The Impact of Innovativeness on Supply Chain Performance: Mediating Role of Supply Chain Integration

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ARTICLE INFO

ABSTRACT

The purpose of this research is to test the innovativeness impact on supply chain (SC) performance by using the mediating effect of SC integration, as well as by taking into account the moderating effect of information system capability in the manufacturing sector of small and medium enterprises (SMEs) in South Punjab Pakistan. The research is based on a survey questionnaire. Non-probability convenience sampling was used, and 251 responses were collected from the SMEs' Owners/CEOs/managers. The findings show that innovativeness has a favorable effect on SC integration, which in turn has a positive effect on SC performance. The findings imply a moderating effect on the link between SC integration and performance. The findings imply that organizations should strive for innovation and SC integration since they contribute to SC performance. The distinctiveness of this study derives from its attention to SC performance is used, which is explored through the mediating effect of SC integration, as well as by taking into account the moderating effect of information system capability in the manufacturing sector of SMEs in South Punjab, Pakistan.

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1.   Introduction

In today's competitive market, companies face tremendous challenges in meeting the needs of their customers. Besides, the work transferred to the entire SC. In these circumstances, SC management performs a vital role in ensuring the company's survival global and competitive market by organizing activities efficiently and effectively to meet the end customer demand from the supplier. Every SC wants to improve and enhance its performance to meet the expectations of its customers. The primary goal of this chapter is to provide the background knowledge for this research. This chapter will begin by describing the complete information structure that underpins the specific problems. The following issues will be discussed in detail, including the necessity of the current research, the research aims, the study's significance, and the scope. Increasing competitive pressures have forced many organizations to customise their SC as a competitive gadget to shape and improve financial and operational performance (Aslam, Saleem, Khan, & Kim, 2021). Literature reveals that an effective SC management program is one of the modern companies' most crucial competitive advantages. Further, SC management focuses on improving a firm's overall value by effectively

utilizing and supplying all of the organization's available resources. A manufacturer's SC comprises all functions connected to receiving and fulfilling customer requests in any business.

Since the first day of exchanges between partners, the SC has been in operation and management. Management of SCs is vital to provide a sustained competitive edge for all partners involved. It is a tremendous task for a company's value creation management in its SC to construct and expand the SC system and to develop a global SC (Cai, Goh, De Souza, & Li, 2013; Huo, Ye, Zhao, & Zhu, 2019; Zhou & Johnson, 2014). Globally, large-scale manufacturing firms rely on SC to manufacture customized goods to fulfil the diverse needs of customers. Additionally, based on the previous discussions, the SC of a firm should be flexible to meet unpredictable demand and a short product life cycle (Gliger, Esmark, & Holcomb, 2015). The role of SC is crucial to launch new products in response to diverse consumer demand and to adapt to the changes in quantities and delivery of products efficiently (Qi, Zhao, & Sheu, 2011).

SMEs are the main type of company necessary for economic growth in industrialized and advanced countries (Redmond, Cox, Curtis, Kirk-Brown, & Walker, 2016). They create job opportunities, reduce poverty and improve technological production capacity. They help increase exports, which is very vital for economic development. SMEs are considered the economic backbone of all countries because they play a vital role in developing economic infrastructure to increase overall productivity through scientific and technological progress. Therefore, to attain the finest results, SMEs often face various encounters in raising working capital to facilitate their business operations (Song, Yu, Ganguly, Turson, & Systems, 2016). In the state of SMEs in Pakistan, the status of the SME sector to the country's industrial development cannot be overstated. Around 90% of Pakistan's businesses are SMEs, which employ 80% of the non-agricultural workforce and contribute 40% of the country's annual GDP (SMEDA). According to (SMEDA) over 4 lacs are manufacturing SMEs operating in Pakistan and as well as there are also service providers SMEs are operational. After the establishment of SMEDA in Pakistan, there has been a lot of growth in SME development. Mainly growth has been seen in the development of south Punjab SMEs. These SMEs play a vital role in developing south Punjab and creating employment opportunities for the people of southern Punjab.

