

Supply Chain Integration and Health Firms Operational Performance-Evidence from Underdevelopment Countries

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ABSTRACT

The purpose of this study is to investigate the influence of Supply Chain Integration (SCI) on services Organizations' (medical field) Operational Performance (OP). The current study is considered as a causality study, it investigates the effect of SCI elements on services Organizations' (medical field) OP. The study surveyed the managers working at the services Organizations (medical field). Practical data were collected from 307 managers out of 330 managers, using 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 SCI and services organizations' OP. The results also indicated that the managers in services organizations (medical field) were almost similar in their preference of the customer integration and internal integration indicators. However, customer integration indicators are the most important indicators, followed by internal integration. Furthermore, empirical results indicated that there are strong interrelationships and interactions among the two components of SCI between them and OP. Finally, the results showed that the respondents believed that there is a strong relationship between SCI and OP. Results indicated that the internal integration was having the highest effect on OP, followed by the customer. Finally, the current study recommends considering improving the two components of SCI together because they are strongly interrelated.

INTRODUCTION

Recent technological advancement of communication and transportation lead to globalization. Due to globalization, customers' needs and requirements have been changed and developed. Customers need a suitable product in a suitable place at a suitable time with high quality and suitable cost. Any organization would like to compete in recent hypermarket should match with the above-mentioned customers' requirements. To fulfil the customers' requirements organizations should improve all their activities and processes. Supply chain management is a system that improves all activities carried out by an organization. Supply chain management is a complex system which covers all supportive activities from suppliers to after-sales services. To be able to grow and survive any organization has to identify its strengths and weaknesses, to re-enforce on strengths and overcome weaknesses. Implementing supply chain management can be a source of competitive advantages which lead to better overall organizations' performance.

Vaidya and Hudnurkar (2012) stated that integration in the supply chain plays a dominant role in improving the organization's performance and gaining a competitive advantage. Cooper et al. (1997) said that to utilize the supply chain at its maximum performance level, organizations have to integrate their goals and activities. Vaidya et al. (2012) mentioned that supply-chain partners need to focus on various elements to ensure competitive advantage: price negotiation to increase in margin, and financial collaboration to ensure innovative product design. Lambert and Cooper, (2000) announced that supply chain management requires integration and coordination for satisfying and responding to change in consumer demand. Finally, Frohlich and Westbrook, (2001) pointed out that supply chain integration influences performance.

Therefore, it seems that it is worth to study the effect of integration of supply chain processes and activities on operational performance, so this study investigates the impact of supply chain integration on operational performance at services organizations (medical field). There are many challenges and obstacles confronting supply chain management which in turn affected the overall performance at these organizations. First, different departments are concerned with achieving their objectives separately. Second, supply chain activities and processes are performed by different departments without specialized people. Third, continuous changes in rules and regulation which imposed by the service sector and medical field especially they have other universal regulations associations which lead to delay in supplier selection and delay in preparation of the inputs to services organization. Finally, continuous change in customer needs and requirements due to tough competitions among the organizations. Consequently, this leads to difficulties in integrating supply chain activities and processes, which delay providing products and services to customers in a suitable place at a suitable time and loss of competitive advantage. Most of the studies that addressed the operational performance, in general, focused on the manufacturing companies, production companies and pharmaceutical sector where these studies neglected the service companies (medical field), which represent a true foundation of the national economy, as a play an active role in the development of economic and social growth through providing and diversifying services, achieving developmental goals and creating job opportunities. Therefore, this research focused on the studying of operational performance in service companies (medical field), and this is what the previous studies have failed to deal with. Thus, this study will explore the relationship between supply chain integration and operational performance. The previous studies such as Chen et al. (2018), Kim et al. (2018), Liu et al. (2018), Prajogo et al.

(2018), Wantao (2017), Baharanchi et al. (2009), Fantasy et al. (2010), Eheshti et al. (2014), B. Liu et al. (2013), Gimenez et al. (2012) and Flynn et al. (2010), have studied different types of supply chain integration. This study focus on three dimensions of supply chain integration: internal integration, supplier integration, and customer integration as a dimension of supply chain integration influences operational performance. Internal integration is considered because it is important and involves obtaining the goals when using and share organization information, thus, should be important for operational performance (Cheng, 2018). Customer integration is considered because of its importance to the organization's satisfaction, business activities and focus on effects that are important in operational performance (Huang et al., 2018). It attempts to create and use new knowledge to develop new products/services, which should also be critical for operational performance (Melton & Hartline, 2013). So there are no previous studies investigated the relationship between operational performances with supply chain integration with dimensions. Hence, this study was designed to address the relationships between supply chain integration with operational performance.

