Supply chain responsiveness and operational performance

In Sudanese service institutions (medical sector)

By

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المستخلص:

ABSTRACT:

The purpose of this study is to investigate the influence of Supply Chain responsiveness (SCR) on services institutions (medical field) Operational Performance (OP). The current study is considered as a causality study, it investigates the effect of SCR dimensions (OPR, LOR, SNR) on services institutions (medical field) OP. The study surveyed the managers working at the services institutions (medical field). Practical data were collected from 307 managers out of 330 managers, by means of a questionnaire which developed and refined through experts' interviews and the panel of judges committee. Statistical techniques such as descriptive statistics, correlation, and multiple regressions were employed. The results of the study indicated a positive significant relationship between SCR and services institutions OP. The results also indicated that the managers in services institutions (medical field) were almost similar in their preference of the SCR. However, the supply chain responsiveness indicators are the most important indicators,.

Furthermore, empirical results indicated that there are strong inter-relationships and interactions among the three components of SCR between them and OP. Finally, the results showed that the respondents believed that there is a strong relationship between SCR and OP. Results indicated that the supply chain responsiveness was having the medium effect on OP. Finally, the current study recommend considering improving the three components of SCR together because they are strongly interrelated.

Key Words: Supply Chain responsiveness (SCI), operation process responsiveness (OPR), logistic process responsiveness (LPR),supplier network responsiveness (SNR), Operational Performance (OP), services institutions (medical field).

INTRODUCTION

Firms are finding it useful to aptly respond to changing customer needs (Huber, 1984; Ward,
McCreery, Ritzman, & Sharma, 1998) and supply disruptions (Christopher & Peck, 2004; Lee,
2004) in today's global supply chains. Consistent with Thatte and Agrawal (2017) and Thatte, Rao, and Ragu-Nathan (2013), this research studies the SCR construct from the customer demand perspective, rather than a supply disruption perspective.

Thatte and Agrawal (2017) found OSR and SNR to positively impact OP. Thatte et al. (2013) dealt with large scale instrument validation and hypotheses testing between SCR and OP using
structural equation modeling and found positive relationship between SCR and OP, SCM practices and SCR, and SCM practices and OP. This study extends Thatte and Agrawal's (2017) and Thatte et al.'s (2013) studies by examining how OP responds to high and low levels of OSR and SNR, in order to draw implications. Such a dimension level analysis between SCR and OP is lacking in existing literature and this study aims to fill this research gap by offering insights into these relationships. Such an analysis can contribute towards providing more meaningful research implications. The relationships among the constructs were tested using Amos, using data collected from 307 respondents to a survey questionnaire.

RESEARCH FRAMEWORK

Thatte et al. (2013) developed the SCR construct and a valid and reliable measurement instrument for SCR through rigorous statistical methodologies, including pretest, pre-test, confirmatory factor analysis, unidimensionality, reliability, and validation of second-order construct.SCR is defined as the capability of promptness and the degree to which a supply chain can address changes in customer demand (Duclos, Vokurka, & Lummus, 2003; Holweg, 2005; Lummus, Duclos, & Vokurka, 2003; Prater, Biehl, & Smith, 2001). This responsiveness is aggregate of three first-order constructs operations system responsiveness (OSR), logistics process responsiveness (LPR), and supplier network responsiveness (SNR). SCR is the ability of the supply chain to rapidly address changes and requests in the marketplace (Holweg, 2005), which implies that speed combined with flexibility results in responsiveness (Prater et al., 2001). Thatte et al. (2013) conceptualized and operationalized OSR, LPR, and SNR as three sub-constructs of SCR. OSR is defined as the ability of a firm's manufacturing system to address changes in customer demand (Thatte et al., 2013). Although it encompasses manufacturing and service operations, this study focusses on firms within the manufacturing industry. In manufacturing operations, it includes the ability to rapidly configure or reconfigure assets and operations of a manufacturing system in order to cope with consumer trends (Lummus et al.,2003; Wu, 2001), respond to changes in product volume, respond rapidly to unexpected events, effectively expedite emergency customer orders, and an ability to swiftly accommodate special or non-routine customer requests. OSR at each node in a supply chain is an integral component of SCR, since each entity in a supply chain is required to deliver the product or service in a timely and reliable manner, to fulfill customer demands (Duclos et al., 2003; Lummus et al., 2003; Meehan & Dawson, 2002). The items under this category measure the responsiveness associated with a specific node or firm in a supply chain (Duclos et al., 2003; Lummus et al., 2003). Measures used to operationalize the OSR construct are: operations system's ability to – respond rapidly to changes in product volume demanded by customers, effectively expedite emergency customer orders, rapidly reconfigure equipment to address

