

Investigating the Supply Chain Logistic Issues for SMEs Service Quality in Pakistan

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ABSTRACT

Small and Medium-sized Enterprises (SMEs) are more adaptable because of their size and straightforward structure; they will be better able to take advantage of changes and innovation. SMEs are common in the nation and have significantly increased Pakistan's GDP. To achieve and guarantee these SMEs' effective performance, they must improve the quality of their services. For this reason, the current study has looked into the significance of Supply Chain Integration (SCI). The present research has adopted a "quantitative research design" to conduct the study. Concerning the research framework, the independent variable is supplying chain logistic issues that impact SME service quality through the mediation of supply chain integration. There are two methods adopted for the data analysis. Firstly, the statistical package for social sciences (SPSS) is employed for the demographic outcomes. Secondly, regression, reliability and validity analysis are carried through the Structural Equation Model (SEM). The results of the study indicated the six linkages. Firstly, the association of High Cost of Information Technology (HCI) positively impacts Coordination and collaboration. Secondly, Quality Logistic Personnel (QLP) is positively and significantly associated with Commitment and competence. Thirdly, HCI indicated a positive link with Coordination and collaboration. Fourthly, QLP expresses a positive and significant relationship with Coordination and collaboration. Fifthly, QLP demonstrated a positive and significant association with Creativeness and customisation. Finally, QLP showed insignificant negative results with Coordination and collaboration. The present study holds greater significance in this regard. The study provides valuable insights to the employees or workforce of SME businesses to supervise or rationally monitor their supply chain performance. The service quality of SMEs has been measured through commitment and competence, creativity and customization, and coordination & collaboration of sales logistic personnel.

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Introduction

Supply chain and logistics are the differentiators in the contemporary business world that create competitive advantages for different organizations within the same industry [1-3]. Supply chain logistics positively and significantly impact the organizations of developing countries [4]. The competitiveness and the capital of the supply chain logistics in developing countries can be enhanced by developing a strong connection between information technology and supply chain personnel through mutual information sharing [5]. It has also been observed that the mutual sharing of information among the employees of small and medium-sized enterprises with their supply chain channels during business transactions has improved the working quality of SMEs. Moreover, the accomplishment of small and medium-sized enterprises depends on vigorous capabilities because it is the source of developing active competency in the business environment for developing countries such as Pakistan [6].

SMEs are significant contributors to Pakistan's overall economic growth and development. Their importance derives from the fact that they contribute to various facets of the economy, all of which, in the end, influence the expansion of the Gross Domestic Product (GDP). Figure 1 demonstrates the yearly GDP growth of SMEs in Pakistan. SMEs play a crucial role in generating employment opportunities within Pakistan, particularly emphasising urban and rural regions. They play a significant role in absorbing a substantial proportion of the labour force, thereby contributing to the mitigation of unemployment and poverty. As their operations grow and expand, they concurrently generate additional employment opportunities, resulting in heightened income levels and enhanced living standards among the populace. They are engaged in various industries, encompassing manufacturing, textiles, agriculture, and services. These entities' combined output substantially contributes to the country's overall industrial production. This phenomenon contributes to the overall growth of GDP as it increases the value of goods and services produced.

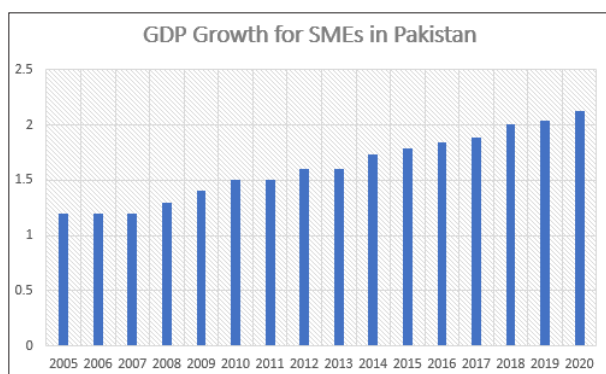


Figure 1: Graphical Representation of the GDP Growth of Pakistan (2010-2021)

Small and medium-sized enterprises are the critical resource for the economic development of developing countries. But still, there are many issues regarding the small and medium enterprises in Pakistan, including the lack of governmental support, lack of infrastructure, and the maintenance of sustainability. Several small and medium-sized enterprises work in Pakistan and maintain the country's economic growth. However, they still face many challenges in operating, which is why Pakistan is still a developing country [7]. Moreover, to cope with the challenges of sustainable development of countries, specifically developing countries like Pakistan, there is a need to innovate the driving process of the whole supply chain [8]. The logistics and supply chain industry of Pakistanis faced significant challenges in terms of the availability of efficient and experienced personnel [1, 2, 9, 10].