Finally, previous studies regarding supply chain integration, operation performance have focused mainly on a specific sector, such as manufacturing (Gunasekaran et al., 2018; Minich, 2010), production (Sukati, 2012), pharmaceutical sector (Eltamimi, 2015) or food industry (Kumar et al., 2017). This study covers service sectors (medical field) including private hospitals, private medical centres and private medical services. Thus, this research addresses the gaps and limitations in the literature by investigating the link between supply chain integration operational performance. Generally, this research will examine the operational performance. Also, the research will investigate the relationship between supply chain integration and operational performance in service firms

(medical field) in Khartoum State. Therefore, the managers believed that it is worth to study the topic of supply chain integration, so the objective of this research is to answer the following question: Is supply chain integration impact on operational performance in services organizations (medical field)?

The main objective of this study is to investigate the impact of supply chain integration on operational performance in services organizations (medical field). This research will also provide recommendations to service organizations (medical field) and might be for decision-makers. Finally, this study will contribute to the scientific field. The first subsection represents the theoretical contribution of this research which can be considered in terms of the following areas of knowledge: The research contributes to bridging the knowledge gap that was failed in the previous studies, especially in Sudan, on the impact of operational performance in supply chain integration to creating a creative performance of workers. This study is an attempt to build a conceptual framework that will contribute to theories and practice in the field of operational performance. The study will provide scientific guidelines and advice through which the service firms operating in Sudan to achieve efficiency and effectiveness. Therefore, it may be providing a new scientific addition especially that this study will combine different variables that diagnose the interaction of their variables, which contribute to the development of new concepts, data and relationships on their subjects. Several practical contributions are expected to emerge from the current research representing in the contribution of knowledge and the level of dimensions in operation performance so that organizations can provide quality indicators in supply chain integration as indicators of quality measurement in performance. The results of the study and suggested recommendations related to the supply chain integration, creative operation performance and the possibility of benefiting from the outputs of study in the real practice

of the service organizations sector (medical field). The study can also draw the attention of managers and decision-makers to the importance of user satisfaction in the service organization sector (medical field) to enhance its role in operation performance, which helps to create a performance. The study can also draw the attention of managers and decision-makers to the importance of user satisfaction in the service organization sector (medical field), to enhance its role in operation performance, which helps to create a performance.

LITERATURE REVIEW

Different authors defined supply chain integration and operational performance in different ways, each definition was tailored according to the nature of the study, industry, and research objective. Supply chain integration is about collaboration, cooperation and coordination among different players of the supply chain which enhances the organization's performance. The following section will tackle the concepts of supply chain integration and operational performance, as well as the relationship between them.

Supply Chain

The supply chain is considered as a system that includes a group of activities, processes and sub-processes such as procurement, operations, transportation and warehousing. It aims to provide the products and/or services either to consumer or customer starting with purchasing materials and equipment then transforming it to semi-finished products that will be reprocessed again to produce the final products.

Supply chain management is concerned with the planning and managing the flow of materials, products and services among and between these processes. The ultimate goals of managing the supply chain are to provide the products at the agreed delivery

time, suitable quality, and competitive price to the customers, and that is reflected by the customer's satisfaction and the overall organizational performance.

The concept of the supply chain has evolved. Chopra and Meindal (2007) said that supply chain consists of all parties involved directly or indirectly in fulfilling customer demand, it includes all functions involved in receiving and fulfilling a customer's requests. These functions include manufacturers and suppliers, warehouses, transporters, retailers, and final customers. Chopra and Meindal (2007) added that the objective of every supply chain is to maximize the overall value created. Wheelen and Hunger (2012) stated that "Supply chain management is the forming of networks for sourcing raw materials, manufacturing products or creating services, storing and distributing the goods, and delivering them to customers and consumers". Then they added that the concept of the supply chain is used first to reduce costs, and then to improve customer service and get new products to market faster than others. Finally, Krajewski et al. (2013) defined supply chain as it is the interrelated series of processes within a firm and across different firms that produce products or service to the satisfaction of customers.

