-cost countries to remain competitive (ChongandOoi, 2008) In order to ensure they remain competitive, Pakistani firms need to better manage their supply chains and bring innovation in their industries. The aim of this paper is to find out the impact of SCM practices on firms' innovation performance in the Pakistani automobile industry.

2. LiteratureREVIEW

2.1 Global Trend in Automotive Industry

The worldwide pattern in the car industry is driving by the innovation even Google is producing a driverless car, right now Japan is coming on the top by delivering out its innovation throughout the world. Producers are following the Consumer perception which enables the automobile sector to modify the structure of their cars to fit the attributes of future markets. In different spots, automakers need their designers to be near 'tuners' to perceive how they alter their next-generation vehicles. These inspirations have driven automakers to build up a progression of partnered configuration focuses in spots, for example, China and Southern California. All things considered, the substantial building work of vehicle advancement, where theoretical plans are converted into the parts and sub-frameworks that can be collected into a resultant vehicle, stay brought together in or close to the structure groups that have emerged close to the central command of lead firms. The car business is in this way neither completely worldwide, comprising of a lot of connected; particular bunches, nor is it attached to the thin topography of country states or explicit areas similar to the case for some social or administration enterprises. Worldwide incorporation has continued at the degree of structure and vehicle improvement as firms have looked to use designing exertion crosswise over items sold in different consumer markets. As manufacturers have taken on a bigger competition in structure development, they, in turn, have established their own design centers close to their major customers to facilitate coordination.

The automotive industry continues to work on high volume and high volume financial transactions in almost every industrial region of the world, especially in North America. It's because of the American auto industry. The law supports around 7 million jobs worth \$ 500 billion a year. This private work covers the entire network of suppliers, manufacturers, and wholesalers (Slope et al., 2010). Newer environmental issues related to global environmental change and the release of ozone-reducing substances have forced car manufacturers to focus on increasing light and environmentally-friendly vehicles. Ozone reduction (GHG) emissions from road vehicles represent 27% of the total combined flows in the United States. The United States, which consumes 1800 million large CO₂s. Since the 1980s, there has been an alarming trend of increasing CO₂ emissions, and since 95% of the world's viability comes from petroleum products, particularly diesel and fuel, the need for significant reductions is significant. related to transportation to meet global obligations for environmental control. The above facts and customer service have led governments and environmental authorities to adopt more stringent emission reduction guidelines, which are legally responsible for the intense miracle of global environmental change. Obama's continuing commitment in November 2014 to "work for 2025 to reduce US air pollution by 26 to 28 percent from 2005" seems to address issues of global connectivity directly. for treatment. CO₂ emissions

over the last three decades. To mitigate these losses, accurate automation of environmental sensors is required, which prevents unique equipment manufacturers around the world from reducing the severity of their vehicles. The National Traffic Safety Organization (NHTSA), USA, in collaboration with the U.S. Department of Natural Resources (EPA). In the United States, they jointly propose a national program that will generally reduce carbon flux and improve the ecology of vehicles moving on solid ground. These new activities should contribute to clear measures in the automotive industry to reduce fuel consumption, leading to the emergence of critical reserve funds of around one billion tonnes of GHG emissions. Lightweight can be an important part of implementing these guidelines, where military fuel use must be between 16% and 24%. Despite the changing environment and greenhouse gas emissions, other important geopolitical issues have led to new measures to improve vehicle efficiency, particularly through the Department's vehicle innovation management program. American Way (Law). Laws They have a multi-faceted team to produce light and light (LM) machine materials that ensure sustainable use of sustainable sources. It is now important to understand that a 10% reduction in vehicle weight can save 6 to 8% on fuel consumption and why lighter elements require less endurance to accelerate compared to more weight. Obviously, lightweight materials provide a good opportunity to increase vehicle mileage and moderate GHG flow.

