



Supplier Relationship Management, TQM Implementation, Leadership and Environmental Performance: Does Institutional Pressure Matter

Thanaporn Sriyakul^a, Rofiqul Umam^b, *Kittisak Jermsittiparsert^{c,d}

^aFaculty of Business Administration, Mahanakorn University of Technology, Bangkok, Thailand, ^bSchool of Science and Technology, Kwansei Gakuin University, Hyōgo, Japan, ^cDepartment for Management of Science and Technology Development, Ton Duc Thang University, Ho Chi Minh City, Vietnam. ^dFaculty of Social Sciences and Humanities, Ton Duc Thang University, Ho Chi Minh City, Vietnam

***Corresponding author email:** kittisak.jermsittiparsert@tdtu.edu.vn

The main objective of the current study is to explore the nexus between supplier relationship, TQM implementation, leadership and the environmental performance. In addition to that the current study is also interested in examining the moderating role of institutional pressure in the relationship between supplier relationship management and environmental performance, and between supplier relationship management and environmental performance. Therefore, the study is among the pioneering studies on the issues. So, current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the current study. The findings of the current study have provided support to with the proposed. The results have shown that along with customer focus approach the firms are also following the production focus approach. The findings of the study will be helpful for policy makers in understanding the issues related to integration supply chain management. In author knower this is among a few pioneering studies on these issues.

Key words: *Supplier Relationship Management, TQM Implementation, Leadership, Environmental Performance.*



Introduction

The rapidly growing concern about environmental protection has given rise to green management policies, within the supply chain network (Gunasekaran and Gallea, 2012); (Meadowcroft, 2018). Today, one-third of the researchers and manufacturing specialists around the world have been frequently using the term green manufacturing. Therefore, it is somehow inevitable. Companies and other manufacturing units are in dire need to adopt proactive approach for preserving the environment. According to an estimate a global manufacturing industry utilizes around 35% of the electricity worldwide and generates 20% of carbon dioxide emissions, which could be harmful for everyone on Earth (Meadowcroft, 2018); (Van Hoof and Lyon, 2013). It calls for the need to give more attention on the area of green manufacturing.

During the past few decades, researchers have shown considerable attention towards environmentally friendly manufacturing (Meadowcroft, 2018). Enough literature is available regarding green manufacturing, as well as on its application (Van Hoof and Lyon, 2013); (Meadowcroft, 2018); (Dües, Tan and Lim, 2013); (Meadowcroft, 2018) but only limited empirical evidence is available regarding the impact of operational performance and leadership on the environmental performance of an organization. A few research studies have used a theory-focused approach in order to identify the role of green manufacturing factors in the firms' operational performance. Therefore, in the light of all the available literature on supplier relationship management (Dües, Tan and Lim, 2013); (Meadowcroft, 2018); (Fahimnia, Sarkis and Davarzani, 2015) leadership, institutional theory (Fahimnia, Sarkis and Davarzani, 2015) and environmental performance a theoretical framework is developed for describing the impact of supplier relationship management, total quality management, and leadership on the environmental performance, while taking the effects of institutional pressures under consideration. The present study aims to extend the research by Ahi and Searcy (2015) in which a business excellence model has been proposed for SCM. Therefore, we use the findings of this study, while accepting that institutional pressures also moderates the implementation of green practices, within a supply chain.

However, it can be assumed that the SRM, TQM, and leadership will have critical effects on the environmental performance, under the moderation effects posed by the institutional pressures and would prove to be powerful in the implementation of eco-friendly practices in the rubber industry. Although, the theoretical explanation regarding the adoption of these practices is still not sufficient. There is a need for theory-based empirical researches on the rubber industry, particularly regarding the post-adoption phase of environmentally friendly activities. The present study has made three contributions in the literature of GSCM, by empirically justifying a derived model of GSCM.



Firstly, it analyzes the model in terms of organizational theory as well as institutional theory (Govindan, et al., 2016); (Hafeez, et al., 2018); (Basheer, et al., 2019); (Smith and Tracey, 2016) where institutional theory is still in its infant phase of development. The sustainable practices within the dairy SC have been investigated in a study, under the institutional theory viewpoint (Hafeez, et al., 2018) providing an insight about the institutional pressures and what effects they pose on the adoption of environmental practices by the manufacturers. Secondly, it calls for the realization that a GSCM model is needed for the rubber industry, thirdly, the prior research regarding the implementation of environmentally safe practices by manufacturers has extended to the rubber industry, by doing an industry-specific examination. Therefore, the proposed model for the rubber industry has driven by two aspects. Numerous researches have been conducted on the automotive components, automotive sector, electronic goods manufacturing sector, oil and gas sector, and chemical manufacturing sector (Aragón-Correa, et al., 2016); (Chin, Tat and Sulaiman, 2015).