In summary, the concept of supply chain management was recently introduced which covers all activities carried out by organizations to collaborate with suppliers and customers to satisfy customers' needs, requirements and preferences.

Supply Chain Integration

Due to the intensity of global competition, the organizations create a cooperative and mutually beneficial relationship among supply chain partners (Wisner & Tan, 2000). Bowersox et al. (1999) and Westbrook and Frohlich (2001), pointed out that organizations or companies need to implement supply chain integration to meet the new challenges of the

global competitive environment. Many studies propose different supply chain definitions. Rosenzweig et al. (2002), Pagell (2004) and Han and Omta (2007) defined integration of supply chain as a process of collaboration in which companies work together cooperatively to arrive at mutually acceptable outcomes. Zhao et al. (2008) described supply chain integration as "the degree to which an organization strategically collaborates with its supply chain partners and manages intra- and inter-organization processes to achieve effective and efficient flows of products, services, information, money and decisions, to provide maximum value to its customers". Krajewski et al. (2013) defined supply chain integration as "the effective coordination of supply chain processes through the seamless flow of information up and down the supply chain". Supply chain integration can be defined as the process through which all parties who involved with supply chain; supplier, organizations and customers, are working independently and dependently in a harmonious way to achieve a unite objectives such as providing maximum customer value and lowering overall cost. Bagachi et al. (2005) and Fabee-Costes and Jahre (2007) said that supply chain integration is key to the success of companies and supply chains.

In this study, supply chain integration defined as the process of collaboration within supply chain players that manage inter and intra-organization activities to achieve an effective and efficient flow of products, services and information to provide maximum value to the customer in right place at a suitable price and high speed. Supply chain integration was measured by internal, supplier and customer integration.

Internal Integration

Internal integration is the centre of gravity for both suppliers and customers and it is considered the linchpin that maintains the stability and continuity for all supply chain

parties, so the organization could make neither supplier nor customer integration without internal integration. Building the proper supply chain strategy depends heavily on the existence of clear and shared goals, which originally derived from the adoption of all departments of the organizational mission, vision, and objectives. In the presence of such consensus, each department is considering two types of customers. The first customer is the main customer that the organization plans to provide with the final product or service, and the second customer is the department or the employee depending on the other output to continue achieving their tasks and thus achieving the overall organizational objectives.

Many researchers were defining internal integration. Among them, Flynn et al. (2010) defined internal integration as "the degree to which a manufacturer structures its strategies, practices and processes into synchronized, collaborative processes to fulfil its customers' requirements and efficiently interact with suppliers". Zhao et al. (2011) said that "the internal integration stresses organizational structure, procedures, and practices, so it must be collaborative and synchronized to fulfil customer requirements".

In this study, internal integration defined as the process of maintaining cross-functional cooperation and collaboration within the organization that intends to achieve organizational strategic goals. It was measured by a group of items that identified the nature of relationship, coordination and collaboration among organizational departments.

Customer Integration

Customers are considering the source of life for organizations whatever they provide either product or service and it's considered the fresh air that is needed by the organization to grow and being able to survive in the presence of the strong and tough competitions. Customer needs and requirements are always

transformed, so what was considered essential in the past perhaps it becomes complementary soon. Accordingly, the organizations should monitor the external environment such as political, economic, social, technological, and legal changes. Moreover, it should behave proactively but not reactively to be superior over competitors in satisfying customer needs.

Managing the relationship with the customer is considered a vital element in the supply chain. Customer integration was discussed and defined by different researchers' perspectives. Flynn et al. (2010), added that customer integration involves core competencies derived from coordination with critical customers. Kulp et al. (2004) have studied the integration with buyers. Vander Vaart and Van Donk (2008) analyzed supply chain integration from different perspectives: attitudes, pattern, and practices. While other authors have studied integration with customers and suppliers such as Salvador et al. (2001), Frohlich and Westbrook (2001) and Narasimhan and Kim (2002). Rosenzweig et al. (2002) examined supply chain integration as a single-dimensional construct, while Droge et al. (2004), Koufteros et al. (2005), Flynn et al. (2010) and Zhao et al. (2011) considered a broader perspective for supply chain integration as internal integration and external integration. Huo (2012) said that both supplier integration and customer integration can be classified as external integration.