Numerous researchers (Ataseven & Nair, 2017; Flyn, Huo, & Zhao, 2010; Zhao, Huo, Sun, & Zhao, 2013) experimentally explored relations between different performance measures and SC integration, such research has no uniform understanding or implication of SC integration, owing to conflicting findings. For example, Saragih, Tarigan, Pratama, Wardati, and Silalahi (2020) have shown significantly negative linkages in performance measurement to SC integration dimensions. In contrast, other research has indicated that the relation between the SC integration dimensions and performance measures is inconsistent (Flyn et al., 2010). Incompleteness and evolution of SC integrating principles and multiple research contexts and the application of different performance measurements are the main cause of inconsistent results (Zhao et al., 2013). The preceding document does not uniformly promote the integration and performance relationship between SCs. It, therefore, requires further study on the direct and intermediate function of integration, especially at the dimensional level (Alfala, Marin-Garcia, & Medina-Lopez, 2015). The literature so far does not agree that the relationship between performance and SCI is positive. There are few studies concluded that advanced SCI levels had a positive effect on performance, but others failed to establish this association. Hence, there is need to explore the relationship between SCI and performance. Prior study into SC management assessed the exchange of information sharing among trade partners as a major element of inefficient SC management (Zimon, Tyan, & Sroufe, 2020). Few companies have recognized the capacity to share knowledge in informed SC performance. Information sharing is a critical component of SC management since it simplifies coordination and advances decision-making to improve customer requirements, advance service and product quality service quality, and reduce costs in the SC (Ramayah & Omar, 2010). This study aims to identify and fill the following gaps in the following ways: First, since there are multiple descriptions of SC Integration in the literature, this research will follow (Alfala et al., 2015) and consider external integration orientation and the previously accepted SC integration measurement, as obvious contradictions of the previous research results and uncertainties about the SC performance integration relationship indicate a lack of measurement.

This research contributes to the literature and knowledge about SC management both in theoretical and practical aspects. Further, the current study elaborates on the SC mechanism by exploring innovativeness's direct and indirect effects on firms' SC performance. Furthermore, the current study also contributes knowledge regarding the moderating effect of formation

system capacity on the relationship between innovativeness and firms' SC performance. These might contribute to the current body of information regarding SC performance. Moreover, because of lacking empirical studies investigating the SC performance of SMEs in Pakistan. The current study fills the literature and theoretical gap in the present research. The study examined how SC's mechanism works and the antecedents and consequences of SC performance (Isnaini, Nurhaida, & Pratama, 2020). Despite multiple types of research showing the efficiency of SCI, few examined the effects on the performance of this integration. Additionally, the current study theoretically contributed to expanding the geographical boundaries of organizational information processing theory regarding SC performance literature to understand hypothesized relationships as detailed in later sections. Hence, owing to the scarcity of practical efforts in Pakistan, the current study examined predictors underpinned by organizational information processing theory for their effect on SC performance. Concerning the practical contribution, the findings of this study may assist policymakers, owners, CEOs, and management in developing effective step-by-step planning to sustain performance. As a result, this study may be utilized as a strategic tool for performance management. In addition, this study is intended to motivate further researchers to the finest of the researchers' understanding due to the absence of empirical "SC performance" research in Pakistan SMEs. It can expand the potential for new research initiatives. The research is focused on Pakistan's manufacturing of SMEs. SMEs' manufacturing sector is critical since its development is directly related to Pakistan's exports (Khalique, Bontis, Bin Shaari, & Isa, 2015).

The current study aims to examine the effect of innovativeness on the SC performance of SMEs from South Punjab, Pakistan. Further, the current study examines the mediating role of SC integration and moderating effect of information system capability variables. Thus the scope of the present study is limited to the framework of SC performance of SMEs based on organizational processing theory. The current study uses a quantitative research method and distributed 300 questionnaires among respondents selected from south Punjab Pakistan manufacturing SMEs. The target population of the current study consisted of owners, CEO, and managers (M. N. Kalyar, I. Shafique, & B. J. I. J. o. E. M. Ahmad, 2019) from SMEs in the South Punjab region of Pakistan. Moreover, the current study used a convenience sampling technique for data collection from 300 respondents who participated in the study. Additionally, the scope of the current study is limited to the South Punjab region because there are more than four lacks SMEs operating in Pakistan, and it wasn't easy to collect the data from all the SMEs. Hence, the current study targets the SMEs of South Punjab, Pakistan.

