SUPPLY CHAIN INTEGRATION AND HEALTH FIRMS OPERATIONAL PERFORMANCE- IMPLICATIONS FOR UNDERDEVELOPMENT COUNTRIES

Abstract

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Based on RBV Theory The study investigated the effect of Supply Chain integration (SCI) on medical sector Operational Performance (OP). the data were collected from 307 managers out of 330 managers, by questionnaire, which adopted from previous studies and refined through experts’ interviews and the panel of judge. Statistical techniques such as descriptive statistics, correlation, and SEM were employed. The results of the study indicated a positive significant relationship between SCI and medical sector OP. The results also indicated that the managers in Medical Sector were almost similar in their preference of the customer integration and internal integration indicators. Furthermore, empirical results indicated that the interactions between the two components of SCI effect strongly on and OP. Results indicated that the internal integration was having the highest effect on OP, followed by customer.

The study shows Theoretical and Practical implications. Theoretically the SCI require higher level of internal integration. Thus, for an institution to support the participation of partners it must create a suitable internal integration. Practically the full collaboration of participation and they integrate the firm internally and externally that should lead to high performance. Moreover, the study provided a suggestion for future research.

Key Words: Supply Chain Integration (SCI), Internal Integration (II), Customer Integration (CI), Operational Performance (OP), (Medical Sector).

Introduction

Now a day’s customer is considering as of the source of life for the organization, so forth organisations give either goods or services, and it's required by the organisation to develop and having the capacity to withstand in the presence of the substantial and extreme competitions, Hien., Doan and Tam (2020) globalization of business and unified customers’ needs and requirements across the globe have been changed and developed, always Customers need a right product in suitable place at right time with high quality and suitable cost. any organization would like to compete in recent hypermarket should align with the new customers’ requirements. To satisfy the customers’ requirements organizations should improve the activities and processes overall. Supply chain management is a complex system, which covers some of the primary and supportive activities from suppliers to after sales services.

[1] Stated that integration in supply chain plays a dominant role for improving organization’s performance and gaining competitive advantage. [2] Said that to utilize the supply chain at its maximum performance level, organizations have to integrate its goals and activities together. [1] Mentioned that supply-chain partners need to focus on different factors to ensure competitive advantage: financial factors and collaboration and non-financial to ensure innovative product design. [3] Announced that supply chain management requires integration and coordination for satisfying and responding to change in consumer demand. Finally, [4] pointed out that supply chain integration influences performance.

Therefore supply chain integration and performance its and area of competitiveness and add value which need more focus and investigation. so this study investigates the impact of supply chain integration on operational performance of the Medical Sector. There are many challenges and obstacles were confronting supply chain management which in turn affected the overall performance at these organizations. First, different departments are concerned with achieving their own objectives separately. Second, different departments without specialized people perform supply chain activities and processes. Third, continuous changes in rules and regulation which imposed by service sector and Medical Sector specially 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 changing in customer needs and requirements due to tough competitions among the organizations. Consequently, this lead to difficulties in integrating supply chain activities and processes, which delay providing products and services to customers in suitable place at suitable time and losing 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 Sector), which represent a true foundation of the national economy, as a play an active role in 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 Sector), 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 [5] [6], [7] [8], [9] [10] [11] [12] [13] [14], have been studied different types to supply chain integration, this study focus on two dimensions of supply chain integration: internal integration, customer integration as a dimensions of supply chain integration influence operational performance. Internal integration is considered because it is an important and involves obtaining the goals when using and share organization information, thus, should be important for operational performance [15]. Customer integration is considered because they important for organization when it satisfied them, business activities and focus on affects that are important in operational performance [16]. It attempts to create and use new knowledge to develop new products/services, which should also be critical for operational performance [17] so there is 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 [18] [19] or production [20] Pharmaceutical sector such as [21] Food industry such as [22] this study covers Medical Sector including private hospitals, private medical centers 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. In addition, the research will investigate the relationship between supply chain integration and operational performance in Medical Sector in Khartoum State. Therefore, the managers believed that its 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 Medical Sector?

The main objective of this study is to investigate the impact of supply chain integration on operational performance in Medical Sector. This research will also provide recommendations to Medical Sector, and might be for decision makers. Finally, this study will contribute to scientific field. The first sub-section 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 operation performance in supply chain integration to creating 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 services firms operating in Sudan to achieve the efficiency and the 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 results of the study and suggestions recommendations related to the supply chain integration, creative operation performance and the possibility of benefiting from the outputs of study in the reality practical of the Medical Sector. The study can also draw the attention of managers and decision makers to the importance of user satisfaction in the Medical Sector, in order to enhance its role in operation performance, which helps to create performance. The study can also draw the attention of managers and decision makers to the importance of user satisfaction in the Medical Sector, in order to enhance its role in operation performance, which helps to create performance.