In the current study, customer integration defined as the process of building and maintaining a strong relationship and partnership with the customers. It includes sharing the knowledge, experiences, products, services, and suggestions with customers. It was measured by selected items that explore the relationship and partnership and related issues. The current research addresses the supply chain integration which includes internal integration and customer integration.

Supply Chain Operational Performance

The concept of supply chain operational performance has emerged from supply chain strategy which derived from overall business strategy. A competitive strategy defined as "the set of customer needs that it seeks to satisfy through its products and services" (Chopra & Meindal, 2007). Each organization attempts to adopt a different competitive strategy that fits its strategy, then it seeks to afford the suitable capabilities and resources that help to achieve it. For example, one organization aims to provide high-quality products with a high price, another organization aims to provide high availability of a variety of products of reasonable quality at a low price, while another organization aims to provide too many products so its competitive strategy must be built to around providing the customer convenience, availability, and responsiveness, and so on.

Any company intended to be successful must fit between supply chain strategy and its competitive strategy. Chopra and Meindal (2007) comment on the strategic fit that it refers to the consistency between the customer priorities that the competitive strategy hope to satisfy.

Academicians and researchers have investigated supply chain performance from many different perspectives. Wang et al. (2009) developed supply chain performance measures based on efficiency. Gimenez et al. (2011) studied profits, delivery speed and transportation costs as a performance measure. Vanichchinchai (2014) investigated a firm's supply performance that composed of flexibility, cost, relationship and responsiveness.

Frohlich and Westbrook (2001) and Yu et al. (2001) stated that eliminating non-added value activities, decreasing variance of orders and speeding product flows affect organizations performance. Hult et al. (2002) mentioned

that IT and process innovation can contribute significantly to operational performance. Shah (2009) said that organizations must recognize the nature of trade-offs between customer services and costs. The organizations attempt to gain competitive advantages by aligning supply chain processes and decisions with their business strategy. Shah (2009) stated that supply chain strategy should ensure that the supply chain provides a superior value to the end-user in an efficient manner. Zelbst et al. (2009) emphasized that the organization's success depends heavily on the success of the supply chain in which the organization participates as a partner. Wheelen and Hunger (2012) reviewed Porter's competitive strategies (lower cost, focus and differentiation) and argued that business strategy focuses on improving the competitive position of business units, products and/or services within a specific industry or market segment. Wheelen and Hunger (2012) indicated that supplier network resources have a significant impact on a firm's performance. Alam et al. (2014) concluded that logistic integration has a mediating effect on operational performance.

Bowersox et al. (2000) and Croxton et al. (2001) said that the use of external linkage performance metrics leads to the creation of end-customer value through integrating activities and communication with other member firms along the supply chain. Harrison and New (2002) pointed out the importance of operational performance metrics as a standard framework to assess operational performance which includes internal and external firm links. Vaidya and Hudnurkar (2012) presented the criteria of performance evaluation through cost, customer service, productivity, asset measurement, quality, time, innovativeness, price, flexibility/adaptability, ability to collaborate, supplier profile, and marketing measures.

This study is considered the operational performance as a group of standards and benchmarks that are adopted and used by

the organizations to achieve a competitive advantage, customer satisfaction, and maximum level of profitability. In this study supply chain operational performance was measured by the following dimensions: Service performance, Quality performance and Cost performance because they are considered the most common dimensions that were investigated between previous studies.

Service Performance

Behaviours 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 the 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 behaviours that indirectly affect the value chain of delivering the product such as providing extra service to the clients. Extra-role behaviour towards 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 behaviour towards 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. The 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.

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 the specific operation. The organization attempts to decrease prices and maximizing profit. Vaidya and Hudnurkar (2012) defined cost as the summation of all costs that include: inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labour 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 the 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.