Additionally, highly skilled and knowledgeable personnel are crucial for the growth of small and medium-sized enterprises because they can manage SMEs more efficiently than uneducated labour. Furthermore, the increasing focus on innovation in supply chain management has led to increased costs of supply chain development. The required technologies are usually highly costly and demand vigorous training and development activities to support their use acceptance in the industry [11, 12].

Furthermore, the effective use of information technology in SMEs increases their dynamic competitiveness in national as well as international markets, and this is the primary reason that the government of Pakistan is making sure to innovate the use of information technology in SMEs so that they can enhance their sustainability, job creation, and actualize their firm performance. Supply chain issues can impact the SMEs' reliability and responsiveness in terms of their service quality [13-15].

The tendency of any country to grow economically depends upon the transformation of technological uses in small and medium enterprises, which will prove to be an advantage in raising the efficiency of work done by them, increase in productivity but still, SMEs in Pakistan face challenges in their adaptation to the digital technology and the fulfillment of the governmental requirement is also difficult for them [16]. The reason for this drawback of the economic state of Pakistan is that there is a deficiency of trained, experienced, well-educated, and knowledgeable personnel in the supply chain and logistic departments of small and medium enterprises, so they are unable to handle the transformation of technology and also the fulfillment of the requirement of the government. The major issue faced here, especially in Pakistan's SME sector, is staffing knowledgeable and experienced labour and management staff for handling logistics and supply chains [16, 17]. If the SMEs are more inclined to hire locally, they usually

face the need for highly costly training activities in time and money. Though SMEs in developing countries are responsible for economic growth by creating job opportunities for the local people and eradicating poverty, appointing local personnel isn't feasible for the progress of SMEs because local personnel are not experienced and require a costly way to training, not sustainable for the economy of Pakistan [18].

Similarly, hiring international personnel can be equally hard for SMEs as such personnel may be much costlier to procure [19, 20]. The development of Pakistan's small and medium-sized SMEs must implant different inventory management strategies. Still, these efforts for innovation related to inventory management are inadequate because the SMEs are not cost-effective. Also, there is a deficiency of skilled and educated personnel staff in Pakistan [21]. Moreover, due to the implementation of innovational strategies in the department of inventory management of small and medium-sized enterprises in developing countries, the SMEs will be capable of dealing with the stock-out situation or any other difficulties faced by the SMEs. However, much research is still required on managing inventory in developing countries small and medium enterprises for economic growth so they can progress in the business market. Inventory management tasks require adequate focus on maintaining service quality but are usually ignored domain [22]. Therefore, there is a need to research how the service quality of SMEs is impacted by the issues faced in logistics and supply chain use and development while interpreting the mediating role of supply chain integration.

Literature Review

The current literature emphasizes the role of supply chain system development, integration, and collaboration. Furthermore, this area is concerned with cost-effectiveness, commitment, innovation, customization, coordination and collaboration, competitiveness, and information technology in order to achieve service performance. Indeed, SMEs are critical to the nation's economic success.

Stakeholder Theory

The stakeholder theory emphasizes organizational management and the basic ethics of business that impact different major components of the business, mainly employees, suppliers, local communities, and others. Moreover, the theory also focuses on the moral values in managing the organization. In addition, the theory's main basic idea is who counts and matters. Stakeholder theory includes all the other parties, including firm employees, suppliers, financiers, customers, social communities, governmental bodies, and trade unions, all a major part of the firm or organization [23]. The theory also counts the competitors as the stakeholders, as they can affect the firm's and other stakeholders' efficacy.

The stakeholder theory is based on the idea that, by nature, groups are cooperative. So, according to the theory, the firm or organization needs to initiate the coordinating and cooperating interests of stakeholders. As a result of the converged nature and coordinating claims of the stakeholders' organizations form coalitions with all the stakeholders to achieve their goals. The stakeholder theory is regarded as of central importance in the practice and management of the supply chain management and says that the decisions of the stakeholders impact the supply chain management.

High Cost of IT and Service Commitment and Competence

Depending on the information technology utilized, any organization's and its departments' competence may rise or

diminish [24, 25]. SMEs may find it challenging to invest in raising their levels of service competence due to the high costs of IT hardware, software, and the experienced staff needed to administer and maintain them [26, 27]. The most recent technology enables a business to support its operations and operate competitively [28, 29]. Elevated or exaggerated technology costs in the supply chain can harm the overall effectiveness of a company's services. Julien and Ramangalahy Investigated the effectiveness of the competitive strategy and exports due to information search and competencies. According to the success of SMEs is driven by their overall competitive strategy, which is decided by their capacity to gather and handle knowledge about overseas markets [30].

H1: The high cost of information technology positively impacts SMEs' service commitment and competence level.