2.0 Literature Review:

Supply chain area is a Richey area with various approaches and theories many 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 supply chain, which enhances organization’s performance. The following section will tackle the concepts of supply chain integration and operational performance, as well as, the relationship between them.

2.2 Supply Chain:

The concept of supply chain has been evolved over time. [23] argue 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. [24] Added that the objective of every supply chain is to maximize the overall value created. [1] Stated "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 supply chain is used first to reduce costs, and then to improve customer service and get new products to market faster than others. Finally, [25] defined supply chain, as it is the interrelated series of processes within a firm and across different firms that produce a 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.

2.3 Supply Chain Integration:
Due to the intense of global competition, the organizations create cooperative and mutually beneficial relationship among supply chain partners [26]. [27], [28] pointed out that organizations or companies need to implement supply chain integration to meet the new challenges of the global competitive environment. [32] 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, with the objective of providing maximum value to its customers”. [33] 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 harmony way to achieve a unite objectives such as providing maximum customer value, lowering overall cost. [33]

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 effective and efficient flow of products, services and information to provide a maximum value to the customer in right place at suitable price and high speed. Internal, supplier and customer integration measured supply chain integration. [61]

2.4.2 Internal Integration
Internal integration is the center 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.

Many researchers were defining internal integration. Among them, [35] defined internal integration as "the degree to which a manufacturer structures its own strategies, practices and processes into synchronized, collaborative processes to fulfill its customers' requirements and efficiently interact with suppliers". [32] said, “The internal integration stresses organizational structure, procedures, and practices, so it must be collaborative and synchronized to fulfill 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.

2.4.3 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 in the near future.

Managing the relationship with customer is considered a vital element in supply chain. Customer integration was discussed and defined by different researchers' perspectives. [41], added that customer integration involves core competencies derived from coordination with critical customers. [36] Has studied the integration with buyers. [37] Analyzed supply chain integration from different perspectives: attitudes, pattern, and practices. While other authors have studied integration with customers and suppliers such as [38] [4] and [39]. [40] Examined supply chain integration as a single dimensional construct, while [40]; [41] and [32] considered a broader perspective for supply chain integration as internal integration and external integration. [42]) said that both supplier integration and customer integration could be classified as external integration. In summary, 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. Selected items that explore the relationship and partnership and related issues measured it.

2.5 Supply Chain Operational Performance:
The concept of supply chain operational performance has emerged from supply chain strategy, which derived from the overall business strategy. A competitive strategy defined as "the set of customer needs that it seeks to satisfy through its products and services" [23] each organization attempt to adopt different competitive strategy that fit its strategy, and 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 high price; another organization aims to provide high availability of a variety of products of reasonable quality at 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.

Any company intended to be successful must fit between supply chain strategy and its competitive strategy. [23] Comment on the strategic fit that it is referring to the consistency between the customers' priorities that the competitive strategy hopes to satisfy.
Academicians and researchers have investigated supply chain performance from many different perspectives. [24] Developed supply chain performance measures based on efficiency. [25] Studied profits, delivery speed, and transportation costs as a performance measures. [26], investigated firm is supply performance composed of flexibility, cost, relationship, and responsiveness. [27] And [28] stated that eliminating non-added value activities, decreasing variance of orders, and speeding product flows affect organizations' performance. [29] Mentioned that IT and process innovation could contribute significantly to operational performance. [30] 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. [31] Stated that supply chain strategy should ensure that supply chain provides a superior value to the end-user in an efficient manner. [31] emphasized that organization success depend heavily on the success of supply chain in which the organization participates as a partner [1] reviewed Porter's competitive strategies (lower cost, focus, and differentiation) and argued that business strategy focuses on improving the competitive position of a business units, products and/or services within specific industry or market segment. [1] Indicated that supplier network resources have a significant impact on the firm's performance. [43] concluded that logistic integration has a mediating effect on operational performance. [44] And [45] 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. [46] Pointed out the importance of operational performance metrics as a standard framework to assess operational performance, which includes internal and external firm links. [1] 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 the following dimensions measured chain operational performance: Service performance, quality performance, and Cost performance because they are considered the most common dimensions that were investigated between previous studies.

**Service performance:**
Behaviors where employees serve and help their customers. [47] 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 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 [48]
[49] 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 [50] suggest that employee service performance has three antecedents: individual level, store level, and service climate. The individual level is the personality of the employee consisting of continuousness, neuroticism, extroversion, and agreeableness. The 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.