2.   Literature Review

For decades economists have seen the impact of innovativeness on corporate success and economic growth. Innovativeness, in the opinion of Gao, Xu, Ruan, and Lu (2017), "is the ability of a company to convert chances into realities", while Yildiz Çankaya and Sezen (2019) described "innovativeness as a corporate culture which enables the implementation of innovations when sufficient resources are present". Innovativeness is vital to performance and focuses on experimenting and adopting progressive ideas, preferably on ancient or current tactics. It helps the development, selection, and implementation of several approaches (Seo, Dinwoodie, & Kwak, 2014), that improve the attractiveness of companies in marketplaces with changes in consumer requirements, the finite possibility of differentiators (Harvey, 2000; Loon, Udin, Hassan, Bakar, & Hanaysha, 2017). Innovativeness is an action-based capacity that, if present, leads organizations to alter a procedure in demand to take advantage of possibilities by presenting and implementing new concepts. The level of innovation depends on the level of new ideas incorporated into a company or the extent of an innovative firm culture that encourages management and workers to endorse innovative actions (Escrig-Tena, Segarra-Ciprés, García-Juan, & Beltrán-Martín, 2018). Higher-innovative organizations can provide superior environmental solutions and can readily acquire the capacity to financially beat others consequently, more rapidly and efficiently, innovative companies can grow more profitable than non-innovators. Modern organizations, therefore, strive to encourage innovation by involving management and staff to take advantage of new attributes, products, procedures, and services.

In a developed world, companies are increasingly competitively driven by technology and demand a more rapid movement of knowledge, information, and resources. This type of competition reduces the product's life cycle. This forces companies to explore deeper technological integration. Technologies form the basis for information exchange throughout SCs,

where elements such as relationships, knowledge, and technological networks are intimately associated with innovation. Technology also promotes innovation by improving communication and collecting data, therefore serving as a source of innovation (Yildiz Çankaya & Sezen, 2019). In addition, innovation creation allows companies to decrease the costs of transforming services, products, and values, boosting efficiency. It will also enable companies to acquire the capacity to decrease the cycle durations of raw material stocks and work in progress. Innovativeness will also maximize the flexibility of enterprises to adapt to unexpected demand without additional expense or time, thereby increasing SC efficiency (Silva, Gomes, & Sarkis, 2019). Similarly, innovativeness should allow companies to decrease order lead times, satisfy the minimal cost SC requirements, and accomplish orders in the appropriate quantity below normal and unusual conditions (Tarafdar & Qrunfleh, 2017). The development of downstream lines and changes to current operators would minimize distribution costs and improve order fulfilment's 'accuracy' (V. Maestrini, D. Luzzini, P. Maccarrone, & F. Caniato, 2017), and ensure SC's reactivity in a healthy functioning environment that could improve SC's effectiveness as a reaction. Based on the available literature, the present research has established the hypothesis as under:

H1: Innovativeness has positive and significant linkages with the SC performance of SMEs in Pakistan.

In addition, Seo et al. (2014) suggested: "that innovation will improve the creation and diffusion of knowledge across companies and SC". It can also enhance the capability of companies to integrate their operations internally and cooperate with "SC partners". In the mode of SC, these competencies include information management, technology management, and collaborative management. "Innovativeness" in SC enables businesses to propose novel approaches to increase their integrated information technology systems' presence with SC associates, resulting in more integrated SCs (Neutzling, Land, Seuring, & do Nascimento, 2018). Initially, a company develops emerging business processes to enhance its integration in overall SCs and simultaneously examine the processes of its partners. The rising demand from suppliers and consumers led companies to embrace updated technology, thereby promoting innovativeness in SC. Planned cooperation, on the other hand, promotes innovation and encourages integration across all stages of the SC (Neutzling et al., 2018). For example, When one SC takes a more innovative approach, it encourages other SCs to design and execute solutions to address inter-SC demand and supply imbalances (V. Maestrini, D. Luzzini, P. Maccarrone, & F. J. I. J. o. P. E. Caniato, 2017).

To adopt innovative capabilities, companies' internal processes are integrated to streamline product development, inventory management, and manufacturing operations. Likewise, innovation will force companies to integrate with providers and customers to manage cross-company business operations, exchanging information, strategic decision-making cooperation, and alliances to achieve competitive advantage. In addition, a predisposition to renovate and invent SCs will encourage a company's attitude towards cooperation and discourage opponent interactions. Therefore, a larger degree of innovativeness is predicted to improve the possibility of customer, internal, and supplier integration and promote external integration orientation. In short, a company's innovativeness increases SC integration across SCs at all levels. Based on the available literature, the present research has established the hypothesis as under:

H2: Innovativeness has positive and significant linkages with the SC integration of SMEs in Pakistan.