High cost of IT and Service Creativity and Customization:

The level of creativity and customization customers can offer regarding services depends significantly on the information technology and innovation a company has adopted. Researchers have discussed how technological developments can give supply chains access to abilities that improve a business's capacity for adaptability and creativity in its services [28, 29]. Also, broadening the implementation of Industry 4.0 advancements heightens customer allegiance and technological progression. Sustainable development of the products is significantly linked with the application of Industry 4.0 in various SMEs because it has obvious implications for maintaining the organization's sustainability [31]. Moreover, it has been evidenced that applying Industry 4.0 in organizations will provide high agility. Sustainability and productivity will eventually lead to success and profitable outcomes for the organizations [32]. Implementing technology in SMEs promotes the customization and creativity of enterprises and enhances the innovative and sustainable manufacturing of products globally [33]. However, the high cost of information technology significantly influences SMEs' creativity and customization and still needs to be researched.

H2: The high cost of information technology potentially affects SMEs' service creativity and customization levels.

High cost of IT and Service Coordination and Collaboration

Previous research has shown that the cost of information technology significantly influences the collaboration of various sectors of small and medium-sized enterprises [34]. The high cost of information technology is a big challenge for SMEs, as it negatively impacts small and medium-sized enterprises' coordination, collaboration, and innovation levels [35]. In other words, the high cost of information technology can be proved as a drawback for the collaboration and coordination of different sectors of small and medium-sized enterprises. Small and medium-sized businesses are negatively impacted by the exorbitant costs associated with information technology in their ability to collaborate and plan services. Therefore, small and medium-sized enterprises should manage the impact of the high cost of information technology, and this could be done by making sure that the technological innovation adopted by the enterprises is in the context of its business process because the incorporation of technology in small and medium-sized enterprises is as compulsory as the productivity, creativity, coordination, and agility of the organization is necessary.

H3: The high cost of information technology affects SMEs' service coordination and collaboration levels.

Logistic Personnel and Service Commitment and Competence:

By deploying and hiring top talent for labour and managerial positions, a company can also raise the level of competence of its services [36]. The study highlighted how crucial it is for SMEs to develop various skills and abilities to satisfy domestic and international clients and concentrate on all organizational functions to maintain long-term competitiveness. This idea was demonstrated using a case study, which contends that for SMEs to be competitive, they must be clear about their mission and actively develop their human resources [37]. A nation's logistics abilities are essential to domestic and foreign trade, directly influencing economic growth. Studies offer policymakers a methodology for enhancing logistics performance in their countries despite constrained resources [38, 39]. Using a three-stage integrative method, the study analyses the effect of competitiveness pillars on logistics performance. The empirical studies suggest that to enhance logistics performance, policymakers should concentrate on technology adoption, higher educational attainment, innovation, market size, and infrastructure [38, 40].

H4: Logistic personnel positively influence SMEs' service commitment and competence level.

Logistic personnel and Service Creativity and Customization

Numerous studies have established a connection between a person's aptitude and quality and the creativity and innovation of their services [41-43]. Most manufacturers place a high priority on customer satisfaction. In addition, customer satisfaction is a crucial concept followed by various small and medium-sized enterprises. It is essential for meeting the consumers' needs because a satisfied customer emphasizes the profitable outcome for the organizations [44]. In some markets, mass customization is one of the many strategies used to raise the perceived value of a product by consumers by combining a low price with significant variation and adaptation [45]. However, logistic personnel are directly related to the creativity and customization of small and medium-sized enterprises because efficient, effective, and creative logistic personnel pave the way for organizations toward mass customization and satisfaction of the consumers and are needed to be researched to generate profitable five outcomes and enhance consumers' satisfaction.

H5: Logistic personnel associate directly with SMEs' service creativity and customization level.

Logistic personnel and Service Coordination and Collaboration

The degree of coordination and collaboration between the various departments of an organization can be impacted by the high quality of the employees who work there [10, 41, 46]. According to Agri-SMEs can strategize their supply chain collaborations by removing scale constraints and contributing to understanding dynamic capabilities in SMEs using the extended resource-based view [47]. The study discovered that integrating logistics and supply chain management practices positively and significantly correlates with a competitive advantage [4]. However, the performance of the logistic employees of small and medium-sized enterprises significantly impacts the collaboration of various sectors of small and medium-sized enterprises. In other words, the greater the interaction between logistic personnel, the greater the collaboration and coordination between small and medium-sized enterprise sectors.

H6: Logistic personnel directly impact SMEs' service coordination and collaboration levels.