demand changes, rapidly reallocate people to address demand changes, and rapidly adjust capacity to address demand changes.

LPR is defined as the ability of a firm's outbound transportation, distribution, and warehousing

system (including 3PL/4PL) to address changes in customer demand (Thatte et al., 2013). These

activities include warehousing, packing and shipping, transportation planning and management

(Duclos et al., 2003; Lummus et al., 2003; Ricker & Kalakota, 1999), inventory management,

reverse logistics, order tracking and delivery. This study focuses on the outbound logistics of the

services institutions. The responsiveness in the logistic processes is a vital component in the success of a responsive supply chain strategy (Fawcett, 1992). Fuller, O'Conor, and Rawlinson (1993) suggest that a firm's logistics system is instrumental in creating value for its customers. This value creation for a firm's customers implies ensuring logistics flexibility (Duclos et al., 2003; Lummus et al., 2003) and speed within the supply chain to serve each distinct customer's needs. Responsiveness components in the logistics system include selecting logistics components that accommodate and respond to wide swings in demand over short periods, adjust warehouse capacity to address demand changes, handle a wide range of products, vary transportation carriers, have the ability to pack product-in-transit to suit discreet customers' requirements, and have the ability to customize products close to the customer (i.e. postponement), and do all of these speedily in order to gain a CA. Hise (1995) maintains that the logistics system of a firm needs to be flexible and responsive in order to be able to adjust its logistics resources rapidly for satisfying market needs. It is also important that firms have easy access to and are able to utilize different modes of transportation to be logistically flexible and responsive (Prater et al., 2001). Lummus et al. (2003) present critical logistics process flexibility aspects of a supply chain, which are vital for SCR. These aspects have been adapted for LPR to form its measures: logistics system's ability to - rapidly respond to unexpected demand change, rapidly adjust warehouse capacity to address demand changes,

rapidly vary transportation carriers to address demand changes, and effectively deliver expedited shipments.

SNR is defined as the ability of a firm's major suppliers to address changes in the firm's demand (Thatte et al., 2013). The ability of firms to react quickly to customer demand is dependent on the reaction time of suppliers to make volume changes. A key to responsiveness is the presence of responsive and flexible partners upstream and downstream of the focal firm (Christopher & Peck,2004). Supply chain networks must be ready to react to any ripple effects due to supply disruptions as well (Walker, 2005). In order to have a CA, organizations need to meet the changing needs of customers by being able to rapidly supply products, including any demand changes in terms of product volume, mix, product variations, and new product introductions. Meeting these needs requires responsiveness in the supply chain at various stages from the raw materials to finished products to distribution and delivery. Supplier networks are the essential building blocks of a flexible system and their flexibility is an important ingredient of being responsive to customers (Holweg & Pil, 2001; Slack, 1991). In order to be responsive, organizations should be able to select suppliers who can add new products quickly and have suppliers make desired changes.