Firms realize they may maintain a competitive advantage by integrating partner firms into the SC (Horn et al. 2014). The key to intelligent SC performance is delivering products, services, and technology from suppliers to customers without waste (Jasti, Kodali, & Control, 2015). This indicates that a lean SC's competitive goal is to minimize costs. In practice, SCI provides businesses with access to uncommon, precious, unique, and non-substitution extra funds (Frank, Humphreys, Gimenez, & McIvor, 2016), which can lead to sustained competitive advantages and thus to an improvement in corporate performance. Innovative business performance is an important competitive aspect, and numerous scholars have been working on finding variables to increase competitiveness (Gamal Aboelmaged, 2012). Knowledge-based views imply that knowledge is essential to innovation development (Jin, Sun, Xu, & Xu, 2015; Wang & Han, 2011). This information can come from internal sources of the company, such as

staff, or outside sources like public agencies, advisors, colleges, and research organizations (Jimenez, Martínez-Costa, & Rodriguez, 2019). Furthermore, Frank et al. (2016) argued that the power of a connection may be split into coordination and collaborative integration represented by the practices and activities undertaken by SC partners. Various material has been collected connecting SCI to organisational performance (Leuschner, Rogers, & Charvet, 2013; Mackelprang, Robinson, Bernardes, & Webb, 2014).

As mentioned, SC integration is a key factor in companies' SC performance. SC integration is based on innovativeness and allows companies to enhance SC order completion, flexibility, lead times, and cycle efficiency. In this approach, integration and integration orientation will increase SC efficiency and effectiveness and promote SC performance. In its opinion, Uniqueness promotes business interactions with suppliers and consumers and motivates companies to invest significantly in new systems and procedures (Panayides & Lun, 2009). Cankaya and Sezen (2018) claimed that there are other sorts of innovations, such as administrative and non-performance procedures, which help businesses enhance their intranet operations, improving computer performance (Seo et al., 2014). In addition, these developments are intended to enable companies to get into tactical relations with their suppliers and customers, therefore improving the performance of companies. Innovativeness, in addition to direct benefits, is also predicted to increase SC performance through mediation processes of the four aspects of SC integration. This study emphasizes directly promoting SC performance, improving innovation the probability of better integration into SCs inside the internals, suppliers, and customers. When one SC takes a more innovative approach, it encourages other SCs to design and execute solutions to address inter-SC demand and supply imbalances. Based on the available literature, the present research has established the hypothesis as under:

H3: SC integration significantly mediates between innovativeness and SC performance of SMEs in Pakistan.

Moreover, Tarafdar and Qrunfleh (2017) noted that IS capacity enables applications for the company to enable customers and service providers to share information, promote market search and surveillance, enable future planning for scenarios and help to introduce new goods and services. Proposed that IS agility further enhances the edge of the three "SC" practices by making it fit among information processing needs and capacities. Baliga, Raut, and Kamble (2020) define uncertainty as the incapacity of a company to properly anticipate possible risks or make accurate and incomplete judgments. Companies are investing heavily in IT to extend their capability to process information and provide elasticity to deal with uncertainties. Some studies show that starts are successful or failing due to management decisions made on their perceptions and available data (Wong, Lai, & Cheng, 2011). In SCs, too, like in other functional areas of companies, there is uncertainty since the interactions of companies lead to many routes in the flow of materials, commodities, and information, making it impossible to predict the linkage of developments (Lu, Ding, Asian, & Paul, 2018). IS abilities indicate a company's ability to efficiently develop and use IT systems. The capability of IS includes a strategically aligned delivery plan and cost-efficient operations and support (Gu, Jung, & Management, 2013). IS capacities may also be characterized as a way to classify and provide access to acquired and effectively used knowledge. Cepeda-Carrion, Cegarra-Navarro, and Jimenez-Jimenez (2012) believe that abilities strengthen companies' informative capacity. Strict IS capabilities may generate value in a company by reacting rapidly to fluctuations in the business environment. The SC ISs should therefore allow the focal company to proceed with information to assist with these procedures and actions, representing the processing of information capabilities of the SC.

It is necessary to match information processing demands and capabilities to achieve the benefits of implementing IS throughout the SC. Literature explores the role of technological applications in integrating the SC (Baliga et al., 2020). Effective planning and integration of the SC need information sharing. Information sharing enables joint decision-making through the SC. Companies enter into a system for information, other resources, and knowledge. Sharing information on the SC accelerates product delivery. It improves service and product quality, improves organizational and functional processes, reduces overhead and inventory costs, and enhances organizational success in important actions such as market share (Cai et al., 2013). The research sees data transferring in an SC as a crucial feature that makes information flow easier overall the SC and therefore enhances decision-making; this advances the SC's

effectiveness and efficiency (Liu, Ke, Wei, & Hua, 2013). Based on the available literature, the present research has established the hypothesis as under:

H4: Information system capabilities significantly moderate among SC integration and SC performance of SMEs in Pakistan.