2.2 Automotive Industry in Pakistan

The vehicle industry is the 6th major manufacturing sector in Pakistan. It has recognized remarkable progress in the last few years with an annual growth rate of above 7% since 2007. The auto sector's annual contribution to GDP amounts to approximately US\$6 billion. It also generates 215,000 direct job opportunities and contributes US\$0.82 billion to revenue collection through indirect taxes (CCP, 2017). This sector also contributes 16 percent to the manufacturing sector of Pakistan. Though Pakistan automotive industry has a very limited player and has a huge gap for the new investment there they also had very strong competition with imported cars. These imports have still not threatened the competitive advantage of local manufacturers because of their higher freight costs and import duties (Ahmed, & Batool, 2017). In Pakistan, there are only three major players which are leading the passenger car industry i.e. Toyota, Honda, and Suzuki. Pakistan's vehicle manufacturing business can be categorized as a distinguished oligopoly (Friedman, 1983). It is obvious that the Pakistani market is mostly occupied by a few top manufacturers. Prices are supposed to be inflexible in an oligopolistic market. This rigidity may reflect the strong competition when a price increase by one producer is not matched by others while a decrease in price by one producer leads to a price reduction by the whole industry. (Sah et al., 2014) in their research on the relationship between SCM practices and continuous innovation (CI) in the Malaysian auto industry, they proved that by adopting (CI) in the supply chain management process the Malaysian auto industry has more performance and considered the best competitor among the world manufactures. In Pakistan, there are only three major players leading the passenger car industry, namely Indus Motors, Honda and Suzuki. (Damanpour, 1991) defines innovation as the acceptance of a self-generated or subcontracted device, policy, system, process, program, product or service that the adopting organization did not previously know." (Chesbrough 2003) also relies on the idea of undeveloped innovation, where organizations must use external innovation as well as internal ideas and the two options that bring market organizations trying to upgrade their technology. Through supply chain management practices, organizations can update information vertically and horizontally, "which enables a company's innovation performance to be improved. This is supported by (Utter back 1978), which identifies this innovation only when It is therefore very interesting to examine whether supply chain practices, such as information technology and information exchange, will contribute to improving organizational performance innovation. (Danneels 2002) investigated that Organizational promotions may occur when associations are able to understand mechanical changes and customer loyalty, which can be identified by the repetition of the inventory network mentioned in this study. a type of achievement that, as a rule, most experts focus on the development of objects and procedures (Prajogo and Sohal, 2001). (Christensen 1995) also

suggests that mechanical progress can be seen in the element development classes and application development procedures, as shown in the current paper (Prajogo and Sohal, 2001). "Pakistan's automotive industry operates under various conditions and under specific conditions of cooperation with world-renowned manufacturers. When everything is ready, it can usually be divided into the following sections: light commercial vehicles and light commercial vehicles, 2/3 wheels, Tractors (SBP, 20018) The Press Council (2019) reports that most Pakistani car makers are trading around 2/3 and that the number of suppliers selected for the automotive sector is 250. This report shows that there is a more comprehensive assessment of car manufacturers, which currently in Pakistan, from 10 to 12 four-wheel-drive vehicles, 90-100f two-wheelers, 40-50 roses and 5-7 tractor manufacturers, 149-165 cars are assembled all over Pakistan. (JICA's (2011) Nominal engine size shows that currently, only one (Suzuki Pak) manufactures cars on 800 cc engines. Suzuki offers optional cars with 1000 cm³ cylinder capacity. Indus (Toyota) opposes the creation of vehicles greater than 1000 cubic meters. View (PCC, 2013). In addition, the information provided by the EDB indicates that the neighboring car industry will achieve significant levels of neighboring content. Commercial vehicles, trucks and vehicles have very limited distances because they depend on imported components. Experts in the recycling program say that despite years of security for this device, family education is still poor. In addition, if the volume of finished goods imports remains high, there will be conclusions from imports from neighbors, including China and India, to reduce production costs and increase production. Customer accessibility (Malhotra et al., 2005) argues that store chain chains participate in interconnected procedures that expand data exchange capabilities and create data innovation funds that allow data processing to be received from partners to obtain new information. Their study shows how different power relationships enhance the ability to build information within an organization (Malhotra et al, 2005). In addition, (Bowersox 1990) further argues that the benefits of cooperation include increased income, investment costs, and increased operational suitability to address popular weaknesses (Fisher, 1997). Two experts and the scientific world are gradually striving to unite in the production chain (Horvath, 2001).

2.3 Continuous Product Innovation

“Most researchers, industrialists, and investors believed in the relevance of the concept of a mature industry, clearly characterized by the stability of its technology”. However, it has recently been noted that some areas of the Japanese car industry (e.g., consumer reliability and consumer value addition) have evolved (Abernathy, Clark and Kantrow, 1983) in formulating the generation and use of New Technologies in a continuous innovation process. This article attempts to explain this new innovation by asking why emerging industrial organizations have always associated meaning with mechanical changes and how competition has led them to new systems of continuous development. In Japan, with the help of institutional structures dedicated to exceptional circumstances (for example, budget funds raised by Keiretsu banks, which generally allow organizations to maintain high commitment/cost ratios), competitive methods are an important organization. Clearly, he has created elements of his own group. In what follows, we will study the processes by which elements between these groups bring development activities to the idea of continuous promotion, focusing first on changes in the purchasing equipment industry in Japan, and then on the automotive sector. Organizations have quickly promoted articles from various countries and are working to reduce design costs and make special, but not many improvements. At the beginning of this period, Matsushita had a great advantage over many organizations due to the power and promotion of large-scale production systems. Sony's new methodology has influenced the situation. The development of transistor radiocommunication (Sony's specialty market) and the development of transistors are key indicators that the company is using new potentials to integrate microelectronics to enhance its products; The creation of CTV Trinitron (which confirms Sony's difficult position in showcasing consumer equipment) has convinced some organizations that even Japanese people can develop new products.