Fisher, Ramen, and McClelland (2000) found that for short lifecycle products, such as fashion apparel, retailers are most successful if they can work with suppliers who can provide initial shipments of product based on forecasts, but then rapidly increase production to the right style,color, size, etc. based on actual sales. Several studies (e.g. Choi & Hartley, 1996) suggest that supplier selection based on product development capabilities, rapid deployment capabilities or product volume flexibility positively impact the delivery time of new products. Holweg (2005) found that the lack of supplier network flexibility hampered its customer's responsiveness capability. Supplier network flexibility (Slack, 1991) and thus SNR (Thatte et al., 2013) is an important part of SCR. The measures of SNR used in this study are: major suppliers' ability to - change product mix in a relatively short time, consistently accommodate the firm's requests, provide quick inbound logistics to the firm, and effectively expedite emergency orders.

Operational performance (OP):

Cost performance building the strategy based on reducing the overall costs entail to run out the following: reducing inventories, maximum utilization of resources, work- in- process inventory turnover, and eliminating non-added value activities.Likely the most common and important measure in evaluating operational supply chain is cost. Bowersox, et.al. (2009) defined the cost as the total cost incurred to accomplish specific operation. Organization attempt to decrease prices and maximizing profit. Vaidya and Hudnurkar (2012) defined cost as the summation of all costs that includes: Inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labor cost, administrative and service costs. Cirtita, et. al. (2012) defined the cost as "the total costs associated with operating the supply chain". In this research the author defined the cost as the total costs and expenses that are incurred by completing all/and or specific activities and operations within supply chain. It was measured by selected items that reflect the total incurred costs and expenses.

Referring to the above previous studies and the referring to the importance of supply chain management and the resulting of substantial benefits as a result of integration, the researcher was investigating the supply chain integration as an independent variable represented by: internal, customer integration, the operational performance as a dependent variable represented by: service performance, cost performance.

Service performance is an external perspective of firms. Behaviors where employees serve and help their customers. Borman and Motowidlo (1993) contend that employee job performance consists of three components: in-role, extra-role toward customers, and extra role toward organization. The in-role component refers to the main tasks included in the job description such as, being well-informed of the delivered service, conducting proper product displays, and handling client orders. Extra-role toward customers is employee discretionary behaviors that indirectly affect the value chain of delivering the product such as providing extra service to the clients. Extra-role behavior toward the organization refers to employee willingness to promote the organization's welfare. In a retail context, the

employee initiatives to increase the quality of his or her service delivery comprise an element of extra-role behavior toward the organization (Bettencourt & Brown, 2003).

Bowen and Ford (2004) maintain that for the employees to serve the customer exceptionally, the firm must motivate and satisfy the employees so they can deliver the service without difficulties. Further, Liao and Chuang (2004) suggest that employee service performance has three antecedent: individual level, store level, and service climate. Individual level is the personality of the employee consisting of continuousness, neuroticism, extroversion, and agreeableness. Store level is human resources practice including employee involvement, service training, and performance incentive. Service climate refers to the shared views among employees concerning the procedures, policies, and practices.

3. RBV Theory:

Resource-Based View, Resource Dependence Theory emphasizes the term "resource" as an important feature within the context of the formulation and implementation of corporate strategy in order to generate persistent competitive advantages [82]. However, unlike the Resource-Based View, Resource Dependence Theory looks at the company from an external perspective [82]. Thus, the dependence of a company on external resources allows it to acquire new businesses; to create co-operations and strategic alliances, and merge with other companies Resource-based view seeks the sources of competitive advantage from within the organization, analyzing its strengths and weaknesses. According to this view, companies can gain competitive advantage if they able to achieve superior resources and capabilities and these are valuable, rare, inimitable and non-substitutable [83]. Thus the objective is to identify, develop and deploying key resources to maximize returns, the relational view finds the source of competitive advantage in the collaboration between firms and more specific, it identifies four sources of inter-organizational competitive advantage: relation specific assets, knowledge sharing routines, complementary resources / abilities and effective governance (Dyer and Hatch, 2006).