3. Research Methods

The quantitative method for research is also validated as the most appropriate approach to inspecting the connection between variables and using theories, models, and hypotheses. Creswell and Creswell (2017) also suggest that the quantitative design for research is acceptable, and the best method of evaluating hypotheses is to evaluate the relationship between groups and to rationalize dependence between variables. This study contains a questionnaire evaluation to investigate the expected links between variables. This cross-sectional research includes statements on "innovativeness, SC integration, SC performance, and information system capability" in the questionnaire. In addition, the target population of this study is "SMEs" in Punjab. The present research examines how a firm enhances its performance (i.e., SC performance). The researcher included only SMEs operating in Southern Punjab of various manufacturing sectors. The target element and sampling unit within the population in this study are the owner, CEOs, and managers of the relevant enterprise. The reason for choosing this sampling unit is because the owner, CEO, and managers of the organization are the most knowledgeable and reasonable persons who know the organization very well in terms of its relationship with their supplier, customer, and internal departments and factors that affect the organizations and SC performance. According to (SMEDA) over four lacs are manufacturing SMEs operating in Pakistan. Therefore, studying the large population is not possible, so the researcher approaches the SMEs of Southern Punjab, Pakistan. Furthermore, the researcher only included some specific manufacturing sectors of SMEs in South Punjab, Pakistan. These are the manufacturing sectors included in this study mentioned in Table 1.

Table 1
Manufacturing sectors SMEs

Manufacturing sectors	No. SMEs included from each region
Flour mills	05
Cotton and ginning	05
Ghee mills	02
Handicrafts	05
Boutiques	05

Additionally, the current study is predicted to produce more consistent and trustworthy results by selecting a representative sample from the targeted demographic. According to (Sekaran & Bougie, 2016), a sample size five times more than the number of independent variables is preferred. Moreover, Hair Jr, Hult, Ringle, and Sarstedt (2021) suggested a minimum ratio of samples to the independent variables of 5:1, with a more desirable level being five samples for each variable. As the researcher has 31 items for the research constructs in this study, a sample size of 155 would be appropriate. Therefore, based on the Sekaran and Bougie (2016) and Hair Jr et al. (2021) current study distributed 300 questionnaires. However, 251 questionnaires were returned by the respondents. Furthermore, according to Mellahi and Harris (2016), the average response rate in the region of Pakistan is 52.68%. Hence, getting (251/300) 83% is a good and justifiable response percentage in the current study. In this research, the target population covers five manufacturing sectors of SMEs, mainly in South Punjab. SMEDA was approached for the SME list in South Punjab; SMEDA is the sole agency that deals with SMEs. It is very difficult for the researcher to approach all the SMEs, so some specific numbers of SMEs from each sector were selected. Thus, a researcher has selected a convenience sampling method for this study based on the following reasons. As a result, convenience sampling was employed to collect the focal data for statistical analysis in the current study.

In addition, the researcher utilized a "five-point Likert" scale in the present study, as it is the maximum used scaling approach in social and behavioral sciences research (Chomeya, 2010). To ensure the dependability of all variables, the researcher measured each object on a 1-to-5-point scale, whereas "1=strongly disagree", "2=disagree", "3=neutral", "4=agree", "5= strongly agree". The structured questionnaires were applied to gather data for each research variable. The surveys were forwarded to each respondent directly by e-mail. The following scales were used to collect data. On a five-point Likert scale, all the scales evaluated

quantitative data rather than qualitative. The "innovativeness" of the study was assessed using a "five-item" scale derived from (Panayides & Lun, 2009). SC integration was quantified on four levels: "internal integration", "supplier integration", and "customer integration", which was obtained from (Seo et al., 2014). The scale was developed by (Alfala et al., 2015) for "external integration orientation". SC performance "efficiency and effectiveness" were assessed by consuming a modified "four-item" measure (Tsanos, Zografos, Harrison, Lalwani, & Mangan, 2014). The "information system capability" is measured by a "four-item" scale extracted from (Tarafdar & Qrunfleh, 2017).

The researchers gathered data in this study utilizing the cover letter starting the study, describing the purpose, and delivering the questionnaires to owners, CEOs, and managers of targeted and selected "SMEs in South Punjab Pakistan". The cover letter was generally contained in the survey forms to tell the individual that the survey was only used for academic purposes and was treated as confidential. The researcher has also gotten contact information and email address. After a week or two, the researcher called the respondents individually according to the appropriate time, so the survey document was finished and returned.

