RESEARCH PAPER

The impact of supply chain risk and supply chain integration on organizational performance: evidence from dairy sector of developing economy

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ABSTRACT

Goal: The purpose of this study is to investigate the mediating role of supply chain integration for Supply chain risks heading toward organizational performance. This study is mainly focused on the dairy sector of emerging economies.

Design / Methodology / Approach: This is quantitative research, in which a multi-item scale web-based survey was conducted to collect primary data. 407 stakeholders of the dairy industry, specifically the customers and the ones dealing with supply chain operations and the planning and integration department were investigated. Confirmatory factor analysis and internal consistency were applied to test the reliability and fitness of the measurement model and structural equation modeling-SEM is used to test the proposed hypotheses.

Results: The results suggest that in the dairy sector, both customer and supplier risks, act as barriers to implementing (SCI) supply chain integration and also negatively influence (OP) organizational performance. However, supplier risks, belonging to the dairy industry of an agricultural-based country like Pakistan, have a comparatively less negative impact on organizational performance as compared to customer risk, conversely, supply chain integration helps the organization to achieve better performance. The integration indeed acts as a strong mediator in reducing the negative impact of supply chain risk.

Limitations of the investigation: This study utilizes cross-sectional data, which restricts the researchers to depict the entire manifestation of (SCR) supply chain risk, supply chain integration, and organization performance, for businesses operating in the dairy sector of a developing economy, like Pakistan.

Practical implications: This study helps managers to use SCI as a tool to reduce the impact of supply chain risk i.e. supplier risk and customer risk on organizational performance. Also, this study explains the importance of customer risk as compared to supplier risk associated with perishable products.

Originality / Value: This paper enriches the literature in an evolving area of SCI and SCR, by investigating the mediating role of SCI. Two key risks i.e. supplier risk and customer risk associated with the supply chain network of dairy sector organizations are addressed, along with the mediating ability of supply chain integration to improve firm performance is investigated.

Keywords: customer risk; Supplier risk; Supply chain integration; Organizational performance; Dairy business; Developing countries.

1. INTRODUCTION

The recent constantly changing environment and demands of the quality-conscious customer, push organizations into situations where they continuously faced challenges from their operations

carried out both internally and externally (S. Chen et al., 2020; Tarigan et al., 2021). This rapid and fast-changing environment compels organizations to adopt a complex network of supply chain partners to deliver goods and services along with applying sophisticated operations strategies such as lean manufacturing and outsourcing, to maintain competitive advantages (Blome & Schoenherr, 2011; Kauppi et al., 2016; Wilhelm et al., 2016). Hence to avoid losses and stay profitable over a longer period, organizations focus not only on supply chain quality management (SCQM) practices implementation initiatives (Fernandes et al., 2022; Hong et al., 2020; Kaynak & Hartley, 2008), but also on risk and vulnerabilities within operations and their impact on organization performances (Mhatre et al., 2017). These complexities create the need to focus more on, identifying vulnerabilities and risks within organizational operations and supply chain functions and processes, and their impacts on performances (Wiengarten et al., 2016). Organizations adopt different ways to manage, and mitigate their associated risks like postponements (B. Yang & Yang, 2009), dual sourcing (Trkman & McCormack, 2009b), and redundancy (Messina et al., 2018).

Therefore, different strategies and frameworks are presented in the literature on supply chain risk to minimize its negative impact on performance Among them, integration along the supply chain network is the eminent tool. (SCI) Supply chain integration helps organizations to collaborate and connect in a more aggressive way to manage their inventory levels (P. C. Yang et al., 2013), better align supplies (Frazzon et al., 2019; Ramanathan, 2013), information sharing (Du et al., 2012), to reduce related risk (Le et al., 2013), create the capability to innovate (Huo et al., 2014), which results in improved firm performance (Soares et al., 2017). Matching the supply and the demand with the help of SCI can support reaching objectives but it is a key challenge in any chain especially when it comes to food perishable products such as dairy (Singh et al., 2020). Further to this, during the recent pandemic, the essential perishable items related to healthcare, food, and medicine further increased the importance of SCI. It is because any flaws in the supply chain that have been exposed during COVID-19 will result in the un-contentment of supply and demand, which leads to revenue losses (Linton & Vakil, 2020). This situation is a learning lesson for better implementation of SCI (Supply Chain Integration) to reduce the risk. In this regard, a detailed analysis of the dairy supply chain network and important steps to minimize the associated risk are brought to the limelight.

As of Pakistan economic survey 2022-23 reflects, 45 percent of the country's population is employed in agriculture, which also supplies feedstock for the country's agro-based industries.