Mediation of Supply chain Integration

Supply chain integration can lead to better integration of information technologies and lower costs as it can exchange information and technological expertise between various industry sectors [48-51]. This could be evidenced by research conducted on the automotive sector of India, which contributes to almost 49% of the country's gross domestic product growth and generates job opportunities for almost 32 million workers [52]. This enhanced development of the sector is due to the effective management of supply chain performance continuously, which ultimately enhances the competency level of small and medium-sized enterprises [53]. So, it is evident that supply chain management or integration is associated with the level of competency and commitment of various small and medium-sized enterprises, specifically in developing countries.

H7: Supply chain integration mediates the association of the high cost of information technology and the service commitment with the competence level of SMEs.

According to research, various empirical evidence proves that supply chain integration positively influences small and medium-sized enterprises' service quality and creativity [54]. Supply chain integration can allow the increased opportunity for training and development for the employees within an organization. It can lead to much more reasonable hiring practices, reducing the impact of low-quality personnel on service quality [55, 56].

H8: Supply chain integration mediates the connection between the high cost of information technology and service creativity with the customization level of SMEs.

Supply chain integration can intercede the effects of the high cost of information technology on SMEs' service coordination and collaboration levels [57]. Improved service levels for SMEs can result from effective coordination and collaboration between the various organizations involved in the supply chain. However, SMEs may find it challenging to implement supply chain integration due to the high cost of information technology, which will subsequently limit their ability to reach higher levels of coordination and collaboration [58-60].

H9: Supply chain integration mediates the connection between the high cost of information technology and the coordination with the collaboration level of SMEs.

Quality logistic personnel are essential for the smooth operation of the supply chain, and their expertise can help SMEs improve their service levels. Personnel development is essential to a business organization's human resource supply chain. This is particularly significant for small and medium-sized enterprises with restricted resources, which could impact their supply chain performance [55,56,61].

Economic expansion and globalization have created a single market, and logistics is crucial. An advantage can be gained from efficient supply chain management and logistics, especially for SMEs attempting to upgrade their logistics infrastructure. Supply chain management and trade logistics can help developing countries like Romania increase their competitiveness and more effectively deal with shortages on a global scale [62, 63]. Therefore, supply chain integration is an essential mediator between competence,

service commitment, and quality of small and medium-sized enterprises working in various developing countries.

H10: Supply chain integration mediates the association of logistic personnel influence on the service commitment with the competence level of SMEs.

Small and medium-sized enterprises use lean practices and process innovation to achieve sustainability in their value chain, a significant development aspect [64]. Other factors like customer feedback, market research, and organizational culture may more significantly impact service creativity and customization levels. Adopting green innovation significantly improves financial performance, with a more substantial contribution from a flexibility-oriented culture and a weaker contribution from a control-oriented culture [65].

H11: Supply chain integration mediates the relationship of logistic personnel's influence on service creativity with the customization level of SMEs.

Small and medium-sized businesses must align their operations with their supply chain partners to adapt to the complex and changing global environment. Both buyers and suppliers must be flexible and adaptable to the ambiguities and fluctuations of one another's businesses for a coordinated supply chain. Coordination encompasses a variety of activities, including integrating processes from different supply chains, sharing information, managing relationships, transferring technology, and more [66].

H12: Supply chain integration mediates the affiliation of logistic personnel influence on service the coordination with collaboration level of SMEs.

Methodology Conceptual Framework

Based on the literature and hypotheses stated above, the following research framework is proposed for the current study. In this model, supply chain logistics is an independent variable, SME service quality is a dependent variable, and supply chain integration works as mediation (see Figure 2). Additionally, the independent variables of supply chain logistic issues are segregated into two dimensions: the high cost of information technology and the quality of logistics personnel. From the dependent variable perspective, SME service quality is divided into three related dimensions: commitment & competence, creativity & customization, and coordination & collaboration.

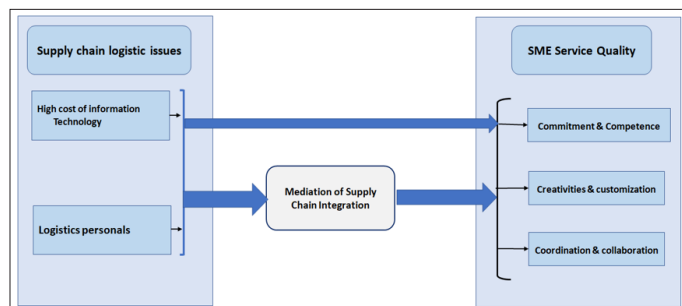


Figure 2: Conceptual Framework

Sampling Techniques and Data collection Method

A quantitative approach is used in this study to find accurate results for exploring the relationship between the variables by using parametric tests. It also does not require much time and budget, while the qualitative approach requires much time and budget for conducting interviews, etc. This study used cross-

sectional data due to limited resources and time. The researcher used convenience sampling as a sampling technique, a type of non-probability sampling, as convenience sampling allows the researchers to select a reachable and convenient sample that can enable the researcher to fulfil the research objectives. It is also cost-effective as it does not require unnecessary resources, budget, and time and works according to the researcher’s convenience. The sample size for this research study was 300 and was decided based on the item response theory. Moreover, the study used SmartPLS for modelling and analysis, so there was no need for a larger sample.