Relationship between Supply Chain Integration and Operational Performance

In the literature reviews, it was shown that there is a strong relationship between supply chain integration and performance. Some studies claimed that there is a strong relationship between supplier and customer integration and organizational performance, other studies comments the presence of a relationship between upstream and downstream interactions and operational performance, another group of studies assured the inevitability of relationship between supplier, internal, and customer integration with the overall organizational performance.

Almost all studies concluded that the supply chain integration is considered a vital process that affects operational performance, consequently the organizations' overall business performance. Scannell et al. (2000) concluded that supply chain practices were positively associated with aggregation measures of cost and flexibility. Salvador et al. (2001), Frohlich and Westbrook (2001) and Vickery et al. (2003) found a positive and direct relationship between information technology integration and supply chain integration. Chen and Paulraj (2004) said that internal integration of different departments within a firm should act as an integrated process. Kulp et al. (2004), Gimenez and Ventura (2005) and Flynnes et al. (2005) showed the importance of downstream integration. Bagchi et al. (2005) stated that supply chain integration affects operational performance and the degree of integration influences cost and efficiency. Swink et al. (2007) and Flynn et al. (2010) pointed out that external integration emphasizes the importance of cooperation and collaboration with suppliers and customers.

So in this study, it assumes that there is a positive relationship between supply chain integration with their dimensions (internal integration and customer integration) and operational performance with their

dimensions (service performance and cost performance) in the service sector (medical field) that consider on (private hospitals, private medical centres and private medical institutions) in Khartoum state.

RBV THEORY

Resource-Based View and Resource Dependence Theory emphasize the term "resource" as an important feature within the context of the formulation and implementation of corporate strategy to generate persistent competitive advantages. However, unlike the Resource-Based View, Resource Dependence Theory looks at the company from an external perspective. 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 a competitive advantage if they able to achieve superior resources and capabilities and these are valuable, rare, inimitable and non- substitutable. 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 & Hatch, 2006).

RBV further suggests that the value of SCI as resources lies in its ability to create organizational processes that drive firms to prioritize supply chain relationships. SCI 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. The

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: 258]. 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. Based on the theoretical point of view, this study will develop a testable hypothesis.

HYPOTHESES DEVELOPMENT

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

The relationship between supply chain integration and operational performance.

In literature, some scholars like Chen et al. (2018), Kim et al. (2018), Liu et al. (2018), Prajogo et al. (2018), and Wantao (2017) have discussed supply chain integration concept is important in developing supply chain focus to enhance the organizational performance. Yuen (2017), Richey, et al. (2018) and Huang (2018) indicate a positive relationship between supply chain integration and firm performance. While, Camora (2018), Baea (2017), Makhdoom (2016), Demeter (2016) and Eltamimi (2015) indicates a positive relationship between supply chain integration and performance.

Based on the above discussions the following hypotheses are generated:

H1. There is a relationship between supply chain integration 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 with its all elements (internal

and customer integration) on operational performance (cost performance and service performance).

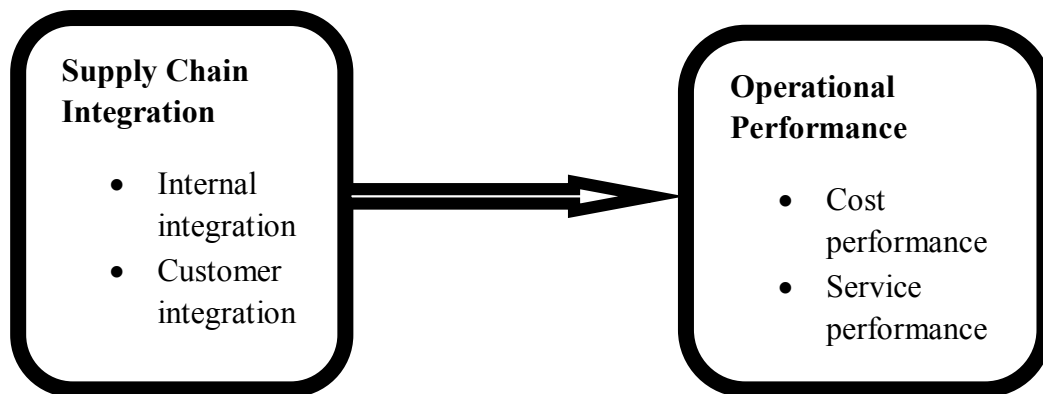


Figure 1 The study model

METHODOLOGY

Data Collection

A cross-sectional survey was used for data collection from a non-probability sample consisted of Sudanese services institutions. A 5-point Likert scale with endpoints 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 1).