In terms of milk production, Pakistan comes in 4th position in South Asia. Similar to India, Pakistan is recognized as one of Asia's top consumers of dairy products. Keeping in view the dairy industry is among the sectors that can be suffered the most because dairy goods are highly perishable and rely on complex distribution networks that are time-sensitive (Mishra et al., 2016). Therefore, this study is devoted to analyzing the mediating role of supply chain integration in the dairy supply Chain and suggesting how various associated risks can be reduced. It is argued that by integrating various partners in the supply chain network, the dairy organization can reduce its operational cost while working at full capacity which helps to regain its competitive advantage and improve organizational performance (Mehrotra et al., 2020). Various studies have been conducted to investigate the relationship between supply chain risk and organizational performance (Aqlan & Lam, 2015; Braunscheidel & Suresh, 2009; C. Chen et al., 2014; Flynn et al., 2010; Ramanathan, 2013; Rosenzweig et al., 2003; Trkman & McCormack, 2009a). However, the context of most of the studies are of developed countries and no such updated studies are available in developing countries especially when it comes to perishable products. Hence, it is important to study these relationships in the local context, to explore and validate the influence of various (SCR) supply chain risks on organizational performance, and the mediating role of SCI between SCR and organizational performance. Therefore, this study is devoted to identifying the impact of SCR factors in the dairy supply chain and analyzing the moderating role of SCI in this regard. Hence a theoretical model is proposed to measure the influence of SCR on an organization`s performance in the presence of SCI. This study is focused on the dairy sector of Pakistan, where, the supply of dairy products is growing at 8.3% while the demand function is growing at around 19.5% (Eggers et al., 2017). This creates a significant supply-demand gap. By introducing this fact, this study is concerned with quantifying the SCR associated with the dairy sector and then measuring the mediating effect of SCI for achieving better organization performance. The rest of this paper is structured as follows: Section 2 presents the literature review and hypothesis development, in which after theoretical underpinning, major drivers of SCR were identified and their relation with SCI and organizational performance is established and a theoretical framework is proposed for analysis. In Section 3, the research methodology for assessment is explained. Section 4 contains the analysis of the proposed theoretical framework. Section 5 exhibits the results and discussion, and finally, conclusions and implications are discussed in Section 6.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The current study examines the relationship between (SCR) supply chain risks, (SCI) supply chain integration, and (OP) organizational performance, grounded its base on Agency Theory proposed by (Eisenhardt, 1989). This is a theory based on the entities that aid in collaboration and engagement in the relationship, in which the principal (one party) delegates decisions and tasks to the agent (the other side). Customers or market needs are the primaries in the context of this study, delegating authority for production to manufacturers and/or service providers, who operate as agents (Zu & Kaynak, 2012). Regarding risk, the issues that result from principal-agent activities related to the organization's customers, suppliers, or processes for meeting the needs of customers or the market is the core area under examination. Further, this study is also supported by Dynamic Capability View (DCV), an extension of Resource Based View (RBV). The theoretical expansions of RBV serve as one of the origins of DCV in part (Teece et al., 1997). According to RBV, companies are made up of a collection of resources that are allocated differently among them, and over time these distributional disparities endure (Wernerfelt & Karnani, 1987). Additionally, according to RBV, an organization's use of rare, valuable, distinctive, and irreplaceable resources may give rise to a sustainable competitive advantage and improve competitive performance (Eisenhardt & Martin, 2000).

2.1 Organizational Performance (OP)

Organizational supply chain networks are becoming more complex day by day, therefore measuring and monitoring the performance of these systems are complex. Evaluation of organizational performance is a tricky method and is well-debated in the literature. There are several factors involved in the evaluation of performance that help to achieve both strategic and tactical objectives (Bottani et al., 2014). The measurement of performance in the supply chain is important for developing and managing the supply chain itself and has much importance in the context where the supply chain is considered a key factor for corporate success (Fan et al., 2017; Xia & Chen, 2011). Furthermore, measurement and evaluation are important for the management of the supply chain, which is the management of the process of planning, controlling, and coordinating the movement of products, parts, and materials through the supply chain, from the sellers to the consumers (Simchi-Levi et al., 2015). The extant literature provides evidence for the positive impact of supply chain quality management on organizational performance and undermines the negative consequences of supply chain operational risks. The literature depicts that supply chain risk is negatively associated with organizational performance (Dey et al., 2015; Tummala & Schoenherr, 2011). Contemporary thinkers emphasize addressing risks in managing, planning, and driving actions (Dolgui et al., 2018). Also (Lotfi & Saghiri, 2018) highlighted that supply chain risk management is an important component of good quality and efficient systems.

2.2. Supply Chain Risk (SCR)

The industries involved in the production and processing of the dairy sector face great challenges due to the intrinsic characteristics of their products. Therefore, supply chain risks in the dairy sector are caused by shorter Product Life-Cycle (PLC), particularly when it is not well managed. Nowadays, business is becoming riskier due to, shorter product life cycles, supply chain globalization, and outsourcing (Babin et al., 2016; Lin, 2018; Tang, 2006). Due to this supply chains are more complex and lean than ever. Organizations need to tactically collaborate with their main suppliers and consumers to thrive, succeed and prosper (Ding et al., 2016; Flynn et al., 2010). Supply Chain literature divides SCR into two main categories i.e. operational risk and disruption risk (Tang, 2006). Operational risks are those which are related to demand & supply management and uncertainty. while Disruption risks are those which are caused by occasions like natural disasters, terrorist attacks, market failure, bankruptcy, etc. Although disruption risks are occasional but are very severe and difficult to manage. On the other hand, operational risk is mitigated with the help of effective management in the supply chain (Bode et al., 2014). Within these dimensions, the focus of this study will be on operational risk can further be divided into supplier risk and customer risk. In this study, these two major categories of SCRs: a) Supplier Risk, and b) Customer Risk have been discussed.