2.4 Supply Chain Practices

The initiatives of supply chain management require a long term view that organizations can take the initiatives and focus on all the processes that are involved in the manufacturing of end-user products to create value addition and a sustainable supply chain network. The literature has proved that in future the competition among organizations may revolve around supply chain management (Das and Narasimhan, 2000). Supply chain management supports the reduction of nonessential processes (waste) and improves the efficiency of the upward and downward process. As a result, the Supply chain includes the overall flow, which begins with the purchase of raw materials, through internal procedures and ends with the transfer of goods to end customers. Advances in data and correspondence support the continuous dissemination of data and sharing for the basic and productive orientation of inventory network partners. Changing the store chain reduces costs and enables organizations to manage costs more efficiently. This is especially important when creating products that are valuable, sensitive and healthy (Fisher 1997). In addition, streamlining the inventory network structure can reduce the weaknesses and delays in demand, ensuring consistent product quality and reliable inventory. You can also increase customer support; thus, the intensity of the organization increases. Organizations have never had conflicts between organizations, however, in-store network inventory (Vickery et al., 1999; Monczka and Morgan, 1996). The whole structure of the cost center is based on the general idea of the authorities influencing business performance. Cost-based investment funds created in conjunction with suppliers and vendors as chain store partners can be reinvested in other innovative work (Cooper and Ellram, 1993). Collaboration to create a cost reserve fund enables organizations to focus their assets on specific areas of change. In general, it is said that certain market elements will stimulate market consolidation beyond the boundaries of ownership. Whenever possible, each organization can continue to improve its performance by converting data and eliminating all repeat procedures. As Sani points out, "organizations must work together at no cost or big deal unless they are part of the organization. It should not be difficult to accept something from suppliers from their own warehouse" (Latamore, 1999).

2.4.1 Leadership

Leadership has been traditionally studied, with an emphasis on the characteristics and behaviors of individuals and their effects on colleagues and organizations. Management as a whole is focused on the nature and manner of people and their impact on partners and associations. Pioneers are regarded as an important defense of the achievement hierarchy and the most important source of power (Bass, 1991, Waldman et al., 2001). Taking into account the individual management hypothesis, investigations were opened at SCM based on authoritarian initiatives. (Stevens 1989) and (Cooper et al., 1997) have chosen energy and structure management as the main segments of the GCA. (Lambert et al., 1998) indicate that if the association does not play an important role in the selection of the important production chain, it may endanger itself in the retail chain and cause chaos. The pioneers of the inventory network can be identified by size, financial power, client sponsorship, exchange or business relationship coverage (Bowersox and Closs, 1996).

2.4.2 Customer Focus

Customers are satisfied when their imaginations meet or exceed their expectations (Slope 1995, Kelley, Donnelly and Skinner 1990). This desire can be identified by the organization's own data for the delivery of better services. In particular, customers have greater control over the process of transferring administrative documents and providing a clearer picture of others' expectations of individual outcomes and performance (Swan et al., 2002). This indicates that when manufacturers install parts for the automotive industry, they may think more about promotion. They create a greater understanding of others' expectations and maintain a level of satisfaction with their own efforts. Therefore, the reality is that customers do not have the authority to determine the need for change, and membership is generally not considered a necessary condition for customers. Given all the circumstances, the association knows better.

Among others, I choose the pace of progress and materials to provide; adjusting models and evaluating performance; they set performance standards based on customer needs, while customers lack experience (Albanian, 1999). However, it is important to remember that many details are included in the customer's specific customer service requirement.

2.4.3 Information Analysis

Quality information and information quality management in an organization are essential for effective decision making and operations. Multiplication of basic information that facilitates the management also demonstrates the association's defense of poor quality information, especially given its different sources of information, parameters, customers and methods. Use that describes the root, the less shocking use of information. and information on commercial options. activities. If you accidentally use a permanent database or information distribution center to guide your organization, it's clear that data quality management is critical to the sustainability of emotional support network options. Where possible, data quality management stems from a clear understanding and consensus on the importance of the term "data quality". Indeed, there are key questions about how to characterize certain qualities and criteria used to study the nature of data. Solving these research questions is an important step in identifying the reasons for establishing a data quality assessment system and discussing related issues such as quality improvement and managers.