The data was collected via an online questionnaire for the present study, where the employees of SMEs in Pakistan were invited to participate. It was an online questionnaire-based data collection process as it is one of the cheapest methods, allowing maximum reach to the potential respondents [67, 68]. The table below summarizes the sources and items for the measurement scales for the variables.

Table 1: Measurement Items

Serial	Variable name	Dimensions	No. of items	Author
1	Supply Chain Logistics Issues	High Cost of Information Technology	3	[69]
		Quality Logistics Personnel	3	
2	Supply Chain Integration	Internal Integration	3	[70]
		Supply Integration	6	
		Customer Integration	5	
3	SME service quality	Commitment & Competence	7	[46]
		Creativity and Customization	3	
		Coordination and Collaboration	3	

Findings and Discussion

Assessment of Measurement model

Figure 3 presents the measurement model of the present study but notes that This model contains all the factors before the analysis of the factor loading. From the figure, it can be seen that there are six observable variables in the study. There are two independent variables: quality logistic personnel and high cost of information and technology; it has three dependent variables: commitment and competence, creativity and customization, and coordination and collaboration. The study also analyses the mediating impact of Supply chain integrations on the associations between independent and dependent variables.

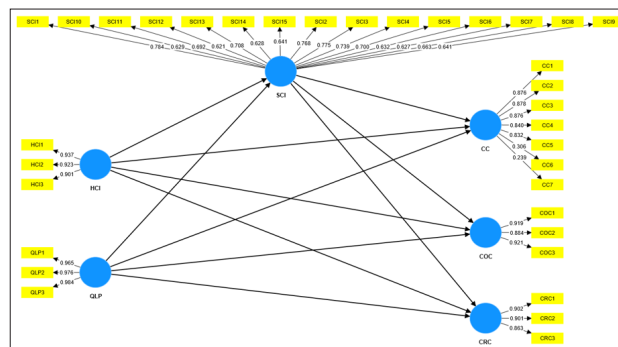


Figure 3: Measurement Model (before factor loading)

After performing several tests of preliminary analysis, which ensures that the sample obtained is adequate and sustainable, the researcher has carried out factor loading analysis by employing a rotated component matrix [71]. The items having less than 0.4 values are discarded and not taken for further statistical analysis. Table 2 shows the results obtained from the factor loading analysis in the rotated component matrix; from the table, only those factors greater than 0.4 are presented in Table 5 below. In addition, the rotated component matrix also ensures no cross-loading in the items of the measurement scale; therefore, to ensure this, the researcher has presented all six observed variables in six separate columns. Figure 3 shows that the researcher has initially taken seven factors of commitment and competence. However, after a factor loading analysis, only five factors were taken further that would have greater than 0.4 values. The two factors were discarded because they were lower than the threshold value.

Table 2: Factor Loading

	CC	COC	CRC	HCI	QLP	SCI
CC1	0.892					
CC2	0.89					
CC3	0.88					
CC4	0.854					
CC5	0.846					
COC1		0.919				
COC2		0.88				
COC3		0.924				
CRC1			0.904			
CRC2			0.901			
CRC3			0.861			
HCI1				0.937		
HCI2				0.923		
HCI3				0.901		
QLP1					0.965	
QLP2					0.976	
QLP3					0.984	
SCI1						0.929
SCI13						0.524
SCI2						0.917
SCI3						0.922
SCI4						0.901
SCI5						0.852

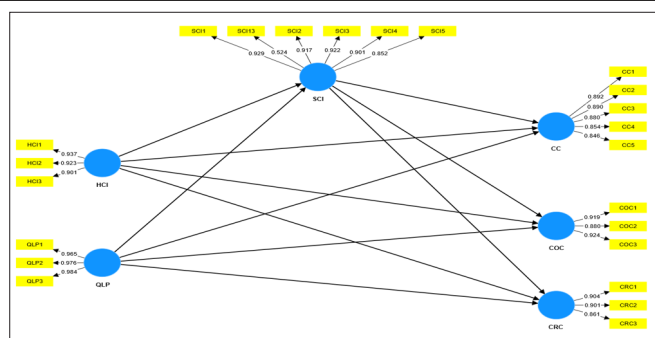


Figure 4: Measurement Model (after factor loading)

The measure of internal consistency reliability is used to test the reliability of the several constructs of the study [72]. This approach includes the “test-retest method” in that a similar test is conducted after a specific time, and the results are compared. If similar results are produced, it shows the presence of reliability. For the reliability measurement, Cronbach Alpha (α) is used; its threshold value must be more than 0.7, which shows that the variables are reliable [73]. Table 3 presents the values of α , indicating that all six variables have values greater than 0.7. Thus, they are reliable. Convergent validity determines how closely the tests regarding the determination of similar observable constructs are associated [74]. It is measured using an indicator known as Average Variance Extracted. The cut-off value of AVE should be more than 0.50 [75]. Table 3 presents its importance as well.