2.2. a) Customer Risk (CR)

These risks are related to the factors that rise from the customer`s end for instance variance in demand forecasted and actual demand by the customer (Zsidisin & Henke, 2019). Customer risks are the result of turbulent conditions and ever-changing customer needs and preferences (H. L.

Chen, 2018). Variation or instability in customer demand is one of the biggest challenges faced by organizations in current times. It leads to an increase in the inventory cost, affects customer service, and the reliable deliveries of the products to the ultimate consumers on time.

2.2.b) Supplier Risks (SR)

Besides the risks related to the characteristics of the product and the customer behavior, today's risks are related to the factors causing issues from the supplier`s end (He et al., 2014). More precisely supplier risk is the possibility of an event that results in the inability of the specific supplier or the supply market for the inbound supply of goods or services to the organization. The outcomes of this failure result in the inability of the organization on the purchasing end in meeting customers' demands. (Zsidisin & Ellram, 2003). Among several characteristics of supplier risks, supplier risk is the most important because the expectations of companies with their suppliers in making just-in-time deliveries are ever-increasing. And if suppliers are unable to do so, causes numerous problems to the organization which include, milk processing schedule disturbance, inventory management problems, and sales operation disturbance. Some of the supplier risks are caused by the outsourcing of various activities like Transportation, Procurement, Distribution, etc. which promotes a lack of control over the processes across domestic boundaries (Tang, 2006).

2.3 Supply Chain Risk (SCR) and Organization Performance (OP)

Any organization's operations can be greatly impacted by supply chain risk, both directly and indirectly, which compromises firm performance (Zsidisin & Henke, 2019). The performance of an organization is impacted by the risks across its supply chain. These factors make the supply chain network complex and time-sensitive, therefore companies should integrate with their customers and suppliers to achieve better efficiency which ultimately results in better firm performance (Flynn et al., 2010). According to Gupta, an organization's ability to perform its various functions smoothly and efficiently is directly influenced by SCR (Gupta et al., 2018). When an organization is facing high risk, the organization becomes unable to share proper inventory information ultimately leading to higher lead times and not meeting customer demand. Higher SCR can also cause issues in supplier relationship management that will cause problems in the supply of raw material materials the end of the string will affect the organization's performance in terms of the delivery of products. SCR also resists the integration of different departments and functions within an organization. The increase in lead time and delayed delivery from suppliers can lead to conflicts between departments such as purchasing and manufacturing. An increase in lead time by the supplier can also affect other departments such as process improvement and product designing as these require proper coordination with the supplier (Zhou et al., 2017). Therefore this study proposed that:

- *H1a: Supplier Risk has a negative impact on Organizational Performance.*
- *H2a: Customer Risk has a negative impact on Organizational Performance.*

2.3. Supply Chain Integration (SCI) and Organization Performance (OP):

According to studies, supply chain integration (SCI) improves demand management, and material management, and improves process efficiency (Kauppi et al., 2016; Stevenson & Spring, 2007). Integration among supply chain partners and the organizational departments allows them to share data regarding customer orders, and inventory detail, efficiently which helps companies to allocate resources accordingly. Also, this integration will help the reduction of the Bullwhip Effect by delivering information quickly (Wu et al., 2007). SCI can also help in knowledge creation and knowledge transfer. SCI links people from different functional departments to meet customer requirements and also improve product quality. Customer satisfaction is considered to be the ultimate goal for an organization and the best tool to ensure the organization's performance when talking about the dairy business. Customers' feedback helps the manufacturers to understand customer preferences (Schoenherr & Swink, 2015) which enhance the manufacturer's responsiveness to customer need. Being able to better understand customer needs, gathering feedback on product quality, and having great responsiveness leads to customer satisfaction (Flynn et al., 2016; Stank et al., 1999). Hence, it is proposed to verify if,

- *H3: Supply Chain Integration positively impacts Organizational Performance.*

2.4. Impact of Supply Chain Risk (SCR) on SCI (Supply Chain Integration):

When it comes to the product life cycle, the dairy industry is considered one of the industries dealing with the most perishable products. Management of the supply chains dealing with such

products may become more complex due to the factor of risk associated with product perishability (Sheikh, 2017; F. Talib et al., 2010). Therefore, it is important to study the impacts of SCR and integration on an organization's performance given the perishability of the product as the main factor. Integration among various suppliers and organizational departments reduces supply chain risk, in both upstream (supplier risk) and downstream (customer risk). Because of the difficulty in coordination and collaboration among supply chain partners, even conflict occurs between suppliers and the organization or between customers and the organization, and if not taking care of this lack of coordination, conflict may arise among the departments of the organization. Generally, this is because the required product from suppliers is wrong, irregular, delayed, or slow (Roy & Satpathy, 2019; Toker & Pinar, 2019). Therefore, supply chain integration can be influenced by supply chain risk, leading to inefficiency. Therefore, the following hypotheses are proposed for further examination.