Literature Review

Environmental Performance

Environmental performance measures an organizational ability to minimize SO₂, NO₂, CO₂, and other harmful emissions, which arise as a result of certain SC activities, across the network of the supply chain. The relation among environment and organization is termed as the environmental performance. It accounts for the environmental effects that occur as a result of consuming resources, the environmental impacts of several organizational processes, the processing and recovery of products, the environmental implications of services and products, and satisfying legal requirements of the environment. According to (Schoenherr et al (2012), the environmental initiatives are; pollution prevention, ISO 14000 certification, waste reduction, and the recycling of materials.

Industrial practices have started to emerge as a result of the rapidly growing pollution and global warming concerns worldwide (Hussain, et al., 2016) thus creating challenges for a global sustainable environment. An empirical study was conducted by Kauppi (2013) using a new approach to compare green and lean manufacturing. The institutional theory states that companies adopt environmentally friendly practices and those which are beneficial to the whole society under the stakeholders' pressure. The mimetic isomorphism takes place as a result of environmental uncertainty, thus pushing firms towards mimicking the practices and actions of other firms, thinking that it would prove to be beneficial for their company (Sauer and Seuring, 2018). Whereas, normative isomorphism takes place as a result of professionalization, that arises from legitimating managers' educational backgrounds (Hana, et al., 2016). Likewise, the economic variants such as trait-based imitation, outcome-based imitation, and frequency-based imitation, results in institutional isomorphism. Therefore, Sharif and Irani (2012) suggested that profit maximization and economic efficiency are



sounded to be a better fit for the paradigms of SCM and OM. However, it is quite challenging to implement the green practices without spreading environmental awareness. Market, competitive, and regulatory pressures are the driving forces of GSCM and have been spreading considerable environmental awareness in this regard (Dubey, et al., 2015). Chinese manufacturers initiated the green practices by adopting the GSCM practices, for the purpose of closing the supply chain loop. Therefore, the preceding discussion has highlighted the significance of TQM, lean manufacturing, training & development, leadership and supplier relationship management. Lean manufacturing emphasizes upon waste reduction and it goes back to the Toyota Production Systems, which greatly revolutionized the production activities in the 1960s and 1970s. Consequently, by the 1990s, the majority of the leading manufacturers had adopted it as a strategy, but they have shifted again towards customer satisfaction for satisfying their foremost objectives.

Leadership

Taking into consideration the environmental factors, the top management from different SC members, and from suppliers to manufacturer networks, i.e. distributors, retailers, and transporters, must keep their objectives in line to meet the requirements of the customers. Leadership is considered as a base for the TQM pyramid (Subramanian and Gunasekaran, 2015) and has been recognized as a driving force in the philosophy of total quality management, as it provides assistance in establishing a fostering collaboration and quality culture among the SC partners (Wiengarten and Pagell, 2012). Leadership also acts as a driver for adopting GSCM practices. In a study, the means through which leadership could facilitate in achieving environmental performance were outlined (Sharif and Irani 2012) within a SC network. Leadership also involves the formulation of environmental goals and policies for stimulating growth, and to provide appropriate training and resources. In addition, developing certain practices by keeping in view the long-term needs of organization, with ever changing customer needs. Thus, we hypothesize:

H1: Leadership has significant impact on the TQM implementation

H2: Leadership has significant impact on the SRM with supply chain partners

Supplier Relationship Management (SRM)

Kanji and Wong (1999) argued that collaborative partnership between the partners of SC improves the coordination within the SC network and also minimizes the bullwhip effect within the system. However, the supply chain collaboration is referred to be a set of shared efforts for satisfying a common goal or objective (Sharif and Irani 2012); (Dubey, et al., 2015); (Subramanian and Gunasekaran, 2015). Therefore, relationship management within the SC network has found to be helpful for achieving organizational green objectives, such as



decreasing the level of carbon emissions in the SC network, facilitates in the successful adoption of green practices, and assists in the implementation of TQM practices [(Van Hoof and Lyon 2013); (Dües, et al., 2013); (Fahimnia, et al., 2015); (Govindan, et al., 2016); (Kauppi, 2013)]. The concept of supplier relationship management works on the notion of supplier involvement in technological development, decision making, as well as satisfying expectations of their customers through collaboration. Such collaboration involves risk, proportionate profit sharing, and information. We therefore hypothesize:

H3: SRM has significant impact on the TQM implementation;

H4: SRM has significant impact on the environmental performance.