2.4.4 Internal Lean Practices

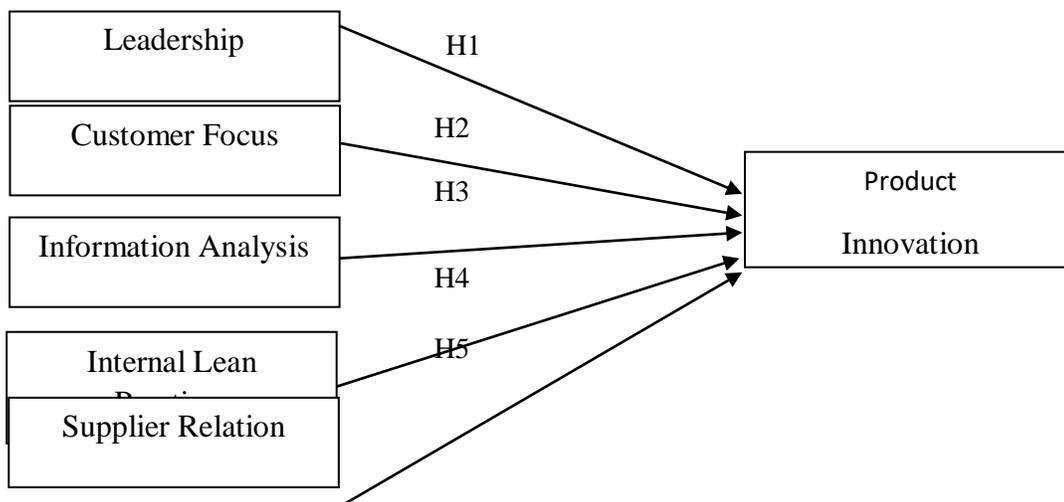
Internal lean practices are the foundation for car manufacturers (Long et al., 2008, Towill, 2009, Esain et al., 2012). lean practices are marked by ways to increase customer value and reduce waste (Endsley et al., 2006, Koning et al., 2006); that is, they are providing the services to their customers with less wastage. Toyota's training equipment is designed to meet the needs of highly promising products (Tomino et al., 2009, Yang et al., 2011). Successful models have inspired many carmakers to adopt lean practices in their associations. The specific objective of lean practice is to achieve credible excellence and increase profitability by providing low-cost management to quality management (Koning et al., 2006; Shook, 2009; Brilliant et al. 2003); that is to promote the movement of goods through development, resources and offices (Womack and Jones, 2005/2009). Where possible, in a unique installation environment, improper practices get conflicting answers. Leaders focus on line profitability, while experts expect better care (Panchak, 2003; Popescu et al., 2011). The test is to see how the chain's specialists look in practice; Workers, in particular, are more likely to analyze the repetition of associations and their influence due to direct work and information on the need for competence in continuing education (Hodgkinson et al., 2006, Long et al., 2008).

2.4.5 Supplier Relationship

In supply chain model improvement of a strong key organization depends upon the supplier relationship and will offer their observation and expectation of the producer's needs, so as to all the more likely observe its evolving prerequisites. This equivalent trade of insights about items, procedures, timetables and abilities assists makers with improving their assembling plans and produce products on schedule, upgrading the execution of the conveyance. By building up a top view of the maker's tasks, providers secure a high level of purchaser administration, which, thusly, enables the makers to improve their client assistance. Provider incorporation has been seen as related to item improvement execution (Petersen et al., 2005; Koufteros et al., 2007; Ragatz et al., 2002) and provider correspondences generally speaking execution (Cousins and Menguc, 2006). Others, nonetheless, have discovered no connection between provider coordination and operational execution. Some of the definitions of SCI focuses on the flow of drugs and also the elements, others focus a lot of on flows data[of data[of knowledge}], resources and money. though these descriptions contact several of the instance factors of SCI, they're intensively focused . additionally, most fail to have faith in the character of methods of SCI., which has the

manufacturer (internal integration) and increasing from it every direction (customer and supplier integration) and building upon its gaps to strengthen an ungenerous definition of SCI. The fundamental measure “integration” is delineated as “the unified management of a variety of sequential or comparable financial or especially industrial procedures erstwhile carried on independently” (Webster’s 1966. 1175). Applying this during a provide chain context, we have a tendency to define SCI because the degree to that a manufacturer strategically collaborates with it provides chain companions and collaboratively manages Intra- and inter-organization processes. The intention is to amass fine and setting friendly flows of merchandise and services, information, cash and choices, to provide most price to the patron at a low value and excessive-pace.

2.5 Research Framework



3. Research METHODOLOGY

The research will be quantitative in nature and will be conducted through a structured questionnaire from the persons related to the automotive industry further the result will be analyzed through PLS software by applying multiple regression models. Research philosophy is a belief about the way in which data about a phenomenon should be gathered, analyzed and used. This research-based on Positivists theory that explains reality is stable and can be observed and described from an objective viewpoint (Levin, 1988), i.e. without interfering with the phenomena being studied. They contend that phenomena should be isolated and that observations should be repeatable. This often involves manipulation of reality with variations in only a single independent variable so as to identify regularities in, and to form relationships between, some of the constituent elements of the social world .The research will be quantitative in nature and will be conducted through a structured questionnaire from the persons related to the automotive industry further the result will be analyzed through PLS software by applying multiple regression models. This research project adopts the primary data collection method. It used first-hand data collected through survey questionnaires. The data acquiring process was segmented into a few stages; namely, identification of areas for questionnaire distribution, distribution of questionnaires, reminding respondents of questionnaire dateline, gathering of the questionnaire and analyzing of data. The research approach is deductive in nature because a theory is already developed from past literature and this research is confirming the fact that supply chain management practices have a positive impact on the continuous product innovation from the automobile industry in Pakistan. According to our research objectives, we