- **Hypothesis 4** *H1b: Supplier Risks have a negative impact on supply chain integration.*
- **Hypothesis 5** *H2b: Customer Risks have a negative impact on supply chain integration.*

Hence SC risk resists organizations from integration that bring competitive advantage by low price /cost, better demand and supply forecasting, product innovation, and a short time to market. The proposed theoretical framework for analysis is shown in **Figure 1.**
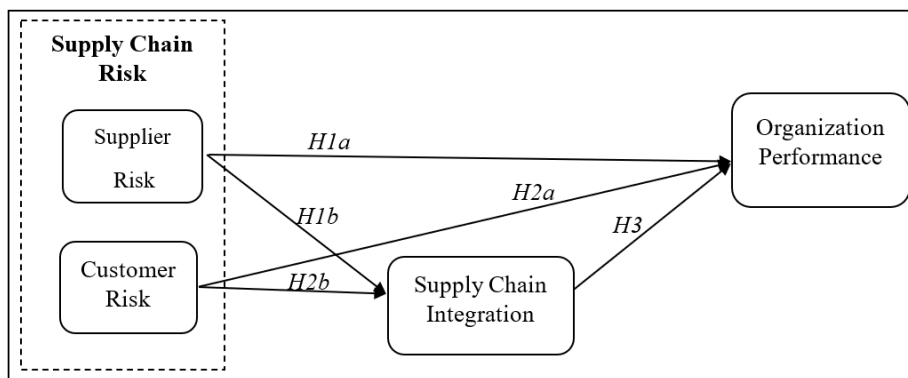

Figura 1 - Theoretical Framework

3. RESEARCH METHODOLOGY

Based on the theory of positivism, this study implies a quantitative research strategy (B. Yang et al., 2005). This study is exploratory with a cross-sectional research design, where primary data was taken from related departments of Dairy organizations, both formal and informal sectors of the country.

3.1 Sampling Technique:

The sampling technique used in this research is random sampling. Our target population for this research was general managers and managers in some cases assistant managers having extensive experience and belonging to departments like planning and supply chain, production, finance, purchase, logistics, or their equivalent. A list of contacts of dairy companies from the members of the Dairy Association and the City's Milk Association is developed for data collection purposes. As a result of joint efforts, a total number of 1678 questionnaires were distributed in various formal and informal organizations associated with the Dairy sector, of which only 612 were received but only 407 were complete and useable. This represents only a 24.25 percent response rate which is quite less than similar studies carried out in the specific area of supply chain performance (Kaynak & Hartley, 2008; Scholten & Fynes, 2017) and is in the acceptable range of more than 10%, as per (Mugenda & Mugenda, 2003). The response rate is also low because the majority of the dairy sector consists of informal businesses. The sample characteristics are explained in Table 1. Shows majority of the respondents were managers, and those having 7 to 10 years of working experience.

Table 1 - Sample Characteristics

Gender	Male	256	62.90%
	Female	151	37.10%
Designation	General Manager	82	20.15%
	Manager	102	25.06%
	Manager	91	22.36%
	Deputy Manager	74	18.18%
	Assistant Manager	58	14.25%
Experience	1 to 3 years	87	21.38%
	4 to 6 years	112	27.52%
	7 to 10 years	141	34.64%
	Above 10 years	67	16.46%
Education	PhD	3	0.74%
	Masters	127	31.20%
	Bachelors	178	43.73%
	Diploma etc.	99	24.32%
	Total	n= 407	100%

3.2 Questionnaire Development:

In this research study, the data was collected through a structured close-ended survey questionnaire. Since the study is cross-sectional, so data were collected from respondents who were approached only once (Dubey et al., 2019). Therefore, a five-point Likert scale was used. To reduce Common method Variance, we apply the technique of reversed scales and a mix of item types (Bozarth et al., 2009; Wagner & Crampton, 1993). While a series of analyses are applied to analyze the construct's reliability and validity.

3.2.1 Content validity

Different measurement items related to variables were adapted from well-established instruments already used in past research. The items of supplier risk (SR) mainly related to long lead time, unreliable deliveries, and stock-outs were adapted from (Zsidisin & Ellram, 2003), and the items of customer risk (CR) are related to uncertain and volatile customer demand, was adapted from (Zhao et al., 2013). The scale of SCI covers information and functional integration along with teamwork and was taken from(Narayanan et al., 2019). The measurements of SCI in this study are also consistent with earlier studies (Flynn et al., 2010; Swink et al., 2007) and the measure of an organization's performance is adapted from (Zsidisin & Ellram, 2003).

Table 2 - Variables and Scales

Constructs	No of Items	Sources
Supply Chain Risk (SCR)		
Supplier Risk (SR)	3	(Zsidisin & Ellram, 2003)
Customer Risk (CR)	3	(Zhao et al., 2013)
Supply Chain Integration (SCI)	6	(Narayanan et al., 2019),
Organization Performance(OP)	4	(Zsidisin & Ellram, 2003).

