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Supply Chain Capabilities and Supply Chain Reponsivenss: The Mediating Role of Supply Chain Information

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Abstract

The supply chain responsive is an important for service-oriented firms including courier-based firms. The key objectives of present study are examining the mediating effect Supply chain information exchange between supply chain coordination exchange capabilities and supply chain integration capabilities for supply chain responsive in courier service-oriented firms in Sindh. The study gathered data with help of adopted questionnaire through survey method and 160 employees from courier companies participated. In order to achieve the research objectives data were analyzed via AMOS version 24. The confirmatory factor analysis and structural equation modeling were conducted. Findings, confirmed the partial mediation effect for both variables supply chain coordination exchange capabilities and supply chain integration capabilities for supply chain responsive in courier service-oriented firms in Sindh, Pakistan. The results of study are insight for top management and managers in order to develop effective and efficient supply chain strategies in courier service-oriented firms in Sindh, Pakistan. The selected supply chain capabilities including coordination and integration are important for supply chain responsive for gaining the consumer confidence and satisfaction with better market sharers in future.

Keywords: Supply chain coordination exchange capabilities; Supply chain integration capabilities; Supply chain responsive; Supply chain information exchange

Introduction

The supply chain process mainly depends on coordination and responsiveness (Asamoah et al., 2019). The accurate information can help all patriciate for quick response to end-customer as per need. The responsive supply chain has many benefits including lower lead times, minimize cost, better customer service and improved quality for end-customers (Tarigan et al., 2021). A positive relationship has been found between supply chain capabilities and supply chain responsiveness. In today' competitive environment the many pressures have been developed on global supply chain due to increase in demand from customers and network complexity must be addressed for better responsive supply chain in both developed and developing countries (Brussel and Teller, 2017). Those firms which timely adopt and adjust with competitive environment with help of responsive supply chain as result increased with bottom line as compare to other firms within industry (Basheer et al., 2019).

In past the role of supply chain capabilities has been examined in context of supply chain responsiveness in various industries including Food and Beverages industry (Irfan and Wang, 2019) and textile industry (Bashir et al., 2019). However, the limited work has been performed in service sector especially courier services firms in regard of Pakistan. The service sector is backbone of any economy because it contributes significant percentage in developing countries such as Pakistan (Kim et al., 2012). Furthermore, the supply chain capabilities such as integration, coordination, information exchange and responsiveness have been in regard of supply chain risk (Rajaguru & Matanda, 2019); supply chain performance (Asamoah, et. al, 2021). But it does not study in light of responsive supply chain. Therefore, present study will fill this gap in context of service sector particularly courier services in Pakistan. This is first study based on limited knowledge of authors that the mediation effect will be checked.

Literature Review

Theoretical Frame work

This study is based on resource-based view theory developed by Barney (1991) and Peteraf and Barney (2033). The relationship between supply chain capabilities and responsive supply chain are studied together. The both internal and external resources are important for success of any firm into industry with competitive advantage (Danneels, 2008; Helfat & Peteraf, 2003; Möller & Svahn, 2006; Rajaguru & Matanda, 2013). These resources are the key assets owned by firm (Amit & Schoemaker, 1993) and they can be tangible or intangible in nature (Cepeda & Vera, 2007). This theory enforced that the supply chain capabilities are important in order to achieve a competitive advantage (Barney, 1991; Peteraf & Barney, 2003).

Literature review and hypothesis development

The supply chain capabilities are important and considered as a building block for implementing the supply chain strategy. The supply chain capabilities can be defined as an internal and external resources or information for facilitating the entire supply chain process for smooth process (Wu et al., 2006). The theory of resource-based view theory suggested that the SCM capabilities usually bring the higher performance within organization through

responsive supply chain (Barney, 1991).Furthermore, the empirical studies also supported this concept such as Liao and Kuo (2014), has found positive and significant impact of supply chain capabilities on responsive supply chain as a result higher firm's performance. Similarly, another recent study by Yu et al., (2018) also found same results and they emphases on the supply chain capabilities for overall better performance of organization. According to Hartono et al., (2010), the higher level of information helps to obtain the responsive supply chain within firms.