4.   Research Findings

It is vital to assess the reliability of the questionnaire or scale used in the data analysis procedure. So, the reliability of the questionnaire items (used is access each variable) is tested through "Cronbach's Alpha Coefficient". The minimum standard of reliability coefficient is equal to 0.70. A reliability coefficient of 0.60 is acceptable but questionable (Hamaker, 2014). More than the 0.8 value is considered a good reliability value overall. These results are given in Table 2.

Table 2
Reliability Statistics

Variables	Cronbach's Alpha Value
SC Performance	0.891
Information system Capabilities	0.886
Innovativeness	0.890
SC Integration	0.942

As shown in Table 2, Cronbach's Alpha Coefficient is 0.9, greater than the least acceptable standard of 0.70 (0.977 > 0.70). Results show that all the scale items used are reliable and legit. As 0.904 is a very good reliability test for further research analysis. Factor analysis is used in this research for some purposes. Firstly, it is used to reduce the large number of variables in the data. Secondly, it can also study the relations among different variables. Thirdly, to develop the parsimonious interpretation of analysis and to support and aid the development of a structural and theoretical framework of the intended research with endorse or refute theories.

Table 3
KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.823
	Approx. Chi-Square	837.290
Bartlett's Test of Sphericity	Df	6
	Sig.	.000

This test estimates the sampling adequacy, which should equal 0.5 for a proper component investigation to proceed (Analysis & Analysis, 2009). KMO test results deliver a file somewhere between 0 and 1. Its value of sampling adequacy with a 0.90 is considered 'superb', 0.80 is interpreted as 'meritorious', 0.70 is considered 'middling', 0.60 is reported as 'mediocre', and 0.5 is 'miserable'. Below 0.5 is unacceptable to proceed with EFA. It can be seen in table 4.8 that the Kaiser-Meyer-Olkin value is 0.823, which indicates marvellous sampling adequacy for proceeding further with EFA. Bartlett's Test is appropriate where higher sample sizes are used in research. It shows the legitimacy and reasonableness of the information gathered from respondents on the issue under examination or research. "Bartlett's test of Sphericity" estimation less than < 0.05 is considered a satisfactory base level. Table 3 shows a significance value of 0.000 (below 0.05) which shows a significant result.

Table 4
Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error
1	.663a	.440	.437	2.47409

Predictors: (Constant), innovativeness

Table 5
ANOVA

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1190.856	1	1190.856	194.548	.000b
	Residual	1518.044	248	6.121		
	Total	2708.900	249			

a. Dependent Variable: SC Performance
b. Predictors: (Constant), innovativeness

The variance difference between the dependent and independent variables is 0.440, as indicated by the R square. Additionally, it is referred to as the determination coefficient. This implies that a significant difference exists between IV and DV. The analysis of variance reveals that the p-value is 0.000, which is statistically significant for the model. The modified degree of freedom adjustment. The adjusted R^2 value in Table 4.12 is.437, which is significant for this data. It demonstrates that innovativeness accounted for 44.7% of the variation in SC performance.

Table 6
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.258	.700		10.362	.000
	innovativeness	.459	.033	.663	13.948	.000

Dependent Variable: SC Performance

As shown in Table 6, innovativeness has a substantial and favorable influence on SC performance, with =0.663 and P less than 0.05. P 0.05 is indicated in the regression coefficient table. As a result, we accept the first hypothesis (H1).

Table 7
Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error
1	.742a	.551	.549	8.97849

a. Predictors: (Constant), innovativeness

Table 8
ANOVA

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	24308.245	1	24308.245	301.542	.000b
	Residual	19830.848	246	80.613		
	Total	44139.093	247			

a. Dependent Variable: SC Integration
b. Predictors: (Constant), innovativeness

The variance difference between the dependent and independent variables is 0.551, as indicated by the R square. Additionally, it is referred to as the determination coefficient. This implies that a significant difference exists between IV and DV. The analysis of variance reveals that the p-value is 0.000, which is statistically significant for the model. The modified R^2 the value indicates the degree of freedom adjustment. The corrected R^2 value in Table 4.15 is.549, which is significant for this data. It demonstrates that innovation accounted for 54.9 per cent of the variation in SC integration.

Table 9
Coefficients

Coefficients Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	28.553	2.549		11.203	.000
innovativeness	2.076	.120	.742	17.365	.000

a. Dependent Variable: SC Integration

Table 9 exhibits a strong, significant, positive innovativeness impact on SC integration, with β=0.742 and P less than < 0.05. The regression coefficient table shows that P < 0.05. Hence, we approve the second hypothesis (H2).