3.2.2 Unidimensionality and Reliability

Considering the exploratory nature of the study, a two-step method was applied, as proposed by (Gunasekaran & Irani, 2010). The Unidimensionality of the measurement scale is analyzed by exploratory factor analysis (EFA). The factors clarification is achieved by Varimax Rotation with Kaiser Normalization and Principal Component Analysis (PCA) (H. H. A. Talib et al., 2014). For reliability, Cronbach's alpha was utilized for each variable construct understudies. For each of the construct SR, CR, SCI, and organization performance the results of exploratory factor analysis (EFA) were shown in Table 2 below. While Eigenvalues and percentage of variance explained were shown in Table 4. Every item from each construct was loaded, only SCI4 and SCI6 having factor loading

below 0.5 were deleted, and the rest all had a factor loading more than 0.5.

Table 2 - Construct Items, Factor Loadings

Items	Supplier Risk	Customer Risk	Supply Chain Integration	Organization Performance
SR1	0.832	0.512	- 0.671	- 0.528
SR2	0.924	0.574	- 0.684	- 0.552
SR3	0.871	0.543	- 0.719	- 0.661
DR1	0.671	0.812	- 0.612	- 0.576
DR2	0.614	0.902	- 0.642	- 0.589
DR3	0.692	0.893	- 0.622	- 0.601
SCI1	- 0.591	- 0.532	0.887	0.612
SCI2	- 0.612	- 0.575	0.891	0.628
SCI3	- 0.624	- 0.599	0.874	0.601
SCI5	- 0.584	- 0.512	0.815	0.548
OP1	- 0.712	- 0.545	0.512	0.941
OP2	- 0.724	- 0.518	0.587	0.888
OP3	- 0.694	- 0.524	0.546	0.913
OP4	- 0.687	- 0.578	0.571	0.727

Notes: Measurement model fit statistics: X^2 = 958.17; df = 712; normed chi-square = 1.61; RMSEA = 0.058; NNFI = 0.89; CFI = 0.91; SRMR = 0.061. b Standardized coefficients; all significant at p < 0.001.

Reliability was evaluated by using composite reliably (CR) and Cronbach's alpha value (Joe F. Hair et al., 2011). The values of Cronbach's alpha in this model ranged from a minimum of 0.754 to a maximum of 0.831, which are quite above the minimum acceptable benchmark value of 0.7 (Bagozzi & Yi, 1988; Joseph F. Hair et al., 2019). Also, composite reliability values are above, the minimum required value of 0.7, assuring the measures as reliable (Joe F. Hair et al., 2011). Also for a more precise estimation of data consistency, Dijkstra-Henseler's rho (RhoA) is used instead of Composite Reliability and Cronbach's alpha. (Henseler et al., 2009).

Table 3 - Constructs Cronbach Alpha, Composite Reliability, and Rhoa.

Construct	Cronbach's Alpha	CR	RhoA
Supply Chain Risk (SCR)			
Supplier Risk (SR)	0.742	0.812	0.812
Customer Risk (CR)	0.792	0.791	0.805
Supply Chain Integration (SCI)	0.827	0.882	0.830
Organization Performance(OP)	0.754	0.798	0.774

3.2.3 Construct validity

According to (Flynn et al., 1995; Kurian, 2014), the ability of items in the scale to measure the construct under study represents construct validity. It consists of convergent validity and discriminant validity (O'Leary-Kelly & Vokurka, 1998). Convergent validity CV, which explains the cohesiveness of indicators with their appropriate measures, was confirmed with the help of extracted average variance, factor loadings, and eigenvalue (Wong et al., 2011). While Discriminate or divergent validity measures how much the variables or construct under the study are unique and distinct from each other (Feng et al., 2010; Joe F. Hair et al., 2011).

To measure convergent validity, according to (Joseph F. Hair et al., 2019) in EFA, if Eigenvalue is more than 1.0 and all factor loading values are more than 0.3, only then convergent validity is confirmed. **Table 2** represents all factor loadings and in **Table 4** the construct's eigenvalues are more than the required criteria and also average variance extracted AVE, the Values of the third measure of convergent validity shown in Table 5 are above the minimum required values of 0.5 (Bagozzi & Yi, 1988).

Table 4 - Construct Items, Eigenvalue

S.no	Constructs	Eigenvalues	EVA
	Supply Chain Risk (SCR)		
1	Supplier Risk (SR)	2.57	0.67
2	Customer Risk (CR)	3.01	0.74
3	Supply Chain Integration (SCI)	4.41	0.64
4	Organization Performance(OP)	4.11	0.61

Percentage variance Explained = 58.328

To measure discriminant validity, two criteria were employed: Cross Loading and Heterotrait Monotrait ratio (Joseph F. Hair et al., 2019). As shown in **Table 4**, the indicators used in this study are loaded higher on their construct as compared to other constructs confirming discriminant validity first criteria. Heterotrait Monotrait ratios- HTMT will be the second measure of discriminant validity. It shows the ratio between the correlations of the items and within the items (Henseler et al., 2015). As shown in **Table 5**, all values are below the ceiling value of 0.85, indicating that the HTMT criterion is met (Ghadge et al., 2020; Henseler et al., 2015).