Supply chain coordination refers to firm has ability to coordinate the various supply chain activities in real time and transactions information with all supply chain partners (Sahin &Robinson, 2002; Wu et al., 2006). Moreover, the supply chain integration capability can be understood as the firm distinct itself from existing firms within industry (Barki & Pinsonneault, 2005). Lastly, the supply chain responsiveness can be defined as the how quickly the all members within supply chain can respond to the changes are taking place within competitive environment (Wu et al., 2006).

The supply chain information exchange it is an ability to organization for sharing the key knowledge with all supply chain partners in both manners with effectiveness and efficiently (Wu et al., 2006). Similarly, a research study conducted by Shore and Venkatachalam, (2003) also suggested that the right information sharing with right supply chain member can improve the overall supply chain performance. Thus, based on above existing relevant literature review following hypothesis are suggested:

H1: Supply chain information exchange mediating the relationship between supply chain coordination capabilities and responsive supply chain.

H2: Supply chain information exchange mediating the relationship between supply chain integration capabilities and responsive supply chain.

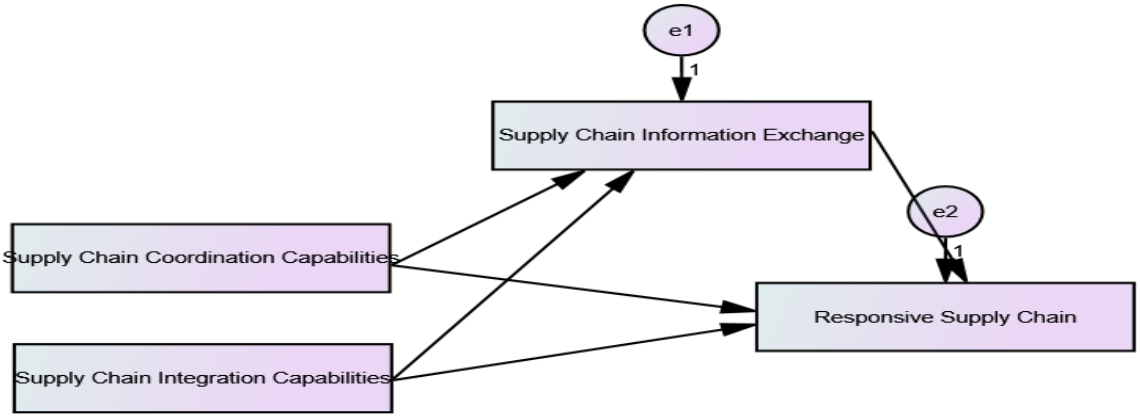

Figure 1: Conceptual Framework

Methodology

The primary data collected with help of adopted questionnaire via google in 1 month June 2022 to July 2022. For this study convenience a type of non-probability sampling is applied due to shortage of time and resources in order to conclude this research. The non-probability sample strategy is acceptable when you are meeting a deadline and it is very difficult of

approach your target population for achieving research objectives (Sedgwick, 2013). The snow ball sampling is also adopted in present study due to limited number of employees working in courier services firms which are operating in Sindh, Pakistan.

The sample size for this study is determined with rule of thumb formula suggested of Rosco (1972), according to him each research items must have at least 10 cases. Therefore, there are four variables including dependent (responsive supply chain), independent variables (supply chain integration and supply chain coordination) and a mediating variable (supply chain information). Each variable consists of four research items. In this regard total sample size for this study is 16x10=160.

The measurement of research variables is adopted from pervious studies. Supply chain information exchange capabilities is adopted from (Wu et al., 2006) and research items are "Our firm exchanges more information with our supply chain partners", "Our firm benefits more from information exchange with our supply chain partners", "Information flows more freely between our firm and supply chain partners" and "Information exchange with our supply chain partners is accurate and timely".

Supply chain coordination exchange capabilities is also adopted from (Wu et al., 2006) and research items are "Our firm is more efficient in coordination activities with our supply chain partners (dropped)", "Our firm conducts transaction follow-up activities more efficiently with our supply chain partners", "Our firm spends less time coordinating transactions with our supply chain partners than our competitors" and "Our firm has reduced coordinating costs more than our competitors".

Supply chain integration capabilities is taken from (Wu et al., 2006) and research items are "Our firm develops strategic plans in collaboration with our supply chain partners", "Our firm collaborates actively in forecasting and planning with our supply chain partners", "Our firm projects and plans future demand collaboratively with our supply chain" and "Our firm always forecasts and plans activities collaboratively with our supply chain partners".