[38] RBV further suggests that the value of RSCI as resources lies in its ability to create organizational processes that drive firms to prioritize

supply chain relationships. RSCI as an intangible capability allows managers to use both formal and informal relationship mechanisms among supply chain members to facilitate a long-term approach to SCM [19] more interactions or negotiations the company undertakes with its external environment, the more assured it will become in response to its access to resources, and the more dependent it becomes on the groups which own the resources it needs [84]. The company is constantly being watched by the external groups which control its resources, and are therefore able to influence the entire resource allocation process [82] based on the theoretical point of view, this study will develop a testable hypotheses.

1.5. Hypotheses Development:

Based on the problem statement and its elements, the following hypotheses can be derived:

The relationship between supply chain responsiveness and operational performance.

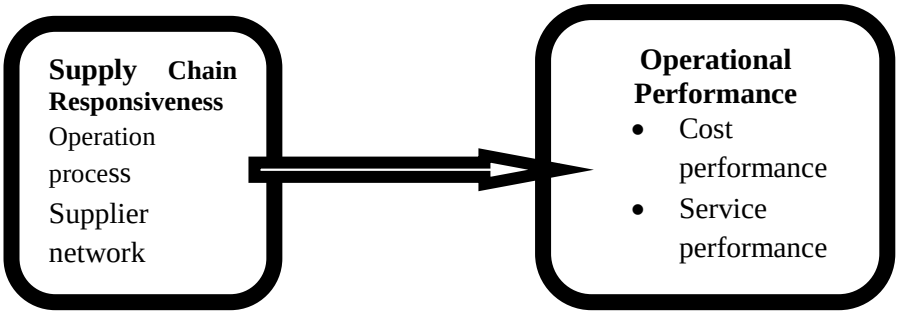
The literature suggests that the responsiveness to build effective responsiveness is a significant driver of performance. (Gunasekaran , 2018) Furthermore (Sukati , 2012) show that there is a significant relationship between responsiveness and performance. Most of the studies that examined the relationship between responsiveness and firm performance have found a highly significant and positive relationship between them such as (Thatte , 2007) investigated that there is a significant relationship between responsiveness and performance. (Cheung & To 2016) show that there is a significant relationship between responsiveness and customer satisfaction.

Based on the above discussions the following hypotheses are generated:

H3. There is a relationship between the responsiveness and operational performance.

Conceptual Framework:

Based on previous studies of supply chain integration and depending on different models, the current study chooses to set the study model that shows the impact of supply chain integration responsiveness with its all elements (operation, supplier network, logistic) on operational performance (Cost performance, service performance) .



5. Methodology

6.1 Data Collection

A cross-sectional survey was used for data collection from non probability sample consisted of Sudanese services institutions. A 5-point Likert scale with end points of ‘‘strongly disagree’’ and ‘‘strongly agree’’ was used to measure the items. The questionnaire was developed, based on the measurement of the previous studies in supply chain integration and operational performance, firstly developed in English then back to back translation from English to Arabic was conducted. This procedure guarantees that the English and the Arabic versions of the questionnaire have equal measures. Subsequently, a number of researchers in the same field assessed the correctness and the clearance of questions and measurement items a pilot test was performed on 50 medical institutions operating in Khartoum State. After the pretest, the survey was changed slightly for clarification All constructs were initially operational by a set of four or more items the measurement items of SCI adopted from [26], [104] value co-creation adopted from [105] for increasing the response rate All questionnaires , attached with a cover letter, target respondents were executive/senior managers responsible for SCM or related position in their organizations, From the resulting sample size of 330, 307 responses were received, resulting in a response rate of 85.%. A total of 15 were discarded due to incomplete information the final sample included.