Table 5 - HTMT Criterion, Assessment of Discriminant Validity

Construct	C	SR	DR	SCI	OP
C					
SR	0.686				
DR	0.571	0.721			
SCI	0.543	0.547	0.742		
OP	0.491	0.482	0.478	0.652	

4. ANALYSIS OF THE FRAMEWORK

To analyze the relations among the variables understudied, Structural Equation Modeling (SEM) was used on SmartPLS-3). To use scale-free, and required asymptotic properties like minimum variance and unbiasedness, we utilize MLE- the Maximum Likelihood Estimation, hence the structural model was based on a measurement modal, gaining the benefit of the MLE method (Anderson & Gerbing, 1988; Jöreskog & Sörbom, 1993).

While measuring model fitness indices, the RMSEA is 0.058, which is very close to 0.06, indicating a very good fit. The true value of RMSEA using a 90% confidence interval, its value must lie between 0.053 and 0.068, which is still below the cut-off value of 0.08, which further supports the model fit. The goodness of model fit is further affirmed by normed chi-square = 1.61, which is below 2.0, and CFI = 0.91, indicating a very good fit. The value of SRMR is 0.061, which is above the conservative threshold of 0.05, but still very much below 0.09, which indicates an acceptable fit for the model with larger than 30 items and CFI > 0.92 (Joseph F. Hair et al., 2019). These results show that the model is acceptable. At a significance level of 0.01, the standardized coefficients for the paths and the conceptual model are shown in Figure 2
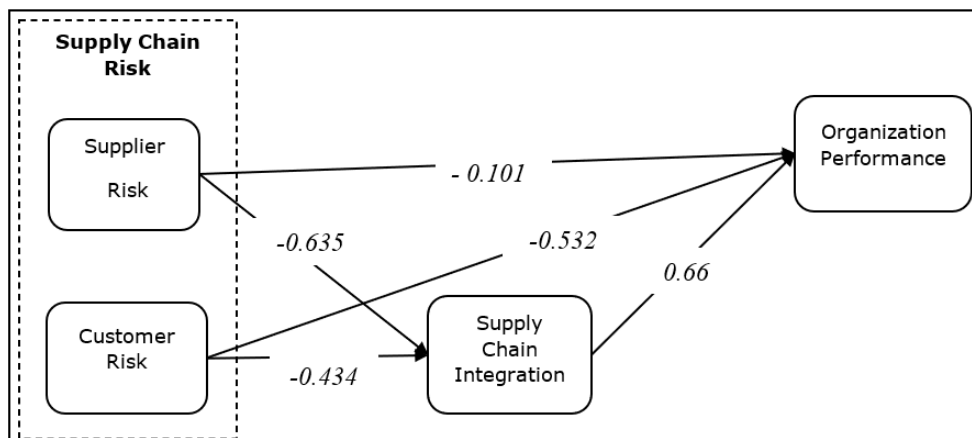

Figura 2 - Statistically Significant Paths for the Research Model

Furthermore, model fitness is also measured from values of path coefficients, R – square, Q-square for predictive relevance, f-square for effect size, t-statistics, and p-values. The value of VIF helps and assures the model result for policymaking. Since the values of VIF are less than 5, hence there confirm non-collinearity. (R^2) is the coefficient of determination that signifies the model's predictive accuracy and the variances explained in each dependent variable. The values of R^2 for the dependent variable OP are closer to 0.5 showing good strength for the structural model (Joe F. Hair et al., 2011; Iacobucci et al., 2016). Also, the value of f-square, the effect size is proved by effect size values, it shows the degree of importance of each path in terms of f-square values. Generally, the values of f-square represent a medium to a large effect. Since the values of all the paths are above zero and also values of the Q-square show model has good predictive relevance (Fornell & Larcker, 1981).

Table 6 - Path Coefficients

Structural path	Beta Value	(STDEV)	R2	f2	Q2	t -Values	Result
SR --> OP	- 0.101	0.097	0.102	0.311	0.321	-1.161	Rejected
SR --> SCI	- 0.635	0.027	0.472	0.691	0.191	-30.524	Accepted
DR --> OP	- 0.532	0.057	0.474	0.677	0.271	-41.714	Accepted
DR --> SCI	- 0.434	0.038	0.519	0.737	0.215	-32.381	Accepted
SCI --> OP	0.664	0.032	0.632	0.841	0.221	31.642	Accepted