Table 3: Reliability Results

	Cronbach's alpha	Composite reliability	Composite reliability	Average variance extracted (AVE)
CC	0.922	0.925	0.941	0.761
COC	0.894	0.906	0.934	0.824
CRC	0.867	0.874	0.919	0.79
HCI	0.91	0.918	0.943	0.848
QLP	0.974	0.975	0.983	0.951
SCI	0.918	0.933	0.94	0.727

For the validity of the constructs, researchers must ensure both convergent and discriminant validity. As per the Fornell-Larcker criterion, the values for the square root of AVE must exceed the correlation values with other constructs [76]. The criterion requires a comparison of the square roots of AVEs represented by the diagonal values with the different values that show the correlation between other respective constructs.

In Table 4, the square root values of AVEs are displayed along the diagonal. Table 4 exhibits the discriminant validity test results. No issue of validity was observed, as all the diagonal values exceeded the cross-correlation values in the subsequent rows and columns. Therefore, discriminant validity was established.

Table 4: Discriminant Validity

	CC	COC	CRC	HCI	QLP	SCI
CC	0.872					
COC	0.201	0.908				
CRC	0.398	0.387	0.889			
HCI	0.408	0.275	0.442	0.921		
QLP	0.488	0.193	0.446	0.717	0.975	
SCI	0.449	0.229	0.44	0.734	0.769	0.853

Model Fitness

Table 5 displays the results for model fitness, where the saturated model and estimated model statistics are shown. In addition, PLS also provides d_{ULS} and d_G , which are the exact indices [77], and Table 5 comprises five fit indices, including SRMR, NFI, and Chi-square. The first column, which represents the saturated model, examines the associations between all the constructs understudy. In contrast, the estimated model statistics also incorporate the model structure and are regarded as a restricted version of the fit measure. It can be observed from Table 5 below that the SRMR value for the saturated model is 0.051, which is below the assigned criterion of 0.08. Similarly, the NFI value must be equal to or greater than 0.9, and it shows that the value of 0.898 is approximately 0.9. The researcher deduced that the proposed model is fit and acceptable.

Table 5: Model Fitness

	Saturated model	Estimated model
SRMR	0.051	0.072
d_{ULS}	0.732	1.417
d_G	0.377	0.406
Chi-square	909.102	968.894
NFI	0.898	0.891

Hypotheses Testing

The first hypothesis proposed in the model assumed that the high cost of information technology positively impacts SMEs' service commitment and competence level. The results in Table 6 show that the linkage is positive; however, the hypothesis was not supported with a p-value greater than 0.05. Hence, it was concluded that the high cost of information technology did not significantly predict service commitment and competence level ($t = 0.726, p = 0.468$). The second hypothesis, H2, in the present study assumed that the high cost of information technology significantly impacts SMEs' service creativity and customization levels. The path analysis results verified that the association between HCI and CRC was positive and significant, with a p-value less than 0.05. Hence, the results supported the second hypothesis ($t = 2.45, p = 0.014$). The third hypothesis presumed that the high cost of information technology affects SMEs' service coordination and collaboration levels. Table 6 shows that HCI has a positive association with COC. The association was significant with a p-value less than 0.05, implying that the second hypothesis was supported ($t = 2.934, p = 0.003$). Due to the significant positive relationship between HCI and COC, it can be interpreted that SMEs enhance their collaboration practices and service coordination just by using advanced IT systems. Those studies highlighting the significance of IT in improving service coordination, organizational performance, and collaboration ensure the consistency of the research findings with previous literature [78].

As far as previous studies are concerned, this result is considered consistent as they highlight the significance of technology in enhancing customization and service creativity. A study by researchers found that the customization of services is enhanced with the use of technology in service innovation [79]. The study has provided insight for managers to develop trust and reliability using quality logistic personnel in the emerging digital market [80].