Table 1 Response rate of questionnaire

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

Source: Prepared by the 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 and company ownership). Employing structural equation modelling (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 satisfies the requirement of using CFA to test the full measurement model simultaneously.

ANALYSIS AND RESULTS

The framework is tested by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in structural equation modelling (SEM) to evaluate the consistency among scale items [107]. In this study, the EFA and CFA are used to test the measurement model of structural SCI and operational performance. For validating 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 SCI and operational performance, Structural SCI and operational performance modelling are investigated. All these tests are in detail in the following sections.

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 to 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). The Cronbach α values are 0.638, internal integration 0.715, customer integration and 0.771 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.

Confirmatory Factor Analysis

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

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

Testing the correlation conducted by comparing the squared correlation between the latent constructs to their average variance extracted (AVE) estimates. Based on that discriminant 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 in Table 1, it can be concluded that none of the squared correlations is greater than the AVE for each variable construct. These outputs of the test indicate as strong evidence of discriminant validity between the theoretical

constructs (refer to Table 2). 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 (see Table 3). 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 2 Discriminant validity of all variables in the data set

	Technological	Service	Cost	Internal	Customer
Service	0.500***				
Cost	0.490***	0.524***			
Internal	0.437***	0.559***	0.720		
Customer	0.457***	0.522***	0.471***	0.567	

Table 3 Cronbach's alpha for study variables

Construct	Variable	Number of items	Cronbach's alpha
Supply chain integration	Internal	4	.638
	Customer	2	.715
Operational performance	Cost	3	.761
	Services	5	.771

Source: Prepared by the researcher.

Hypothesis Testing

The hypothesized structural equations model (Figure 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 such as (internal integration and customer integration) on operational performance such as (service performance and cost performance) structural equation modelling has been employed and a measurement model of these constructs has been assessed. Figure 2 reveals that reflective indicators have been used for the measurement of latent constructs and the non-causal relationship has been studied among different constructs, by drawing a path.

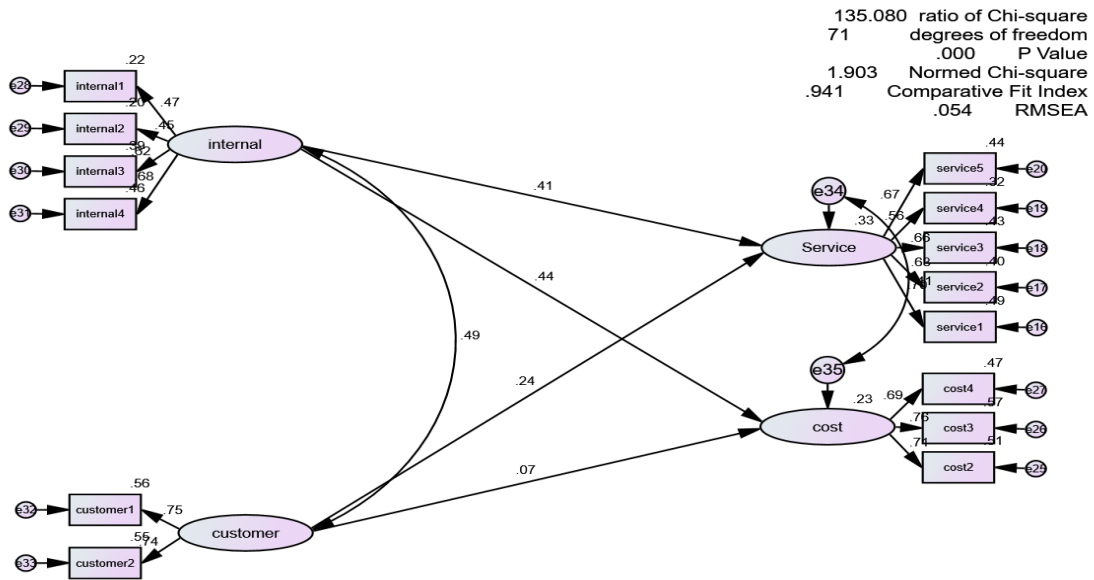


Figure 2 Structural equation model

The structural model reveals the same value of model fit shown in Table 4, all the model fit indices for the structural model were not only significant but remain the same as in the measurement model. The low index of R square (i.e. 0.22) justifies the underlying theoretical model.