Note: all significant at p < 0.01

In SmartPLS-3, the technique of blindfolding is used to compute Q-square. The Q-square results become more stable when blindfolding is used at the omission distance of 7 and was found to be fairly higher than zero (Henseler et al., 2015). Since, for each path, the values of both Q-square and R-square are positive and also significant, we can say that the proposed structured model is robust (Al Zaabi et al., 2013) as shown in (Figure 2). The obtained results are fully aligned with study expectations. In particular, the standardized path coefficients highlighted in Table 7, represent there is a significant negative linkage found for SCR with SCI and organizational performance, while there is a significant positive linkage exists between SCI and organizational performance, and all proposed hypotheses are accepted by the current study. Especially the strongest path of SCI and organization performance in particular, with a t-value of 31.624, β= 0.664, and p-value <0.01, However, on the other hand, the weakest among the studied constructs of SCR is supplier risk and organization performance, with a t-value of -1.16, β= -0.101 and p-value <0.01,

4.2 Correlation Analysis

Bivariate correlation analysis was also carried out to examine the relationship among each pair of constructs. The correlation value of each pair should be in the range of +0.30 to +0.90 which means constructs are distinct from each other and measure different concepts. Moreover, the multicollinearity issue with each construct is examined. The summarized results for bivariate correlation are shown in **Table 7.**

Table 7 – Correlation Matrix

Construct	CR	SR	SCI	OP
Customer Risk	1.00			
Supplier Risk	0.11	1.00		
Internal Integration	- 0.63	- 0.69	1.00	
Organization Performance	-0.75	- 0.27	0.83	1.00

Note: (p < 0.01 level) Correlation is significant at the 0.01 level

The results presented in given above table shows that the highest correlation value (r=0.83) is for pair SCI and Organizational Performance (OP), which means supply chain internal integration has a significantly high positive correlation and SCI is the important tool for organizational performance improvement. On the other hand, the lowest correlation value (r=0.11) is for the pair of Supply chain customer risk and supplier risk, which is positive and very weak relation or indirectly independent from each other which removes the issue of multicollinearity. Furthermore, the p-value for each pair is less than 0.01 so there is a significant correlation between each pair. Interestingly SCI is negatively correlated with supplier risk and customer risk. Showing that customer risk and supplier risks are acting as barriers to SCI implementation. When analyzing an

organization's performance both risk factors like supplier risk and customer risk are negatively correlated. But customer risk is significantly and negatively correlated with organizational performance. While SCI is also positively correlated with organizational performance. Since correlation values for each pair are placed in an acceptable range there is no issue with multicollinearity and each construct measures dissimilar concepts. Also, there is Predictive validity shown, since all constructs of supplier risk, customer risk, and SCI are significantly related to organizational performance.

5. RESULTS AND DISCUSSIONS

This study advances the literature on SCR management and SCI in several ways. First, this study helped to prioritize the identified antecedents of SCRs specifically in the dairy industry of developing countries. This study found that supplier risk and customer risk both act as a resistance to the implementation of SCI and hence decrease the performance of organizations engaged in the dairy sector of the economy. Hence by reducing SCR and implementing integration across the supply chain network, organizations' performance will ultimately be enhanced (Marshall et al., 2018). Contrary to the expectation, supplier risk has no or very weak impact on organizational performance. However, on the other hand, as shown in this study, there is a strong negative correlation between supplier risk and SCI (with a path coefficient of 0.565). Hence it is safe to say that supplier risk acts as a barrier to implementing SCI (Cragg & McNamara, 2018). It is because, organizations in the dairy sector make enough safe stock of raw materials for the livestock, due to its wide availability in the local market. As it is an agricultural country, these things do not make supplier risk a significant factor. Furthermore, the impact of supplier risk on organization performance can also be reduced by using Material Resource Planning (MRP) or Enterprise Resource Planning (ERP), software as an example. If the buying organization anticipated any delay in the supplies from a specific supplier, they easily can find another supplier, hence able to mitigate supplier risk. This reduces the direct impact of supplier risk of required material but it increases the production process variations.

In comparison with supplier risk, which has a very weak or almost no impact on organizational performance, the study reveals that customer risk has a significant negative impact on performance. This confirms the fact that organizations operating in the dairy sector find demand variations more challenging when compared with supply variations. It has two potential explanations for this. Firstly, it is because of the perishable nature of the product, and secondly the lack of advanced technology to preserve it. This makes demand-side risk more noticeable. It is because organizations feel more comfortable keeping an inventory of raw materials to manage supply variations. It is also possible because the cost of the loss or keeping the finished product i.e. milk is higher than raw material.

By considering the relative effect size of path estimates, it highlights the importance of SCI toward achieving higher organizational performance. Although there is no significant direct impact of supplier risk on organization performance, however, the total effect through SCI is 0.664 (- 0.101) = 0.563. While the total effect of customer risk on organizational performance is 0.664 (- 0.434) = 0.230. Comparing the total effect of supplier risk with that of customer risk through SCI as a mediating factor reveals that supplier risk has the strongest effect on organizational performance, however, both supplier risk and customer risk harm not only the SCI but also the organizational performance.