Lastly, the Supply chain responsiveness is adopted from (Wu et al., 2006) and research items are "Our firm and supply chain partners understand trends in sales and customer preferences", "Our firm and supply chain partners promote storing, searching, and retrieving business information (share common database)", "Our firm and supply chain partners derive inferences from past events (e.g., process expectations, patterns of demand shifts, what worked and what did not work)" and "Our firm and supply chain partners use information from different partners in multiple ways depending upon various requirements".

Results and Discussion

4.2 Convergent validity and Reliability

According to Anderson and Gerbing, (1988), the two steps must be conducted for structural equation modeling (SEM). First, the reliability and validity should be checked of research instrument (questionnaire) in order to collection of data. Then, the proposed hypothesis to be checked after collection of data. In this regard, both stages are covered in the present study.

It can be noticed in Table 1 the reliability and validity of this study. All items' loadings are more than proposed value (0.50) by Hair et al., (2010). The higher loading of item is 0.85 and lower item loading is 0.50. Furthermore, the AVE (average variance extracted) value if is also

greater than recommended threshold which is 0.50. AVE fall between 0.50 to 0.68. Lastly, the value of composite reliability is also more than suggested value 0.70 and it values ranges from 0.76 to 0.89. Hence, this study achieved the convergent validity and reliably. In the light of these values the step two hypothesis can be performance in order to obtain research objectives of present study.

Table 1: Convergent Validity and Reliability

Construct	Research Items Coding	Items loading	Composite Reliability	AVE
Supply chain information exchange capabilities	IEC1	.553	0.76	0.50
	IEC2	.747		
	IEC3	.589		
	IEC4	.765		
Supply chain coordination exchange capabilities	CEC1	.759	0.86	0.61
	CEC2	.820		
	CEC3	.788		
	CEC4	.743		
Supply chain integration capabilities	IC1	.737	0.89	0.68
	IC2	.858		
	IC3	.849		
	IC4	.850		
Supply chain responsive	SCR1	.712	0.84	0.56
	SCR2	.809		
	SCR3	.817		
	SCR4	.648		

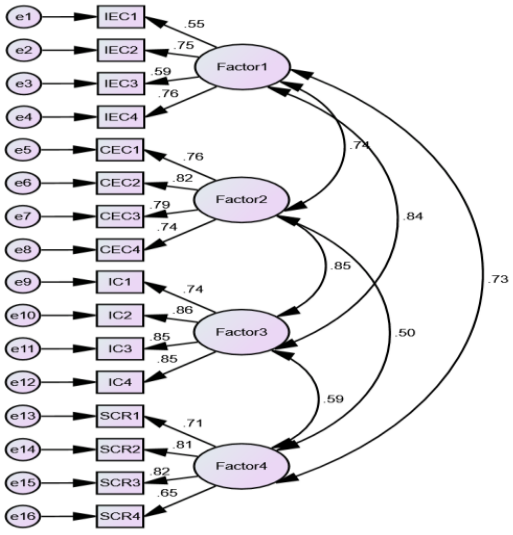

Figure 1: Confirmatory factor analysis (CFA)

Hypothesis Testing
Supply Chain Coordination Exchange Capabilities

The role of as a mediating variable supply chain information exchange coordination has been checked between supply chain coordination exchange capabilities and supply chain responsive. It is suggested by research scholars that the three effects should be verified including total effect, direct effect and indirect effect. Therefore, the first effect total effect confirmed the positive and significant between independent variable supply chain coordination exchange capabilities and supply chain responsive with beta value= .432 and p-value=.001 respectively. Second the direct effect also between independent variable supply chain coordination exchange capabilities and supply chain responsive with beta value= .221 and p-value=.004 respectively. Lastly, the indirect effect via role of mediating variable supply chain information exchange coordination revealed the positive and significant impact with beta value=.211 and p-value=.001. Based these present study's findings the partial mediation effect concluded and value of beta also decreased from .221 to .211. Thus, the recommended hypothesis 1 supported. See the Table 2:

Table 2: Supply chain coordination exchange capabilities (Mediation effect)