intend to investigate the impact of Supply chain practices on continuous product innovation. Therefore a Surveys enable the researcher to obtain data about practices, situations or views at one point in time through questionnaires or interviews. Quantitative analytical techniques are then used to draw inferences from this data regarding existing relationships. The use of surveys permit a researcher to study more variables at one time than is typically possible in laboratory or field experiments, whilst data can be collected about real-world environments. The research approach is cross-sectional in nature due to the limited timeframe for six months A longitudinal study is an observational research method in which data is gathered from the same subjects repeatedly over a period of time. The total manufacturer of passenger cars in Pakistan is three i.e. Toyota, Suzuki and Honda out of which the head offices of the first two companies are in Karachi and the head office of Honda is in Lahore all the three organizations are taken into consideration for our research further there are 500 authorized distributors in Karachi. The sampling technique used in this research project is convenience sampling which is under non-probability sampling. This is a sampling procedure used to obtain data from those persons who were easily available. This method is also able to obtain a large number of completed questionnaires quickly, conveniently and economically. According to the Krejcie and Mogan table 1970 if the total population is 500 than the sample size will be 217, therefore, the sample size considered for this research will be 220. The primary data collected through the Questionnaire and will be analyzed through SPSS, while the secondary data (quantitative in nature) will be used to describe the trends and explaining the profile.

4. Result and Discussion

In the previous chapter, we have discussed the research instrument on how data were being conducted and analyzed. In this chapter, the researcher will interpret the data using the selected statistical analysis scale. All results were obtained from the output of PLS computation analysis software. The presentation of the results in this chapter includes descriptive analysis and simple linear regression. Findings will be presented at the end of this chapter.

4.1 Demographics Description

The respondent's demographics contain the variation on the basis of Gender, Age and Education.

Gender	Frequency	Percentage	Detail
Male	291	80.08	The majority of the respondents of data collected were male with 80.08% and female ration is 19.2%
Female	52	19.2	
Managerial Position	Frequency	Percentage	Detail
Officer	241	89.03	The majority of the respondents of data collected are designated at office level with a percentage 89.03% followed by Executive with the percentage of 9.2%, respondents at managerial level with a percentage of 1.4% and finally Director with 0.4%.
Executive	25	9.2	
Manager	4	1.4	
Director	1	0.4	
Education	Frequency	Percentage	Detail
Intermediate	63	23.3	The highest number of respondents (170) reported having obtained the undergraduate level of education followed by intermediate (63), followed Graduate education level (36) and final Post-graduate education level (2).
Undergraduate	170	62.7	
Graduate	36	13.3	
Post-Graduate	2	0.700	
Experience	Frequency	Percentage	Detail
5 and Below	153	56.55	The majority of the respondents of data collected are having the experience below 5
6 to 10	67	24.78	

11 to 15	19	6.99	years with the percentage 56.55% followed by 6 to 10 years of experience with 24.78%, 7.58% in 16 to 20 years of experience and finally only 14 individuals with the 4.08% with the experience of 21 years and above.
16 to 20	21	7.58	
21 and above	11	4.08	

Table 1: Demographics Description

4.3 Measurement Model

4.3.1 Validity

The face validity is the measure of the quality of judgment which people with similar background use to carry and it possesses a judicious amount of measurement reliability (Nevo, 1985). The questionnaire developed for the purpose of the data collection was presented to the two domain experts in the field of Supply chain management and their kind insight and expert opinion was requested. The insight received from domain experts were incorporated into the questionnaire.

4.3.2 Reliability

The questionnaire was further distributed among 30 respondents to check the reliability statistics of the questionnaire. The purpose of establishing the reliability of the questionnaire is to ensure the internal consistency of items of construct measure the actual concept through a conservative measure of Cronbach alpha (Cronbach, 1951). The accepted value of Cronbach alpha is above point 0.60 (Taber, 2017). Following table illustrate the value of Cronbach alpha.

Constructs	No of items	Cronbach's Alpha
Customer Focus	5	0.673
Leadership	4	0.706
Lean Practices	4	0.762
Product Innovation	7	0.754
Quality Information	5	0.705
supplier relationship	5	0.736
Overall reliability	30	0.722

Table 3: Reliability Analysis

The above table shows the value of Cronbach alpha to measure the reliability of the data collection instrument. All of the variables meet the criteria of an acceptable range of Cronbach alpha except. The value is not far from the acceptable range of the 0.60, therefore, researchers decided to retain all of the items for data collection and run the other measures to ensure the reliability of the data.

4.4 Explanation of variance

The variance can be explained through the R-Square and adjusted R-Square. The R-Square is the amount of variance each and every independent variable contributes to the variance of the dependent variable which helps to predict the future outcome of relationship in between variables and testing of hypothesis (Nagelkerke, 1991). The adjusted R-Square is R-Square which has been adjusted after adding the number of variables in the model.

	R Square	R Square Adjusted
Product Innovation	0.644	0.639

R-Square: There are discussions and debates regarding the values of the R-Square. But, a minimum 0.10 value of R-square should be present to explain the variance among the dependent and independent variables (Falk, Miller, 1992). However, in the literature of PLS-SEM, the R-Square value of 0.64, 0.33 and 0.19 is considered to be strong, moderate and weak (Chin, 1998).