Table 10
Model Summary

OUTCOME VARIABLE SC Integration

R	R-sq	MSE	F	df1	df2	p
.79	.63	.26	143.92	3.00	256.00	.00

Table 11
Regression Results

Variables	Coeff	SE	t-stat	prob	LLCI	ULCI
constant	-2.43	.87	-2.78	.001	-4.14	-.71
INN	1.34	.25	5.43	.000	.850	1.820
SCP	.90	.23	3.96	.000	.45	1.34
Int_1	-.14	.06	-2.33	.002	-.26	-.02

Table 12
Test(s) of highest order unconditional interaction(s)

	R2-chng	F	df1	df2	p
X*W	.01	5.43	1.00	256.00	.02

The above results show that the model is said to be significant (P = 0.000, square R = .79). The interaction row of the next table exhibits that SC integration has a significant but positive mediation influence between the "innovativeness and SC performance" level statistically with b = -0.14, S.E = 0.06, and p = 0.02 (< 0.05). So, it can be said that SCP does have a statistically significant negative impact and mediation the relationship between innovativeness and SC performance. Hence, the H3 hypothesis is accepted here.

Table 13
Outcome Variable SCP

OUTCOME VARIABLE SC Integration

R	R-sq	MSE	F	df1	df2	p
.7736	.5984	4.4895	118.2125	3.0000	238.0000	.0000

Table 14
Regression Outcome (SCP)

	Coeff	se	t	p	LLCI	ULCI
constant	8.4885	2.3299	3.6432	.0003	3.8985	13.0784
INN	-.1103	.1304	-.8461	.3984	-.3672	.1465
ISC	.1603	.1262	2051	-.0883	.4089	
Int_1	.0155	.0063	2.4800	.0138	.0032	.0278

Table 15
Test(s) of highest order unconditional interaction(s)

OUTCOME VARIABLE SC Integration

	R-sq	MSE	F	df1	df2	p
X*W	.0104	4.4895	6.1503	1.0000	238.0000	.0138

The above results show that the model is said to be significant (P = 0.000, square R = .7736). The interaction row of the next table exhibits that information system capability has a significant but positive mediation impact between the innovativeness and SC performance level

statistically, with b = 0.0155, S.E = 0.0063, and p = 0.0138 (< 0.05). So, it can be said that SCP does have a statistically significant positive impact and moderate the relation between the "innovativeness and SC performance". Hence, the H4 hypothesis is accepted here.

4.1. Discussions

The overall findings of the current study revealed that innovativeness has a significant positive relationship with SC performance. Also, the direct Innovativeness impact has a significant and positive relationship with SC integration. In contrast, the mediating effect of SC integration and moderating effects between Innovativeness and SC performance outcomes have a significant positive relationship. Generally, the relationship between performance and SC integration aspects is favorable and constant with prior results. The findings suggest that innovativeness motivates businesses to integrate with SC partners, improving their SC performance. Additionally, the existence of indirect impacts implies that innovativeness is an action-oriented strategy that requires appropriate SC behaviors to increase performance.

To investigate the relationship between innovativeness and SC performance, this study's results have shown that innovativeness has a significant positive but moderate impact on SMEs operating in south Punjab, Pakistan. The findings of this research suggest that when any organization adopts innovativeness, its performance goes high. This result is consistent with research conducted by (; Panayides & Lun, 2009; Seo et al., 2014) claimed that innovativeness is positively associated with SC Performance, which implies that the higher the innovativeness higher the SC Performance of the organization. For instance, M. N. Kalyar, I. Shafique, and B. Ahmad (2019) claimed that innovativeness is a good tool for enhancing SC performance. Adebanjo, Teh, and Ahmed (2018) used qualitative case studies of ten logistics companies in Singapore and Australia to show how SC collaboration always leads to new ideas. So, based on the results of this study and previous research, it has been found that innovativeness is one of the most important and important predictors of SC performance for SMEs. This has also been proved statistically that Innovativeness has a significant positive but a moderate impact on SC performance, which is explained in the correlation matrix table 4.20 and also, i.e. table 4.12; both values show that innovativeness has a significant and positive relationship. Hence, based on statistical analysis and results mentioned in table 4.20, the current study supported the H1, which is stated as a significant relationship exists between innovativeness and SC management performance of manufacturing SMEs located in the region of south Punjab Pakistan.