Total Quality Management (TQM)

A theory of total quality management states that an organization aims to provide quality services or goods to its customers. Therefore, TQM is a constant improvement process for groups of people, firms and individuals and thus revolves around four organizational principles that is a) management by fact, b) delight the customer, c) continuous improvement, and d) people-based management. It comprises of eight key concepts, such as all work in progress, internal customers are real, customer satisfaction, teamwork, measurement, prevention, continuous improvement cycle, and people make quality (Hsu, et al., 2016). Thus, it can be stated that total quality management is a philosophy as well as a systematic set of activities for improving the quality and value of all products and services that are provided to their customers, by maximizing and boosting the potential of their stakeholders.

The role of total quality management has been highlighted in past by several researchers, for the purpose of providing help to organizations in fulfilling their green objectives through recycling wastes, reducing carbon dioxide emissions and wastage (Esfahbodi, et al., 2016). The significance of quality management activities on the firms' environmental performance has been observed in a study (Dubey, et al., 2017). The TQM assesses the ability of an organization to enhance the quality of a product, reduce variability and improve coordination level across the SC. Furthermore, it also facilitates in developing a mind-set among the SC partners, for minimizing cost through reducing the amount of waste that generates as a result of overproduction, defects, and transport. Therefore, we propose a hypothesis:

H5: TQM has significant impact on the environmental performance.



Moderation effect of Institutional Pressures

Moderation effect of Institutional Pressures

The role of institutional theory has increased since the past few years, particularly in the areas of SCM and OM (Hussain, et al., 2016); (Dubey, et al., 2017); (Hsu, et al., 2016). According to Institutional theory, it is the external forces which encourage organizations to adopt strategic actions. Organizations do not solely seek to maximize profits rather it also realizes how important it is to reach to the social legitimacy position (Esfahbodi, et al., 2016). In addition, Dubey et al (2017) have suggested two forms of institutional theory i.e. a social variant and an economic variant, whereas it is divided into three mechanisms namely normative, mimetic, and coercive (Subramanian and Gunasekaran, 2015); (Wong, et al., 2012) leading to institutional isomorphism.

According to Chu et al (2017) green supply chain management can be incorporated as a tool which can help firm in improving its environmental image as well as in acquiring business competitiveness in the international market. Initiating green supply chain practices require incorporating environmental principles in the supply chain practices and institutionalize it in the design and structure of the SC. Gómez-López et al (2016); Shibin et al (2017) have argued about the significance of environmental principles in developing eco-friendly firms and achieving eco-efficiency. They clearly emphasized to adopt these principles and practices in the product cycle of organizations. A practicing manager must understand the significance and linkage among such GSCM practices and economic progress, with the successful implementation of these practices. Thus, environmental pressures drive firms to adopt GSCM practices. Such regulatory, environmental, and market pressures allow firms to improve their practices, as they are expected to directly affect the green purchasing and eco-design. Therefore, manufacturers having greater regulatory and market pressures seek to readily adopt policies regarding investment recovery and green purchasing.

Adopting various GSCM practices due to competitive pressure can greatly enhance the economic benefits (Chu, et al., 2017); Gómez-López, et al., 2016); Shibin et al., 2017); (Hafeez, et al., 2018). Research was conducted to analyze the moderation effects of green supply chain operations and environmental management on the performance of a manufacturing organization (Govindan, et al., 2016); (Kauppi, 2013); (Esfahbodi, et al., 2016). However, we aim to extend it in terms of institutional theory. As institutional pressure also compels firms to initiate environmental management practices; such as the impact of green supply chain management has been observed on the GSCM practices on the textile industry in Taiwan, having moderation effects posed by institutional pressures (Dubey, et al., 2017). Thus, we accept that the effects of TQM and SRM on the environmental performance of organization can be influenced by the moderation effects of institutional pressures.