4.5 Assessment of structural model: Hypothesis

The structural model of the current study summaries the final findings of the current study, the structural equation modeling helps to accept and reject the hypothesis developed for the current study. To conclude the final decision of accepting and rejecting the hypothesis, Bootstrapping procedure was applied with the help of SmartPLS 3.0 by creating 5,000 sub-samples for the current study. The final results of the analysis are presented in the following table.

Hypothesis	Beta Values	T Values	P Values	Decision
Customer Focus -> Product Innovation	0.242	3.806	0.000	Accepted
Leadership -> Product Innovation	0.023	0.498	0.618	Rejected
Lean Practices -> Product Innovation	0.223	3.891	0.000	Accepted
Quality Information -> Product Innovation	0.163	2.737	0.006	Accepted
supplier relationship ->Product Innovation	0.316	6.435	0.000	Accepted

1. The hypothesis developed which states that there is a positive and significant relationship between customer focus and product innovation Value, has been accepted based on the above three different Values (B= 0.242, T=3.806 P=0.000). Therefore, it can be said that there is a positive and significant relationship between Customer focus and product innovation. Furthermore, it can be said that, if 1 unit of customer-focused is increased than a 24.2% increase in product innovation will be observed.
2. The hypothesis developed which states that there is a positive relationship between leadership and product innovation have been rejected based on the above three value (B=0.23 T=0.498 P=0.618). Therefore, there is no positive and significant relationship between leadership and product innovation.
3. The hypothesis developed which states that there is a positive and significant relationship in between lean practices and product innovation have been accepted based on the above three different Value (B=0.223 T=3.89 P=0.000) Therefore, it can be said that, there is a positive and significant relationship in between lean practices and product innovation. Furthermore, it can be said that, if 1 unit of lean practices is increased than a 22.3% increase in Product innovation will be observed.
4. The hypothesis developed which states that there is a positive and significant relationship in between Quality information and product innovation have been accepted based on the above three different Value (B=0.163 T=2.737P=0.006) Therefore, it can be said that, there is a positive and significant relationship in between lean practices and product innovation. Furthermore, it can be said that, if 1 unit of quality information is increased than a 16.3% increase in Product innovation will be observed.

5. The hypothesis developed which states that there is a positive and significant relationship in between Supplier relationship and product innovation have been accepted based on the above three different Value ($B=0.316$ $T=4.435$ $P=0.000$) Therefore, it can be said that, there is a positive and significant relationship in between lean practices and product innovation. Furthermore, it can be said that, if 1 unit of Supplier relationship is increased than a 31.6% increase in Product innovation will be observed.

5. Discussion and Conclusion

In this chapter, an in-depth discussion and summary of the research findings will be presented by the researcher. The discussion and conclusion will be linked to the research objective that had been discussed in Chapter 1. Through current and past literature coupled with these research findings, it provides valuable insight for the automobile industry that how product innovation can be achieved through supply chain practices. Lastly, the conclusion will be presented at the end of this chapter.

5.1 Discussion

5.1.1 Does Leadership positively affect Product innovation?

The research findings indicate that the Leadership did not affect the product innovation in Pakistan whereas the result of (Asmida,2014) was totally opposite she proved that leadership has a positive impact on continuous innovation in the Malaysian automobile industry.(Hahn at all,1990) said that Top-level manager has a better understanding of supply chain management's need because they are the most important people that can recognize the firm's strategic imperatives to remain competitive in the market place.

5.1.2 Does the Supplier relationship positively affect Product innovation?

The research indicates that a supplier relationship is a powerful tool that brings product innovation as a supplier is providing consistent support for the production in the organization, (Asmida,2014) also supported the statement stated that suppliers play a more direct role in an organization's quality performance. (Landeros at all 1989) identified that through the close bonded relationships, supply chain partners are more willing to share risks and reward and be able to maintain the relationship over a longer period of time.

5.1.3 Do lean practices positively affect Product innovation?

The research has proved that lean practices has the highest contribution in product innovation in Pakistan automobile industry whereas the idea was also supported by (McIvor,2001) who explained The term lean is refer to a system that uses less input to produce at a mass-production speed and at the same time be able to offer more variety to the end customers (Ragu-Nathan,2005) has identified that the lean thinking and lean practices have become very important aspects to achieve SCM effectiveness.

5.1.4 Does Quality information positively affect Product innovation?

The research has proved that quality information analysis has a positive impact on the product innovation whereas the statement was also proved by (Asmida, 2014) in Malaysia where she conducted similar research and provided that facts that quality information enhances accuracy, timeliness, adequacy, and information exchanged credibility and contributes positively in product innovation.

5.1.5 Does Customer Focus positively affect Product innovation?

The research findings indicate that the Customer focuses positively affect the product innovation in Pakistan whereas the result of (Asmida, 2014) also represents the positive result in the Malaysian automobile industry.(Hahn at all,1990) said that customer focus creates a better understanding of supply

chain management's need because they are the most important people that can recognize the firm's strategic imperatives to remain competitive in the market place.