Further to this, supplier risk (with a path estimate of 0.635) is more than customer risk (with a path estimate of 0.434) toward SCI, which indicates the fact that SCI got a severe impact on supplier risk as compared to customer risk, which ultimately reduces organizational performance. Also, the concept of lean manufacturing implies that any failure in the upstream supply chain will produce a ripple effect in the chain of reacting moving downstream of the supply chain. These findings are aligned with the previous studies (Ivanov, 2022; Lotfi & Saghiri, 2018; Paul et al., 2019; Ziaullah et al., 2017), which explains the fact that supply chain scholars and managers showed more concern toward supplier risk as compared to customer risk. Secondly, organizations investing in SCI have shown considerable improvement in organizational performance (Wang et al., 2016; Ziaullah et al., 2017). When organizations integrate with their supply network, return on investment is increased to an optimized desire level, which helps organizations to achieve competitiveness (Danese et al., 2019; Lotfi & Saghiri, 2018).

6. CONCLUSION AND IMPLICATIONS

6.1 Conclusion

This research is a survey-based study to investigate the impact of two important supply chain operational risks, i.e. supplier risk and customer risks, on organization performance, and explore the mediating role of SCI. The perspective considered in this study is aligned with the concept of the supply chain, which considers the supply chain as a system view another than as a set of fragmented parts (Goldberg et al., 2018; Scholten & Fynes, 2017). Similar to the Social network theory that explains organizations would not be studied in isolation while integrating the supply chain along its network not only reduces the impact of various SCRs but also brings superior organizational performance. The empirical findings of this study also support the proposed hypothesis, except that the supplier risk is negatively related to organizational performance in the dairy sector, whose impact is further nullified by SCI. This research study also highlights the importance of SCI as a tool for not only mitigating the negative impact of SCR but also as a tool for gaining superior organizational performance. In this study SCRs, i.e. supplier risk and customer risk reveal their proposition as barriers to organization performance based on the resource-based view. The empirical finding reveals that SCR has a significant negative impact on SCI and organizational performance. Moreover, the finding reveals that supplier risks do not significantly impact organizational performance in the dairy sector, but it has a significant negative impact on SCI. And also SCI act as a tool to mitigate the impact of SCR on organizational performance. Thus, organizations belonging to the dairy sector, and developing countries that want to enhance their performance, should implement SCI for better organizational performance and while taking various strategic moves, should place special emphasis on customer risk and SCI.

6.2 Implications

6.2. a) Theoretical Implication

This study contributes to the theoretical literature on SCR and SCI, by further broadening the application of the Theory of Swift, Even flow. Some scholars like (Kaefer & Bendoly, 2004; Kwesi Buor, 2019) further extend its horizon by explaining the benefits of (ERP) Enterprise Resource Planning. But this study directly applies this theory, by investigating the flows among risks associated with suppliers and customers, by the mediating role of SCI, in this survey-based research which further broadens its application base. This study also enriches the literature on the knowledge-based view, which is the extension of (the RBV) resource- based-view. It explains the knowledge of the organization, as the most strategically important resource, to gain competitiveness (Rafi-Ul-Shan et al., 2018). This study elaborates on the increasing effect of knowledge by integrating various departments to improve organizational performance. Another theoretical implication of this research study for students and supply chain staff is that it provides them with a framework to enhance the organization's performance. On the other hand supply chain, internal integration also has positive and SCRs that have negative effects on performance because it gives them a tendency to strictly follow as well as implement supply chain policies, procedures, and guidelines.

6.2.b) Managerial Implication

This study has implied two important managerial implications. Firstly, this study helps managers to understand the importance of SCR and SCI toward better organizational performance. While handling various SCRs associated with suppliers and customers, this study helps managers to use SCI as a tool to reduce the impact of risk on organizational performance. This research explains the importance of customer risk as compared to supplier risk associated with perishable products. And further explain that, by investigating the mediating role of SCI. Thus, organizations must integrate their supply chain to achieve superior performance. Secondly, it will bring up the importance of an integrated knowledge-based supply chain to handle various SCR, both upstream toward the supplier and downstream toward the customer. It is because of the uncertain environment, a barrier to achieving SCI, which results as a hindrance in achieving competence based on integrated knowledge. Hence, the manager must develop the ability to gather and integrate knowledge not merely at the organizational level but should be at the supply chain level.

6.3 Recommendation for Future Research

Although all the results were significant and consistent with the literature. Besides these results, some limitations were not considered in this study, and these limitations are required to be considered in future research to fill these gaps. Firstly, this study utilizes cross-sectional data, which restricts the researchers to depict the entire manifestation of SCR, SCI, and organization performance, so longitudinal data is more beneficial while studying performance variations over time (Zhu et al., 2017). Secondly, this study focuses on the influence of SCR dimensions and SCI on organizational performance. In future studies, it is suggested to extend this research model by adding some dimension of quality along with SCI and examining their influence on organizational performance. Third, this study only considers Dairy businesses whereas to make this model more generalized it should apply to other industries as well as other cities all over the country. And lastly, as this research finds the direct relationship of only two dimensions of SCR risks on organizational performance and supply chain internal integration, the level of quality performance of an organization was not considered in this research. So it is suggested to researchers incorporate quality performance dimensions besides the organization's performance.

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