The fourth hypothesis, H4, assumed that logistic personnel quality positively influences SMEs' service commitment and competence level. The results revealed a positive association between the quality of logistics personnel and service commitment and competence. The result is deemed significant with a p-value

below 0.05 and 0.01 ($t= 3.436, p= 0.001$). Per the fifth hypothesis, H5, logistics personnel directly impact SMEs' service creativity and customization level. The quality of logistics personnel was found to positively influence service creativity and customization levels of SMEs. Table 6 below shows that the p-value is below 0.05, indicating that the fifth hypothesis in the present study was supported ($t= 2.013, p= 0.044$). The sixth hypothesis presumed that the quality of logistic personnel directly impacts SMEs' service coordination and collaboration. The statistics in Table 6 below confirm that the quality of logistic personnel, service coordination, and collaboration have a negative connection. However, the p-value exceeded 0.05, so the hypothesis was unsupported ($t=0.654, p=0.513$).

Table 6: Path Analysis

	Original sample (O)	Sample mean (M)	Standard deviation	T statistics	P values
HCI -> CC	0.058	0.06	0.081	0.726	0.468
HCI -> CRC	0.194	0.195	0.079	2.45	0.014
HCI -> COC	0.247	0.247	0.084	2.934	0.003
QLP -> CC	0.321	0.32	0.093	3.436	0.001
QLP -> CRC	0.188	0.187	0.094	2.013	0.044
QLP -> COC	-0.056	-0.057	0.086	0.654	0.513

Regarding indirect effect, the seventh hypothesis, H7, presumed that supply chain integration mediates the association of the high cost of information technology and the service commitment with the competence level of SMEs. For H7, it can be seen that the mediation of supply chain integration in the relationship between HCI and CRC was insignificant, as the p-value exceeded 0.05. Therefore, the hypothesis was not supported at a 5% significance level ($t= 1.698, p= 0.09$). However, the mediating effect of SCI in the relationship between HCI and CC was significant at a 10% significance level. In addition, as per the eighth hypothesis, H8, supply chain integration mediates the connection between the high cost of information technology and service creativity with the customization level of SMEs. The results showed that the indirect effect was unsupported as the p-value exceeded the specified significance level ($t= 1.635, p= 0.102$). The present study proposed the ninth hypothesis that supply chain integration mediates the connection between the high cost of information technology and the coordination with the collaboration level of SMEs. As per the t-statistic and p-value in Table 7, the mediation of SCI between the relationship of HCI and COC was not supported as a result, was rendered insignificant with a p-value higher than 0.05 ($t=0.928, p= 0.353$). Hence, the results did not support the assumption of SCI as the mediator in the associations concerning HCI and dependent variables.

As per the tenth hypothesis, supply chain integration mediates the association of logistic personnel influence on the service commitment with the competence level of SMEs. The results showed that with a p-value greater than 0.05, the mediating effect of SCI in the relationship between QLP and CC was insignificant.

However, the indirect effect is supported at a significant level of 10% ($t= 1.725, p= 0.085$). The eleventh hypothesis, H11, anticipated that supply chain integration mediates the relationship of logistic personnel influence on service creativity with the customization level of SMEs. The values in Table 7 revealed that the mediation effect was insignificant at 5% and 10% significant levels. SCI did not mediate the QLP and CRC link ($t= 1.617, p= 0.106$). The last hypothesis, H12, proposed that supply chain integration mediates the affiliation of logistic personnel influence on service coordination with the collaboration level of SMEs. Table 7 shows that the t-statistic is 0.957, and the p-value exceeded the significance level of 0.05. Therefore, the mediating effect of SCI between QLP and COC was found insignificant. As per the results of PLS-SEM, it can be concluded that the mediating role of supply chain integration was only significant in two associations at a 10% significance level. Firstly, SCI mediated the association between the high cost of information technology and service commitment and competence. Secondly, SCI significantly mediated the association between the quality of logistics, personal and service commitment, and competence.

Table 7: Mediation Analysis

	Original sample (O)	Sample mean (M)	Standard deviation	T statistics	P values
HCI -> SCI -> CC	0.061	0.061	0.036	1.698	0.09
HCI -> SCI -> CRC	0.058	0.058	0.035	1.635	0.102
HCI -> SCI -> COC	0.035	0.036	0.037	0.928	0.353
QLP -> SCI -> CC	0.081	0.082	0.047	1.725	0.085
QLP -> SCI -> CRC	0.077	0.079	0.048	1.617	0.106
QLP -> SCI -> COC	0.046	0.048	0.048	0.957	0.339

Figure 4 represents the research model, showing the PLS path model and the model comprising the items, latent structure, associations, and path coefficients.