Table (5.2) Response rate of questionnaire

Total distributed questionnaires	330
Total questionnaires received from respondents	307
Valid questionnaires received from respondents	0
Invalid questionnaires	0
Questionnaires not received	23
Overall response rate	307
Useable response rate	307

Source: prepared by researcher from data (2018)

The response bias was assessed by comparing the means of the responses in the last quartile of respondents using this design, a Chi-square and DF of all the variables used in the study revealed significant differences between the groups. So a control test is conducted for the variables(competitors, suppliers, company age, job title, company ownership,)Employing structural equation modeling (SEM) conducted by using AMOS version 22 for testing the measurement and structural model requires large samples, [106] suggest that a minimum of 100 to 150 observations should be satisfactory. Based on these definitions, The sample of this study satisfy the requirement of using CFA to test the full measurement model simultaneously.

6. Analysis and results

The framework is tested by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in structural equation modeling (SEM) in order to evaluate the consistency among scale items [107]. In this study, the EFA and CFA are used to test the measurement model of the structural RSCI and operational performance. For validate the constructed model the following tools used convergent and discriminant validity, reliability, and common method bias. moreover to test the inter-relationships between the variables , the direct relationship between Structural SCR and operational performance, Structural SCR and operational performance modeling are investigated. All these tests in detail in the following sections.

6.1 Exploratory factor analysis

The results of SCI factor analysis by a principal component analysis. The EFA with varimax rotation was performed for both constructs: SCI and operational performance. First, this analysis was applied for SCI. There

were 12 items related to SCI, and at the end of the steps 7 items were loaded on two different factors. Based on the loadings, these factors were named credibility (CRE), cooperative norms (coo) also. The Cronbach α values are 0.638, operation process 0.852, logistic process 0.821 and supplier network 0.826 for service performance and 0.761 for cost performance. These values are greater than the threshold value 0.7 [108], therefore all of them are used in this study.

6.2 Confirmatory factor analysis

CFA tests the measurement model of variables. Therefore, SCR, operational performance were tested with a first-order confirmatory factor model to evaluate the construct validity. The confirmatory analysis results confirm that structures for SCR and operational performance.

The values for the model fit indices X 2=1262.195 with df=71; CFI=0.941;CMIN=102.024 ;SRMR =0.051 ; RMSEA=0.054).

Testing the correlation conducted by compared the squared correlation between the latent constructs to their average variance extracted (AVE) estimates. Based on that discriminate validity exists if the items share more common variance with their respective construct than any variance the construct shares with the other constructs. Therefore, the correlation between each couple of variables in the model construct has to be less than the AVE of each variable construct. Comparing the correlation coefficients given, it can be can conclude that none of the squared correlations is greater than the AVE for each variable construct. These outputs of the test totally indicate as strong evidence of discriminate validity between the theoretical constructs. Reliability was assessed using internal consistency method via Cronbach's alpha [109] All variables and dimensions have a Cronbach's alpha greater than 0.70. This result establishes the reliability of all the theoretical constructs.Moreover, the AVE values for all dimensions exceed 0.50. Taken together, these results imply that the instrument constructs exhibit good psychometric properties

Table () Discriminate validity of all variables in data set.

Table 3: Correlation and Reliability Analysis for study variables

variables	Cronbach's alpha	Mean	Standard Deviation	1	2	3	4	5	6
Operating process	.852	3.98	0.93						
Network	.821	3.80	1.01						
Logistic	.826	3.78	0.98						
service	.771	4.11	0.87						
cost	.761	3.94	0.93						