5.2 Contribution

The contribution of this research project is summarized below and the facts will be useful for the Pakistan automobile regulatory authorities, automobile manufacturers, researcher and the reader of this project. This research is adding to the literature on the impact of supply chain practices on product innovation in automobile industry Pakistan by investigating the facts that how leadership, supplier relationship, lean practices, quality information analysis and customer focus promotes innovation in an organization. The main supply chain factor which has been discovered in this research is the supplier relationship due to which 31.6% of innovation is profound in the organizations. Secondly, customer focus is considered as the most significant factor since the user requirement is defined, therefore, personnel involved in innovation in coordination with customer demand are delivering the quality product by adding the value in their product as desired by the customer. In the last quality information analysis is the most important factor due to which product innovation is carried out in the automobile sector.

5.4 Conclusion

The overall present study provides further evidence in revealing the product innovation in the automobile industry is largely influenced by supplier relationship and customer focus. Quality information and lean practices moderately affect product innovation, for the managers who are really concerned about the innovation for their organization they must have control over these variables. This model can help to explain the strong relationship between Supply chain practices and product innovation it provides for a better understanding of product innovation in the automobile industry; as well as impetus to promote and priorities supply chain agenda that strengthen the use of technologies. This paper identifies the five significant latent variables that could influence innovation in the automobile industry. It demonstrates the interesting feature of product innovation which may help the organizations to enhance the supply chain practices.

References

1. Ahmed, V., & Batool, S. (2017). India–Pakistan Trade: Perspectives from the Automobile Sector in Pakistan. In *India-Pakistan Trade Normalisation* (pp. 129-161). Springer Singapore.
2. Albanese, M. (1999). Students are not customers: A better model for medical education. *Academic Medicine*, 74, 1172–1186
3. Bass, B.M. (1991). “From transactional to transformational leadership: learning to share the vision”, *Organisational Dynamics*, 18, 3, 19-31.
4. Birkinshaw, J., Hamel, G., & Mol, M. J. (2008). Management innovation. *Academy of Management Review*, 33(4), 825-845.
5. Bowersox, D.J. (1990), “The strategic benefits of logistics alliances”, *Harvard Business Review*, Vol. 68 No. 4, pp. 36-43
6. Bowersox, D.J. and Closs, D.C. (1996). *Logistics Management: The Integrated Supply Chain Process*, McGraw-Hill Series in Marketing, The McGraw-Hill Companies, New York.
7. Chapman*, R. L., & Corso, M. (2005). From continuous improvement to collaborative innovation: the next challenge in supply chain management. *Production planning & control*, 16(4), 339-344. Chicago
8. Chong, A. Y. L., & Ooi, K. B. (2008). Collaborative commerce in supply chain management: a study of adoption status in the Malaysian electrical and electronics industry. *Journal of Applied Sciences*, 8(21), 3836-44.

9. Cooper, M.C., Lambert, D.M. and Pagh, J.D. (1997). “Supply chain management: more than a new name for logistics”, *The International Journal of Logistics Management*, 8, 1, 1-14.
10. Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of management journal*, 34(3), 555-590.
11. Danneels, E. (2002). The dynamics of product innovation and firm competences. *Strategic management journal*, 23(12), 1095-1121.
12. Davenport, T. H. (1993). *Process innovation: reengineering work through information technology*. Harvard Business Press.
13. Endsley, S., Magill, M.K. and Godfrey, M.M. (2006), “Creating a lean practice”, *Family Practice Management*, Vol. 13 No. 4, pp. 34-38, available at: www.aafp.org/fpm (accessed 23 June 2012).
14. Friedman, J. 1983. *Oligopoly Theory*. Cambridge University Press.
15. Goebel, D. J., Marshall, G. W., & Locander, W. B. (2003). Enhancing purchasing's strategic reputation: Evidence and recommendations for future research. *Journal of Supply Chain Management*, 39(1), 4-14.
16. Hill, F. M. (1995). Managing service quality in higher education: The role of the student as primary consumer. *Quality Assurance in Education*, 3, 10–21.
17. Hines, P., Holweg, M., & Rich, N. (2004). Learning to evolve: a review of contemporary lean thinking. *International journal of operations & production management*, 24(10), 994-1011
18. Hodgkinson, B., Koch, S., Nay, R. and Nichols, K. (2006), “Strategies to reduce medication errors with reference to older adults”, *International Journal of Evidence-Based Healthcare*, Vol. 4 No. 1, pp. 2-41.
19. Horvath, L. (2001), “Collaboration: key to value creation in supply chain management”, *International Journal of Supply Chain Management*, Vol. 6 No. 5, pp. 205-7.
20. Lambert, D.M., Cooper, M.C. and Pagh, J.D. (1998). “Supply chain management: implementation issues and research opportunities”, *International Journal of Logistics Management*, 9, 2, 1-20.
21. Long, L., Pearson, A., Page, T. and Jordan, Z. (2008), “Engaging consumers in safety and quality at Royal Adelaide Hospital”, *International Journal of Evidence-Based Healthcare*, Vol. 6 No. 1, pp. 119-134.
22. Malhotra, A., Gosain, S. and ElSawy, O.A. (2005), “Absorptive capacity configurations in supply chains: gearing for partner-enabled market knowledge creation”, *MIS Quarterly*, Vol. 29 No. 1, pp. 145-87.
23. Maxton, G. P., & Wormald, J. (2004). *Time for a model change: re-engineering the global automotive industry*. Cambridge University Press.
24. Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, 22(2), 1-25.
25. Panchak, P. (2003), “Lean healthcare: it works”, *Industry Week*, Vol. 252 No. 11, pp. 34-40, available at: www.industryweek.com/articles/lean_health_care_it_works_1331.aspx (accessed 15 August 2011).
26. Pearson, J. N., Ellram, L. M., & Carter, C. R. (1996). Status and recognition of the purchasing function in the electronics industry. *International Journal of Purchasing and Materials Management*, 32(1), 30-36.
27. Prajogo, D. I., & Sohal, A. S. (2001). TQM and innovation: a literature review and research framework. *Technovation*, 21(9), 539-558.
28. Rafique, M. (2011). Effect of profitability & financial leverage on capital structure: A case of Pakistan's automobile industry. *Available at SSRN 1911395*.
29. Sah, M. A. M., Habidin, N. F., Latip, N. A. M., & Salleh, M. I. (2014). Supply Chain Management (SCM) Practices and Continuous Innovation (CI) in the Malaysian Automotive Industry. *European Journal of Academic Essays*, 1(4), 62-67.