Now, on to the third and fourth major objectives of this study to look into how SC integration affects the relationship between innovation and SC performance and how it affects the direct relationship between these two things. From the existing studies, SC integration was the main focus of researchers. Many researchers (Frank et al., 2016; Soosay, Hyland, & Ferrer, 2008) explored the mediating role with performance (i.e., organization, operational, and financial) and concluded that SCI has a strong positive relationship between innovativeness and SC performance and this research also discuss that a positive and significant relationship exists. SC integration mediates the connection between innovativeness and SC performance, which shows that SC integration is a strong mediator, and it is also consistent with previous studies conducted by (Kim, 2017; Kumar, Jabarzadeh, Jeihouni, & Garza-Reyes, 2020; Vickery, Koufteros, & Droge, 2013). Overall, the relationship between SC integration and performance is positive, consistent with previous research (Kumar et al., 2020). The findings indicate that innovativeness has a direct effect on SC integration and that integration has a positive effect on SC performance. This study also shows a moderate positive relationship between variables, indicated by correlation value and explained in Tables 4-20. Both values are in favor and acceptance of a hypothesis. Hence, based on empirical evidence and current study findings, support the H3.

The current study's primary purpose was to examine information system capabilities' moderating effect on innovativeness and SC performance. According to the study's findings, information systems are a moderator in the link between innovativeness and SC performance. In other words, the moderating influence of information system capabilities contributes to building the relationship between innovativeness and SC performance. The agility of the information system can amplify all of these situations, hence favorably moderating this mediation effect. For instance, it enables the focus organization to monitor market developments, increasing the chances that such changes will be communicated to suppliers. It improves the focus firm's capacity to communicate information with suppliers and customers,

increasing the possibility of enhanced integration, supplier engagement in product life-cycle activities, and cooperation and knowledge transfer (Chin, Hamid, Raslic, Heng, & Sciences, 2014). The current study's findings are also consistent with Tarafdar & Qrunfleh, 2017 also claimed that information system significantly affects the relationship between SC integration and performance.

Based on statistical findings and literature evidence, the current study supports the H4, which was stated as Information system capability moderates the relationship between SC integration and performance. Hence, there is a moderate positive relation, also by correlation value and explained in table 4-20. Both values are in favor and acceptance of the hypothesis. Previous studies also explained ISC has moderate positive relation between SCI and SCP.

5.   The implication of the Study

The study's findings have significant implications for management, particularly for SC professionals working in developing market businesses. To begin, this study highlights the importance of innovation in managing the SC to attain optimal performance. Firms developing extremely efficient SC integrations must examine innovativeness on a higher level in terms of its strong alignment with specific SC segments. In the context of SC, innovation must begin with innovative concepts and methods for designing and executing SC practices, developing new processes for SC operations, optimizing SC operations through existing methodologies, and developing strategic integrations. Thus, developing market enterprises must build an innovative culture that enables them to leverage existing resources and concepts to inject new life into intra- and inter-firm operations, which include downstream and upstream SC partners.

Additionally, this study contributes to the SC management literature by establishing an integrated framework for understanding how innovativeness leads to better SC performance and when cross-SC integration is more successful at boosting performance. Unlike earlier studies that defined SC integration as a one-dimensional construct or used inconsistent dimensions, we view it as a multidimensional construct that involves internal integration, supplier integration, customer integration, and EIO. Additionally, this research evaluates the efficiency and efficacy of SC performance. Notably, the study makes a substantial contribution by developing a fresh paradigm for the effect of information system capabilities on integration alternatives for SC performance improvement. Additionally, this study addresses "how" SC innovation might result in increased performance. Because firms engaged in SC innovation compete with rivals using innovative technologies such as integrated communication networks or web-based orders to build their network and information database on the foundation of a collaborative network, the study hypothesized that SC integration was the underlying mechanism promoting superior SC performance.

5.1.   Limitations and Future Recommendations

The study's primary constraint and future direction are classified into three categories: validity, generalizability, and methodology. It used a survey questionnaire research design that used cross-sectional data, which was gathered at a specific point in time, to test the hypotheses in this study. A future study may look into long-term research to get more information. As a consequence of some elements and situations over which the researcher has no control, there are certain limits in terms of generalizability. There are numerous limits to this study. Due to the time constraints of our thesis, the research dissertation is focused on Pakistan's SMEs in south Punjab. Only a small amount of information is gathered. Future research can broaden the scope of the analysis by including more corporate sectors and expanding the research's international setting. More variables can be added to obtain a more significant finding. Secondly, this study has not considered service SMEs, which are also part of the SMEs of Pakistan. The researchers may include service sector SMEs and compare the service and manufacturing sectors. Thirdly, another limitation of this study is that it consists of small sample size and convenience sampling is used. Further, it is limited to a certain region of Pakistan, i.e. South Punjab.

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