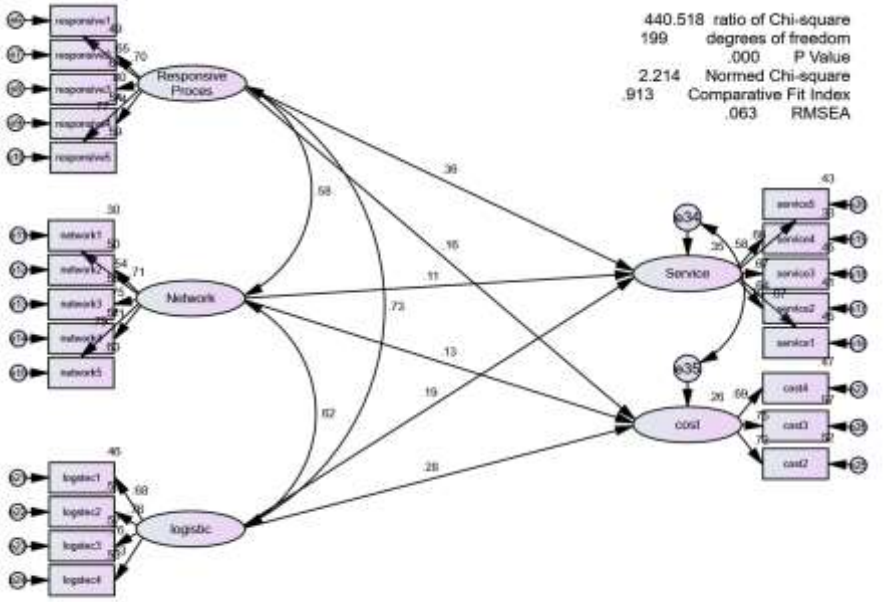
Technological	Technological	Responsive process	Network	Service	Logistic	Cost
Operating process	**0.841**					
Network	0.410***	**0.733**				
Service	0.500***	0.576***	**0.706**			
Logistic	0.511***	0.564***	0.434***	**0.646**		
Cost	0.490***	0.734***	0.620***	0.524***	**0.732**	

6.3 Hypothesis testing

The hypothesized structural equations model (Fig. 2) was tested using LISREL [110], with variance–covariance matrices for the latent variables and residuals used as input. Given the satisfactory measurement results, we used summated scores to measure the model's latent constructs. The use of summated scores reduces the model's complexity, identification problems, and the variable-to-sample ratio [110] In the hypothesized structural model, the measurement coefficients were constrained to one and the corresponding error coefficients were constrained to zero. The model parameters were estimated using the method of maximum likelihood [111].

To assess the impact of supply chain integration responsiveness such as (operation, supplier network, logistic) on operational performance such as (service performance, cost performance**)** structural equation modeling has been employed and a measurement model of these

constructs has been assessed. Figure (1) reveals that reflective indicators have been used for the measurement of latent constructs and non-causal relationship has been studied among different constructs, by drawing path



The structural model reveals the same value of model fit shown in Table …. , all the model fit indices for the structural model were not only significant but remain same as in the measurement **Regression Weights: (Group number 1 - Default model)**

			Estimate	S.E.	C.R.	P	Result
Service	<---	Operation process	.328	.101	3.244	.001	Supported
Cost	<---	Operation process	.191	.135	1.413	.158	Not supported
Service	<---	Network	.101	.080	1.257	.209	Not supported
Cost	<---	Network	.162	.112	1.442	.149	Not supported
Service	<---	Logistic	.149	.090	1.648	.099	Not supported
Cost	<---	Logistic	.292	.127	2.296	.022	Supported

The table () show the probability of getting a critical ratio as large as 3.244 in absolute value is .001. In other words, the regression weight for operation process in the prediction of Service is significantly different from zero at the 0.001 level. However, the probability of getting a critical ratio as large as 1.413 in absolute value is .158. In other words, the regression weight for operation process in the prediction of cost is not significantly different from zero at the 0.05 level. While, The probability of getting a critical ratio as large as 1.257 in absolute value is .209. In other words, the regression weight for Network in the prediction of Service is not significantly different from zero at the 0.05 level. However, the probability of getting a critical ratio as large as 1.442 in absolute value is .149. In other words, the regression weight for Network in the prediction of cost is not significantly different from zero at the 0.05 level. And also, the probability of getting a critical ratio as large as 1.648 in absolute value is .099. In other words, the regression weight for logistic in the prediction of Service is not significantly different from zero at the 0.05 level. And finally, the probability of getting a critical ratio as large as 2.296 in absolute value is .022. In other words, the regression weight for logistic in the prediction of cost is significantly different from zero at the 0.05 level. Model the low index of R square (i.e. 0.22) justifies the underlying theoretical model.