It is significant to note that the non-availability of indirect effects doesn't imply the non-availability of a direct association between the high cost of information technology, customization levels, and service creativity of SMEs [81]. The study's results also suggest that other dimensions and factors not analysed might play a vital role in the association between the study's variables. Further research could investigate other study moderating and mediating variables that could play a crucial role in explaining the association between service creativity, high IT cost, and SMEs' customization levels. Tiwari [82] demonstrated that companies with an integrated supply chain enhance their flexibility to feasibly adjust to client requests, competitors' actions, and industrial events. Consequently, the waste is reduced, and costs are lowered. When the literature was reviewed, many studies were reviewed and discussed that indicated the quality of logistics personnel and the increased service customization and creativity [83, 84]. The logistic services quality has become crucial for many companies to gain monetary benefits. A study also demonstrated the significance of the quality of logistics personnel as it was noted that efficient service quality of the personnel ultimately results in increased customer satisfaction, which indirectly becomes a beneficial medium of gaining productive and optimized outcomes [85].

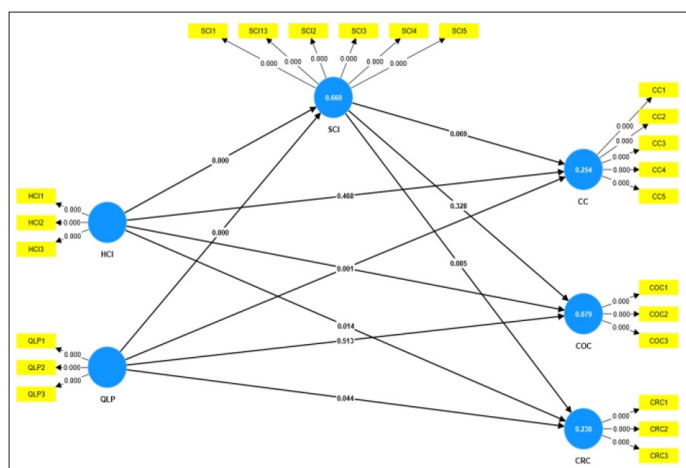


Figure 4: Partial Least Square SEM Model

Conclusion

Supply chain integration is the process of information sharing among the supply chain partners in the product’s lifecycle from inception to the endpoint. If technology is being used adequately with appropriate policies in the company, supply chain integration enables the contributors throughout the supply chain to access similar up-to-date information. This consequently results in improved coordination, advanced learning, alignment, and overall supply chain visibility among the entire supply chain members. The present research has explored service quality improvement for small and medium-sized enterprises in Pakistan through supply chain integration. The study has thus been based on analyzing the effect of supply chain logistics on the service quality of SMEs.

Furthermore, the research also analyzed the mediating role of “supply chain integration” between the association of supply chain issues and the service quality of SMEs. The study also analyzed the extent to which the high cost of information technology and logistic personnel affects the supply chain integration and influences the service quality of SMEs. Results indicated that HCI significantly impacted COC, and QLP also significantly impacted CC. In contrast, the results demonstrated an insignificant association between HCI and CC, HCI and CRC, QLP and CRC, and QLP and COC. Regarding mediation results, SCI has resulted in being an insignificant mediator between HCI and CC, HCI and CRC, HCI and COC, QLP and CC, QLP and CRC, and QLP and COC.

Research Implications and Future Directions

Due to its relevance with the contemporary business environment in Pakistan, the present research holds several theoretical and practical implications that have been explained in this section.

The study is beneficial for Pakistani SMEs as it provides a pathway of improved service quality through which the performance of the entire supply chain of SMEs can be enhanced. Therefore, the governing bodies of SMEs can pay heed to develop sound and positive relationships with their supply chain partners to ensure feasibility and productivity. The research is also helpful for Pakistani SME governing bodies as it provides insights regarding the high cost of information technology and its influence on SME service quality, such as commitment and competence, creativity and customization, coordination, collaboration, etc. practical implication of this research also lies in knowing the importance of supply chain integration for SMEs in the country. Therefore, the management of SMEs can plan to improve the

supply chain procedures. The integrated supply chain allows management partners to share upgraded information regarding product development, upgrading, or delivery.

Every research has shortcomings or limitations, as is the case with the present research. There are certain limitations also current in the present research. Firstly, the researcher has selected a quantitative research design due to the nature of the present research. Future researchers can shift the methodological choice of research and attempt to analyze the service quality improvement for SMEs in Pakistan by adopting a “qualitative research design.” This would help the researcher to include personal experiences, attitudes, and opinions regarding the supply chain integration and improvement of service quality for SMEs in Pakistan.

Moreover, mixed-method research can also be applied to assess the authenticity of adequacy in research. In this way, the methodological choice can be altered by future researchers. Supply chain integration is an important concept, so apart from examining it in the SME context, future researchers can also investigate the topic under another corporate sector other than SMEs, such as the manufacturing or services sector, to attain fluctuated results. Because most corporations usually develop positive relationships with suppliers to achieve long-term beneficial consequences. In this way, future researchers can fill the current study’s limitations

Foundation Items: Not applicable.

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