Table 4 Regression weights (Group number 1 – Default model)

			Estimate	S.E.	C.R.	P
Service	←-	Internal	.517	.134	3.856	***
Service	←-	Customer	.234	.088	2.656	.008
Cost	←-	Internal	.692	.178	3.877	***
Cost	←-	Customer	.081	.112	.724	.469

Table 4 shows the probability of getting a critical ratio as large as 3.856 in absolute value is less than 0.001. In other words, the regression weight for internal in the prediction of service is significantly different from zero at the 0.001 level. While the probability of getting a critical ratio as large as 2.656 in absolute value is .008. In other words, the regression weight for a customer in the prediction of service is significantly different from zero at the 0.01 level. Also, the probability of getting a critical ratio as large as 3.877 in absolute value is less than 0.001. In other words, the regression weight for internal in the prediction of cost is significantly different from zero at the 0.001 level. Finally, the probability of getting a critical ratio as large as 0.724 in absolute value is .469. In other words, the regression weight for a customer in the prediction of cost is not significantly different from zero at the 0.05 level.

Table 5 Testing hypotheses

			Estimate	S.E.	C.R.	P	
Service	←-	Internal	.517	.134	3.856	***	Supported
Service	←-	Customer	.234	.088	2.656	.008	Supported
Cost	←-	Internal	.692	.178	3.877	***	Supported
Cost	←-	Customer	.081	.112	.724	.469	Not support

Table 5 summarizes the findings of testing hypotheses concerning the relationships between supply chain integration and operational performance. The table shows that two of the hypotheses fully supported (service and cost) with internal integration that means the medical institutions were integrated internally which lead to providing a good service to customers, one is supported service with a customer. This means that some of the customers are not satisfied with the service that some of the medical institutions provide and another is not supported cost with a customer. This related to the high cost of the services in the medical institutions which refers to the economic situation in the Sudan that there is no medicine manufacturing or medical materials manufacturing. These findings signify that internal integration shows a significant positive relationship between two dimensions of operational performance (service and cost performance). While the results show that cost performance has no significant positive relationship with one dimension of supply chain integration (customer integration). Thus, some of the hypotheses are fully supported.

RESULT AND DISCUSSION

In this section, the study results will be presented and discussed in light of previous studies as follows. Result of the current study shows that there is the significant importance of the supply chain integration among medical field institutions. The researcher refers to this result to the awareness of the managers, supervisors, and other employees who work at medical institutions about the importance of supply chain integration and its effect on the overall operational performance. Some of the independent variables have a high degree of integration (internal), (customers) are not significant with services performance related to the highest cost of the service in medical institutions. This result refers to multiple reasons that most important is no manufacturing of medical material. That

the first and highest level of integration is related to customer integration which is the most important variable among supply chain integration because customer satisfaction is the ultimate goal that all organizations seek to achieve. Then, internal integration is ranked in the second level of integration as it is the linchpin between supplier integration and customer integration, and it is impossible to achieve either supplier integration or customer integration without internal integration.

The study showed that there are strong interrelationships and interactions among the two components of SCI and between them and OP. Finally, the results showed that the respondents believed that there is a strong relationship between SCI and OP.

Results indicated that the internal integration was having the highest effect on OP, followed by customer integration. These results are going in line with most of the previous studies, such as Wong et al. (2011) who showed that there is a positive relationship between supply chain integration dimensions and operational performance dimensions as well. Jin et al. (2012) also showed that the integration positively related to operational performance and firm performance – primarily through its influence on productivity and customer service. Zhang and Huo (2012) showed that trust with customers significantly influences supply chain integration. Customer integration significantly improved financial performance, Al-shaar (2010), Zhao et al. (2013), Han et al. (2013) and Xu et al. (2014) showed that internal, and customer integration affects the competitive performance and related to the firms' performance as well.