Although, reasons can be stated for why institutional pressures are not considered to be a mediating variable.

Most of the time, researchers become uncertain between mediating, controllable, and moderating variables. Therefore, an insight and critical review of these concepts can further assist in resolving this issue. However, enough literature is available that supports the moderating effects of institutional pressures. A study has explored the stimulus for applying TQM practices in an organization (Wong, et al., 2012). In another study, the moderation effects of institutional pressures have been explored on the firms' desire of adopting internet-based SC (Chu, et al., 2017). Moreover, a supplier development program has also been considered in terms of institutional theory perspective, where institutional pressures accounts for the mimetic, normative and coercive pressures, driving firms to adopt GSCM (Gómez-López, et al., 2016). Institutional pressures are measured through market pressure, regulatory pressures, profit motive, and brand consciousness, resulting in institutional isomorphism. In the light of this discussion, we hypothesize as:

H6: Institutional pressures moderate the impact of SRM on environmental performance.

H7: Institutional pressures moderate the impact of TQM on environmental performance.

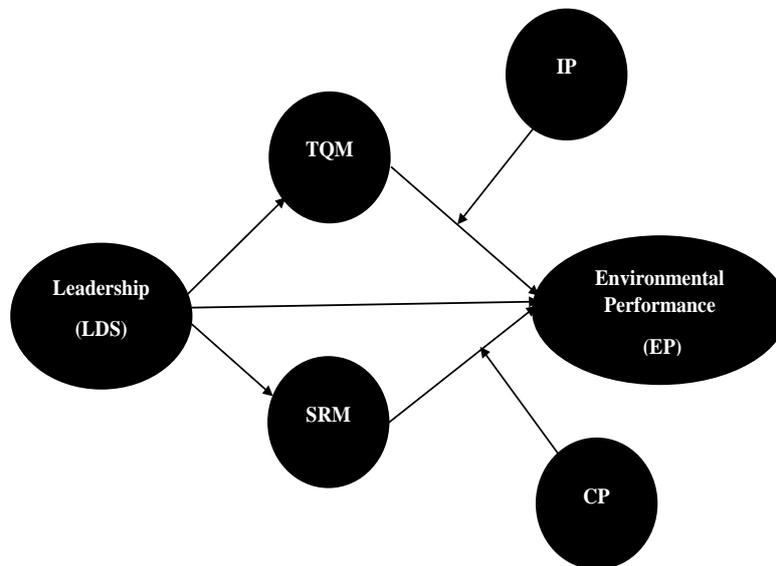
Institutional theory is shaped by three important dimensions namely; normative, mimetic, and coercive pressures (Etikan, et al., 2016). The normative isomorphism arises due to professionalization and is referred as the collective efforts of the occupation members to explain the work methods and working conditions (Gómez-López, et al., 2016); (Dües, et al., 2013); (Basheer, et al., 2019) as well as to guide professionals about the future working through legitimacy. On the other hand, the mimetic isomorphism occurs as a result of imitating the actions of other competitive organizations in the market. An organization usually imitates other organizations due to lack of clarity regarding their own goals and objectives, or lack of understanding about the technology, and environmental uncertainty (Chin, et al., 2015); (Hana, et al., 2016). Whereas, the coercive isomorphism occurs as a result of informal and formal pressures that arise from other organizations, such as government, buyers, regulatory norms, and agencies etc. because of societal expectations (Wiengarten and Pagell 2012); (Hsu, et al., 2016); (Esfahbodi, et al., 2016); (Aragón-Correa, et al., 2016).

In situations where the strength of market supply is low and buyers are strong, a firm is able to practice coercion for satisfying its own demand (Hair, et al., 2014) i.e. by demanding the implementation of favourable operational activities by the partners (Kauppi, 2013). Customers, government, as well as stakeholders put pressure to companies for adopting best practices. However, the coercive pressure occurs as a result of the external pressures from the stakeholders, such as government agencies, regulatory norms, and buyers, etc. For fulfilling

stakeholders' expectations, the top management tries to mediate among the SRM activities and coercive isomorphism under the GSC network. A study has observed the impact of such coercive pressures on the behaviours of top management, having a crucial role in the process of developing procurement policies in accordance with institutional norms . Thus, we can further hypothesize that:

- H8: Coercive pressures moderate the impact of SRM on environmental performance.
 H9: Coercive pressures moderate the impact of TQM on environmental performance.