Thatte et al. (2013) found SCR to have a direct positive impact on CA of institutions and confirmed the assertion in literature that a responsive supply chain in terms of an organization's operations system, logistics and distribution processes, and suppliers could provide firms with OP on cost, services dependability, services innovation, and time-to-market dimensions. This study builds on Thatte and Agrawal's (2017) study which found OSR and SNR dimensions of SCR to be significant in predicting OP on a composite basis. The data analysis utilized AMOS to study how OP and its dimensions are impacted with high and low levels of OSR and SNR can provide additional insights into improving OP and its

constituents by means of OSR and SNR. Thatte and Agrawal's (2017) study which utilized regression analyses did not find support for impact of OSR or SNR on OP dimensions, with the exception of 'delivery dependability.' This section aims at understanding if the measures of OP when considered collectively and individually, significantly differ for high and low levels of SCR dimensions.

Thatte and Agrawal (2017) found OSR and SNR as two significant dimensions of SCR that predict OP. Thus for conducting AMOS only OSR and SNR have been considered as three distinct independent variables (IVs). The dependent variables (DVs) are the two dimensions of OP (service performance, cost performance). The results of AMOS shall answer the research questions. This study follows the data analysis procedure for AMOS.

Results' Discussion:

In this section, the study results will be presented and discussed in the light of previous studies as follows:

1- Result of the current study shows that there is a partially significant importance of the supply chain responsiveness among medical field institutions. The researcher refers this result to the unawareness of the managers, supervisors, and other employees who work at medical institutions about the importance of supply chain integration responsiveness and its effect on the overall operational performance. Some of independent variables have high degree of integration responsiveness (logistic process) and (supplier network) is not significant with services performance this related to the highest cost of the service in medical institutions , this result refer to multiple reasons the most important are there is no medical material manufacturing . That the first and highest level of integration responsiveness is related to the operation process with service performance and logistic responsiveness with cost performance which is actually the most important variable among supply chain integration responsiveness because operation process and logistic process responsiveness satisfaction is the ultimate goal that all organizations seek to achieve. Then, supplier network is ranked in the second level of SCR as it's the linchpin between supplier and customer, and it's impossible to achieve either supplier or customer integration without SCR.

2- The study showed that there are strong inter-relationships and interactions among the two components of SCR (operation and logistic) between them and OP (service and cost). Finally, the results showed that the respondents believed that there is a medium relationship between SCR and OP.

The conclusion of this study is clear; a responsive supply chain realizes a operational performance which strengthens the position of a company within the customer medical field. But there are some aspects of the responsive supply chain which are not discussed in the study.

First of all the implementation a responsive supply chain is not taken into account thoroughly. Each company has a different culture, values and social structure and operates in a certain setting within the market. Due to the conversion of a company's business and operation strategies when implementing a new supply chain construct, each institution has to design its own unique responsive supply chain to make it work for that institution. This requires a lot of time and money to specialize the system to a institution's needs.

Furthermore, as already mentioned in the conclusion, responsive supply chains depend on highly integrated operation process and logistic systems. The use of SCIR makes the institutions vulnerable, especially when all the players in the supply chain apply these systems. The risk of failure within the SCR or leaking of sensitive information increases when the supply chain depends heavily on automation.

Since the customer of medical field is such a medical service or service cost, the concept of the responsive supply chain may become outdated when major innovations occur in the future. Great consideration is needed when implementing this construct.

Finally it must be emphasized that the concept of the responsive supply chain described in this study is primarily based on research and works of Angappa Gunasekaran. Although it is one of the top researchers in performance measures and, , logistics, and supply chain management, other views on responsiveness must be considered to gain a better perspective on the subject.