30. Soosay, C. A., Hyland, P. W., & Ferrer, M. (2008). Supply chain collaboration: capabilities for continuous innovation. *Supply Chain Management: An International Journal*, 13(2), 160-169.
31. Stevens, G.C. (1989). “Integrating the supply chain”, *International Journal of Physical Distribution and Logistics Management*, 19, 8, 3-8.
32. Sturgeon, T., Van Biesebroeck, J., & Gereffi, G. (2008). Value chains, networks, and clusters: reframing the global automotive industry. *Journal of economic geography*, 8(3), 297-321.
33. Swan, J.E., Bowers, M.R., & Grover, R. (2002). Customer involvement in the selection of service specifications. *Journal of Services Marketing*, 16, 88–103.
34. Tomino, T., Park, Y., Hong, P. and Roh, J. (2009), “Market flexible customizing system (MFCS) of Japanese vehicle manufacturers: an analysis of Toyota, Nissan, and Mitsubishi”, *International Journal of Production Economics*, Vol. 118 No. 2, pp. 375-386.
35. Utterback, J. M. (1971). The process of technological innovation within the firm. *Academy of Management Journal*, 14(1), 75-88.
36. Waring, J.J. and Bishop, S. (2010), “Lean healthcare: rhetoric, ritual, and resistance”, *Social Science and Medicine*, Vol. 71 No. 7 pp. 1332-1340.
37. Womack, J. and Jones, D. (2005/2009), *Lean Solutions: How Companies and Customers Can Create Value and Wealth Together*, Free Press, New York, NY.
38. Worley, J.M. and Doolen, T.L. (2006), “The role of communication and management support in a lean manufacturing implementation”, *Management Decision*, Vol. 44 No. 2, pp. 228-245.

APPENDIX 1
QUESTIONNAIRE

Please Tick Mark () the best Possible option fits your organization

1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-StronglyDisagree

Leadership		1	2	3	4	5
1	Making employees feel Valued					
2	Sharing my experience/training					
3	Providing them good technical Knowledge					
4	Making them recognized for their accomplishment					
Customer Focus		1	2	3	4	5
5	We frequently interact with customers to set reliability, responsiveness, and other standards for us.					
6	We frequently measure and evaluate customer satisfaction.					
7	We frequently determine future customer expectations.					
8	We facilitate customers’ ability to seek assistance from us.					
9	We periodically evaluate the importance of our relationship with our customers.					
Quality Information Analysis		1	2	3	4	5
10	We inform trading partners in advance of changing needs.					
11	Our trading partners share proprietary information with us.					
12	Our trading partners keep us fully informed about issues that affect our business.					
13	The more information the subordinate has the better he/she will perform.					
14	Information to a subordinate must always be simple and concise.					
Lean Practices		1	2	3	4	5

15	JIT/continuous flow production					
16	Preventive maintenance					
17	Single piece flow production/one-piece flow					
18	Setup time reduction					
Supplier Relationship		1	2	3	4	5
19	We consider quality as our number one criterion in selecting suppliers					
20	We regularly solve problems jointly with our suppliers					
21	We have helped our suppliers to improve their product quality					
22	We have continuous improvement programs that include our key suppliers.					
23	We include our key suppliers in our planning and goal-setting activities.					
Product innovation:		1	2	3	4	5
24	In the new product and service introduction, our company is often first-to-market.					
25	Our new products and services are often perceived as very novel by customers.					
26	New products and services in our company often take us up against new competitors.					
27	We manage to cope with market demands and develop new products quickly.					
28	We continuously modify the design of our products and rapidly enter new emerging markets.					
29	Our firm manages to deliver special products flexibly according to customers' orders.					
30	We continuously improve old products and raise the quality of new products.					