Figure 1. Conceptual framework



Methodology
Sampling

According to All India Rubber Association, more than 3500 licensed manufacturers of rubber goods are operating in India, using GSCM practices.

Table 1: Reliability

	CR	AVE	Cronbach Alpha
EP	0.975	0.872	0.885
LDS	0.702	0.737	0.924
TQM	0.960	0.871	0.893
SRM	0.802	0.832	0.916
IP	0.891	0.801	0.993
CP	0.922	0.852	0.946



Duarte and Raposo (2010) referred to Discriminant validity refers as the degree to which a specific latent construct diverge from all the other constructs.

Discriminant validity in the present study was determined using average variance extracted based on suggestion. He further emphasized that it was realized when the between the latent constructs with the square roots of AVE. In addition, following the criterion of Fornell and Lacker (1981) discriminant validity was achieved. Firstly, there was the benchmark for estimating discriminant validity, therefore, Wong (2016) suggested that the (AVE) average variance extracted with a score of 0.50 or more is acceptable. For adequate discriminant validity to be achieved, Duarte and Raposo (2010) suggested that the square root of the average variance extracted (AVE) has to be greater than the correlations among the latent constructs. See table 2 above show the values for AVE that ranges as 0.56-0.87, indicating the acceptability of these values.

The target respondents for this study are the senior managers. The sample size is estimated using a formula presented by Etikan, et al (2016). Therefore, the estimated sample size came out to be 358 at CI= 95%. However, recent studies (Etikan, et al., 2016); (Ramdeholl, et al., 2017); (Wong, 2016) on the areas of SCM and OM have suggested that a sample size of 150 is considered to be sufficient for testing of the hypotheses.



Data collection

For this study, data collection is done using an electronic survey, by employing a split survey technique (Wong, 2016); (Duarte and Raposo 2010). The questionnaire was split into two halves. The first part includes items addressing supplier relationship management, leadership, institutional pressures, such as market pressure and regulatory norms, and total quality management; whereas the second part includes the items regarding environmental performance. Initially, 358 firms were taken as a sample frame from all over India and were assembled using a database of AIRA. The purpose of choosing this database is to reach to the maximum number of executives having knowledge and enough seniority to address the split survey. A modified version of total design method was used for data collection. As a whole, 187 usable and complete surveys were received for first part, whereas 174 usable and complete surveys were obtained for the second part. The total response rate of firm was 52.23% and the ratio for split survey was 93.04%. The response rate turned out to be slightly lower than expected. Although, the obtained sample size is sufficient for testing the proposed hypotheses and is consistent with the recent researches on operational management and supply chain.

Results

The Smart PLS Structural Equation Modelling (SEM) is used to test the relationships between the constructs in its conceptual model. SEM, which is recognized as a second-generation approach, is a powerful alternative to the first-generation approach; multiple regressions. While the multiple regressions allow only one dependent variable in the model, SEM can simultaneously handle multiple dependent variables (both techniques allow the inclusion of multiple independent variables (Ramdeholl, et al., 2017). SEM, which is very popular among behavioural science researchers, offers researchers the ability to incorporate latent (unobserved) variables in the analysis and to perform path-analytic modelling with them. Latent variables are those concepts that cannot be directly observed and measured in the study and which need to be approximated by other measures (also called items or indicators). All of the constructs in this research are latent and they need to be measured via their indicators. SEM couples a structural model (also called an inner model) with a measurement model (also called an outer model).

The convergent validity is defined as the level to which the items represent their respective latent constructs, having correlation among other indicators of the same construct (Hair et al., 2006; Kareem, et al 2017). For this study, the Average variance extracted for each of the latent construct were examined to assess the convergent validity for the present study, following the suggestion by Hair et al (2014). Based on Gómez-López et al (2016), to achieve adequate convergent validity, the AVE of each latent construct should be 0.50 or

more. In line with Chin (1998), the AVE values in table 1 ranged from 0.567 and 0.8771 which revealed high loadings (>0.50) on their respective constructs, indicating that for all the constructs, the convergent validity has been established.