Path effects	Directions of Paths (SEM)	Path beta value	Sig value
Total effect	SCCEC->SCIEC	.432	.001
Direct effect	SCCEC->SCR	.221	.004
Indirect effect	SCCEC->SCIEC->SCR	.211	.001

Supply Chain Integration Capabilities
The role of as a mediating variable supply chain information exchange coordination has been checked between Supply chain integration capabilitiesand supply chain responsive. It is suggested by research scholars that the three effects should be verified including total effect, direct effect and indirect effect. Therefore, the first effect total effect confirmed the positive and significant between independent variable Supply chain integration capabilitiesand supply chain responsive with beta value= .107and p-value=.001 respectively. Second the direct effect also between independent variable Supply chain integration capabilitiesand supply chain responsive with beta value= .016 and p-value=.004 respectively. Lastly, the indirect effect via role of mediating variable supply chain information exchange coordination revealed the positive and significant impact with beta value=.092 and p-value=.001. Based these present study's findings the partial mediation effect concluded and value of beta also decreased from .016 to .092. Thus, the recommended hypothesis 2 supported. See the Table 3:

Table 3: Supply chain integration capabilities(Mediation effect)

Path effects	Directions of Paths (SEM)	Path beta value	Sig value
Total effect	SCICE->SCIEC	.107	.001
Direct effect	SCICE->SCR	.016	.001
Indirect effect	SCCEC->SCIEC->SCR	.092	.001

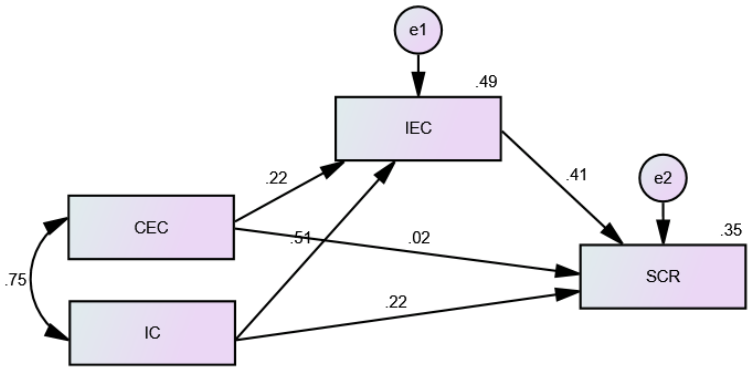

Figure 2: Sturtural equaltion modeling (SEM-Paths)

The findings of present study's aligned with previous research (Asamoah et al., 2019; Lee et al., 2013; Hartono et al., 2010) in context of supply chain coordination exchange and supply chain responsive. Similarly, supply integration has also significant and positive impact revealed by past studies ((Narasimhan & Kim, 2001; Agbenyo et al. 2018; Rajaguru and Matanda 2013).

Conclusion

The present study checked the mediating effect of supply chain information exchange coordination between supply chain coordination exchange capabilities and supply chain integration capabilities for supply chain responsive in courier service-oriented firms in Sindh, Pakistan. In order to achieve research objectives of this study primary data gathered with help of adopted questionnaire through survey method. Findings, confirmed the partial mediation effect for both variables supply chain coordination exchange capabilities and supply chain integration capabilities for supply chain responsive in courier service-oriented firms in Sindh, Pakistan.

Managerial Implication

The results of study are insight for top management and managers in order to develop effective and efficient supply chain strategies in courier service-oriented firms in Sindh, Pakistan. The selected supply chain capabilities including coordination and integration are important for supply chain responsive for gaining the consumer confidence and satisfaction with better market sharers in future. This how is overall supply chain performance can be improved and a competitive advantage can be achieved within respective industry.

Theatrical Implication

This study is based on resource-based view theory which support the supply chain capabilities are important for managing supply chain responsive in competitive environment. Authors have applied this theory and confirmed the findings in Sindh, Pakistan context. They believe this is a first study related supply chain capabilities and supply chain responsive in Sindh, Pakistan.

Future research direction

There are many contributions of this study. However, due to time and resource constrains there is always limitations in any research which develop or provide research gap for future researchers. First, limitations of study are limited sample size, which can be increased in future research. Second, only employees were asked to fill the questionnaire but in future customer may also taken into consideration. Third, a serial mediation effect can be checked by adding to more relevant variables. Lastly, more developing countries can be explored for confirming the this study's results.

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