The study result shows that the supply chain integration has an impact on operational performance at medical field institutions Organizations. This result is in line with different previous studies, such as Jassim (2010) showed that there was a positive impact of supply chain strategies (outward

strategies) on competitive advantage, while Rosenzweig et al. (2002), Hamad (2013) and Huo (2012) found that there was a significant impact of supply chain integration on business and organizational performance as well.

The study shows that internal integration has an impact on operational performance at medical field institutions. This result is supported by Jr, et al. (2008) and Huo (2012). Jr, et al. (2008) showed that aligning marketing strategies of partners throughout the supply chain improves operational performance, and Huo (2012) showed that internal integration improves external integration and that internal and external integration, directly and indirectly, enhance company's performance and that goes directly with the study result about the most important role of internal integration.

The study shows that customer integration has an impact on operational performance at medical field institutions. This result is matching with the result of Jassim's (2010) who showed that there was a positive impact of supply chain strategies (outward strategies) on competitive advantage. Some studies discussed several factors that affect supply chain integration such as Devaraj et al. (2007) showed that information technology was supporting supplier integration and customer integration as well. Xu et al. (2014) showed that top management support and information technology are two vital enablers of supply chain integration. While Parast and Spillan (2013) indicated that the logistics/supply chain strategy was the main driver of logistics and supply chain integration and logistics decisions. Also, Zhang and Huo, (2012) showed that trust with customers significantly influences supply chain integration.

Theoretical and Managerial Implication

Theoretical

Conceptually, in this study and based on the SCI, two factors (internal integration and customer integration) were found. It can be observed that the most factor of SCI in Sudanese services institutions (medical field). Indeed, this suggests that the SCI construct could be considered in the future operationalization of SCI in Sudan context. The study extends existing research on the performance and supply chain integration relationship. In addition to the study contribution by proposing operational performance in the context of supply chain integration in the service sector especially in the medical field. Also, the present study confirms the notion that SCI will have a strong positive effect on operational performance.

This study support calls of earlier studies which emphasize that SCI require a higher level of internal integration. Thus, for an institution to support the participation of partners, it must create a suitable internal integration. Furthermore, the direct effect of SCI (internally) with the effect of operational performance is significant and stronger than its direct impact. Although some studies have been interested in the effect of SCI on business outcomes or any related kind of performance, this study indicated the importance of SCI to detect the impact on operational performance. Specifically, although the supply chain management concept is predicated on SCI (integration) extant research has yet to explicitly consider the implications of SC with regards to supply chain integration efforts. The overarching theoretical contribution relating to the role of SCI is demonstrating that SCI is responsible for external environment behaviours that are unattainable via integrative mechanisms.

Managerial Implication

From a practical perspective, this study provides several insights into how institutions can more strongly utilize internal integration (SCI) to improve operational performance. Specifically, managers can use it to expand their understanding of the role of SCI on operational performance and develop specific integration that helps to reach customer needs. SCI is a full collaboration of participation and they integrate the institutions internally and externally that should lead to high performance which is difficult for competitors to replicate and can afford institutions a competitive advantage. Moreover, the developed conceptual model of the study provides better highlights with the interplay between SCI and operational performance on the medical field. It is an important factor for firms to turn competitive advantage.

Limitation and Suggestion for Future Research

As previous studies have some limitations in this work, which may encourage future research, the study was a cross-sectional study which provides some evidence about the relationship between SCI and operation performance. Therefore a longitudinal study would have to be undertaken to assure the effect of SCI and operation performance. Furthermore, this study mainly tested SCI and operational performance which may represent a less holistic view for supply chain management, future research may consider the other factor supply chain integration. The sample included a medical field in the service sector that can be tested in another services sectors, also should be tested in all Sudan while this study tested in Khartoum state only a broad range of firm sizes and industries and often they are different in the level of adopting SCI and operation performance. Thus future research can test these variables in such specific sector. This study examined SCI by two dimensions (internal and customer) as

constructs while some suggestion considers trust as one of the dimensions of SCI. Therefore future research can measure supplier as part of SCI. In this study, we used operation performance measures by two dimensions (service and cost). Future research would have to expand the dimensions or should be tested with another performance such as institutional performance, financial performance.

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