Table 2. Discriminant Validity

	1	2	3	4	5	6
EP	0.709					
LDS	0.68	0.727				
TQM	0.657	0.676	0.712			
SRM	0.642	0.654	0.682	0.832		
IP	0.627	0.641	0.653	0.732	0.872	
CP	0.612	0.624	0.625	0.622	0.782	0.932

The next stage is the assessment of the structural model after ascertaining the measurement model in the study. The procedure is the bootstrapping through a number of 5000 bootstrap samples and 331 sample size to assess the significance of the path coefficients was applied (Hair et al., 2014) Structural model, according to Hair et al (2014) illustrates the reliance and dependence of relationships in the hypothesized model. In partial least squares (PLS), structural model takes before the directional relationships between the variables, their t-values and the path co-efficient. Regarding path coefficient, partial least squares (PLS) is entirely like the standardized beta (Std. Beta) coefficient in regression analysis.

Table 3: Direct Effect

	(β)	SD	T-value	P-Values
H1	0.211	0.135	3.211	0
H2	0.357	0.152	3.678	0
H3	0.321	0.178	3.321	0
H4	0.342	0.165	3.234	0

The study spotlights the evaluation model and then the assessment of the hypothesis of regression and correlation of variables. In the hypotheses structuring perspective, PLSSEM supports Parsimonious models those offer “as few parameters as possible for a given quality of model estimation results”.

Similarly, a hierarchical component model is a second-order or, of a higher order, framework having multiple layers of constructs with higher abstraction level. It includes an abstract with higher-order construct linked with two or more LOCs, either in formative or reflective way. Although, there are a number of reasons for the inclusion of HCM in PLS-SEM (Sarstedt, et al., 2014). Such as, HCM enables to minimize the number of relationships within the structural model, thus allowing the PLS path model to become easier to understand and to become more parsimonious. Furthermore, in case of high correlation of the constructs, the structural relationships turn out to be biased and can cause collinearity issues, resulting in the unacceptability of the discriminant validity (Kareem, Olusegun & Arogundade 2017).

Therefore, in such situations, a second-order construct may resolve the collinearity and discriminant validity problems.

Table 4: Indirect Effect

	(β)	SD	T-value	P-Values
H5	0.211	0.135	3.211	0
H6	0.357	0.152	3.678	0
H7	0.453	0.187	3.768	0
H8	0.408	0.132	3.968	0

The (R²) R-squared is another important criterion for assessing the PLS SEM structural model, which is referred as the coefficient of Sarstedt et al (2014) equally, referred to R² value to represent in the independent variable the proportion of variation that can be explained by one or more predictor variable (s). Although the research context determined the acceptable level of R² value (Hair et, al., 2014) recommended a minimum acceptable level of an R-squared value of 0.10. In the meantime, it was suggested by Duarte and Raposo (2010) that it can be considered when R², value is 0.19 ,0.33 and 0.67, categorized respectively as weak, moderate and substantial in the PLS-SEM table 4 presents the R-squared values of the endogenous latent variable.

Table 5: Expected Variance

	R ²
TQM	19.00%
SRM	33.00%
EP	67.00%



Conclusion

SRM, TQM, and leadership will have critical effects on the environmental performance, under the moderation effects posed by the institutional pressures and would prove to be powerful in the implementation of eco-friendly practices in the rubber industry. Although, the theoretical explanation regarding the adoption of these practices is still not sufficient. There is a need for theory-based empirical research on the rubber industry, particularly regarding the post-adoption phase of environmentally friendly activities.

This study has made three contributions in the literature of GSCM, by empirically justifying a derived model of GSCM. Firstly, it analyzes the model in terms of organizational theory as well as institutional theory where institutional theory is still in its infancy phase of development. The sustainable practices within the dairy SC have been investigated in a study, under the institutional theory viewpoint providing an insight about the institutional pressures and what effect they have on the adoption of environmental practices by the manufacturers. Secondly, it calls for the realization that a GSCM model is needed for the rubber industry, thirdly, the prior research regarding the implementation of environmentally safe practices by manufacturers has extended to the rubber industry, by doing an industry-specific examination.

Therefore, the proposed model for the rubber industry has been driven by two aspects. Numerous studies have been conducted on the automotive components, automotive sector, electronic goods manufacturing sector, oil and gas sector, and chemical manufacturing sectors. Therefore, the study is among the pioneering studies on the issues. So, the current study has used SEM-PLS as a statistical tool to answer the research questions raised in this study and research objectives envisaged in the study. The results have shown that, along with a customer focus approach, the firms are also following the production focus approach. The findings of the study will be helpful for policy makers in understanding the issues related to integration supply chain management.



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