FINDINGS AND IMPLICATIONS

The study found that OP of a firm differs significantly, collectively based on its dimensions, service performance and cost performance for high and low levels of OSR. This implies that institutions may be able to improve their overall competitive position based on service and cost performance, by having in place a responsive operations system in terms of the three measures of OSR set forth in

5. Theoretical and Managerial Implication

8.1 Theoretical

Conceptually, in this study and based on the OP, two factors(service and cost) were found, It can be observed that the most factor of SCR in Sudanese services institutions Indeed, this suggests that the SCR construct could be considered in the future operationalization of SCR in Sudan context . the study extend existing research on the performance and supply chain responsiveness relationship, In addition to the study contribution by proposing operational performance in the context of supply chain responsiveness in service sector specially in medical field. Also the present study confirms the notion that SCR will have a partial effect on operational performance in service sector (medical field).

This study support call of earlier studies which emphasize on that SCR require higher level of operation process Thus, for institutions to support the participation of partners it must endeavour to create a suitable responsiveness. Furthermore, the indirect effect of SCR with the effect of operational performance is significant and stronger than its direct impact. Although much Studies has been interested in the effect of SCR on business outcomes or any related kind of performance, this study indicated the importance of SCR to detect the impact on operational performance.
Specifically, although the supply chain management concept is predicated on SCR, extant research has yet to explicitly consider the implications of SC with regards to supply chain responsiveness efforts. The overarching theoretical contribution relating to the role of SCR is demonstrating that SCR is responsible for internal and external environment behaviors that are unattainable via integrative mechanisms.

8.2 Managerial Implication

From a practical perspective, this study provides a number of insights into how institutions can more strongly utilize the SCR to improve operational performance. specifically, managers can use it to expand their understanding the role of SCR on operational performance and develop specific culture that help to encourage customer participation in responsiveness to improve job more active .SCR that is fully supportive of participation and the value they best on the institutions should lead to high performance which are difficult for competitors to replicate and can afford firms a competitive advantage. Moreover the developed conceptual model of the study provides better highlights the interplay between SCR and operational performance on medical field. And it is an important factor for institutions to turn competitive advantage.

LIMITATIONS AND FUTURE RESEARCH

This research has extended past research in several ways, by building on theoretical and empirical studies. Although this research has contributions from both theoretical and practical point of views, it also has some limitations, which are described below and which may be addressed in future research. The individual respondents (high-level executives from purchasing, operations, materials, and logistics functions) in an organization were asked to respond to complex SCM issues dealing with all the participants along the supply chain, including upstream suppliers and downstream customers. However, no person in an organization is in charge of the entire supply chain.

Therefore, the use of single respondent may generate some measurement inaccuracy. In addition,

this study was limited to the service sector(medical field) in Khartoum state . This could limit generalizability of results to other service institutions. Future research may extended or replicate the study for other service sector to enhance generalizability. Future research may apply multiple methods of obtaining data. The use of single respondent to represent intra or inter-organization wide variables may generate some inaccuracy, more than the usual amount of random error (Koufteros, 1995). Future research could seek to utilize multiple respondents from each participating organization in an effort to enhance reliability of research findings. Future research may test the relationships across countries. Thus SCR dimensions impacting OP indifferent countries can be

compared and country-specific SCM issues can be identified. Additionally, future research may develop additional dimensions of SCR such assembly responsiveness and inbound logistics responsiveness and study their impact on OP. Future research may study SCR and its dimensions at the supply chain level. Observing a complete supply chain, it may be interesting to investigate the various SCR components across supply chains operating in different industries (e.g. electronic and computer, heavy machinery manufacturing, fashion and apparel, and consumer goods) and their role in creating OP. Further, to confirm the inverse relationship between responsiveness and cost/price found in this research, future research can study this relationship in greater detail. Finally, canonical correlation analyses may be used in future studies to test the simultaneous relationship between the various dimensions of SCR and OP. Such an analysis may provide additional insight into and easy interpretation of the various relationships pertaining to OP of a institutions, and may enhance the quality of this research from a methodological standpoint.

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