**2.5.1 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 the operational supply chain is cost. [44] Defined the cost as the total cost incurred to accomplish specific operation. Organizations attempt to decrease prices and maximizing profit. [1] Defined cost as the summation of all costs that Include inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labor cost, administrative, and service costs. [51] 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. Selected items that reflect the total incurred costs and expenses measured it.

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 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 as vital process that affects operational performance, consequently the organizations’ overall business performance.

[52] Concluded that supply chain practices were positively associated with aggregation measures of cost and flexibility. [53]; [4]; and [54] found a positive and direct relationship between information technology integration and supply chain integration [55] said that: internal integration of different departments within a firm should act as integrated process [56]; [57]); and [58] showed the importance of downstream integration. [59] Stated that supply chain integration affects operational performance, and the degree of integration influences cost and efficiency. [60] And [61] pointed out that external integration emphasizes the importance of cooperation and collaboration with suppliers and customers.

So in this study it assume that there is positive relationship between supply chain integration with their dimensions (internal integration, customer integration) and operational performance with their dimensions (service performance, cost performance) in service sector (Medical Sector) that consider on (private hospitals, private medical centers, private medical institutions) in Khartoum state.

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. 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 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 [62].

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. More interactions or negotiations the company undertakes with its external environment, the more assured it would 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. Based on the theoretical point of view, this study will develop testable hypotheses.

Firm resources can be internal (or inside out) and external (or outside in) to the firm. Internal resources are assets owned and controlled by the firm, such as financial, human, physical, and technological resources; whereas external resources are assets that may be earned and controlled, to a certain extent depending on various factors like industry attractiveness and structural autonomy, but not necessarily owned by the firm, such as customers, competitors, and suppliers, among others (Anggraeni, 2014; Dierickx & Cool, 1989; Hulland et al., 2007; Wade & Hulland, 2004). This suggests that SCI are an internal firm resource because the acquisition, integration, and usage of its interrelated components are owned and controlled by firms.

4. **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 a number of scholars like [5] [6], [7], [8], [9] beside others, are discussed supply chain integration concept is important in developing supply chain focus to enhance the organizational performance. [63] [64], [17] indicates a positive relationship between supply chain integration and firm performance. While, [65], [66], [67], [68] [22] 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, service performance). 

Based on the above discussions the following hypotheses are generated:

H1.1 There is a positive relationship between Supply chain integration and service performance

Developed sub hypotheses from first hypothesis as follows:

H1.1a There is positive relationship between internal integration and service performance

H1.1c There is positive relationship between customer integration and service performance

H1.2 There is a positive relationship between Supply chain integration and cost performance

H1.2a There is positive relationship between internal integration and cost performance

H1.2c There is positive relationship between the customer integration and cost performance

**Source:** prepared By Researchers.

5. **Methodology**

When deciding upon the research approach for a study, the researcher can choose among several research approaches, all characterized by specific strengths and weaknesses. The most important condition for choosing an appropriate approach is to identify the type of research questions that should be answered. Yin (2003) presents five different types of questions: “who”, “what”, “where”, “how”, and “why” - questions, to which different approaches are suitable. Due to the nature of this dissertation, they are Three main characteristics distinguish a survey approach from other approaches such as case studies or experimental studies. First, the collection of information in done by asking people in a structured manner. Collection methods in a survey approach could be mailed questionnaires, interviews face to face, or telephone calls. Second, a survey approach is a quantitative method that demands standardized information from and/or about the studied subject, e.g. individuals, groups or organizations. Third, information is generally gathered from a sample, which is a fraction of a specific population. The sample should be chosen
in such a manner that the answers from the sample could be generalized to the whole population. (Malhotra and Grover, 1998; Pinsoneault and Kraemer, 1993).

Consistent with the purpose of this study to investigate the effects of supply chain integration (SCI) on operation performance (OP) in the service Sector (Medical Sector) in Khartoum state the quantitative method was used (quantitative involves the collection of primary data from a large number of individuals, frequently with the intention of projecting the results to the larger population Black (1999) for this purpose the study have used the descriptive method (use of survey).

5.3 Data Collection:

5.3.1 Primary data collection tool:
The collection of the data will be done using structured questionnaire including closed answers.

5.3.2 Secondary data collection:
The secondary data will be collected using the following:
- Scientific books, references and international journals
- Previous related studies
- Internet web sources.

Research philosophy and approach: Philosophy guides research, philosophy of science is really looking, what is the truth of science? In addition, what depends on it as a science?

The philosophy of positivism: What observed and confirmed from previous studies builds upon it through the development and testing of hypotheses through theoretical testing (Saunders et al., 2009). The study is based on the descriptive analytical approach. It is characterized by its comprehensive view. It aims at studying the phenomenon, as it exists in reality. It is concerned as a precise description and expresses it in qualitative and quantitative terms. It works to gather facts and information about them and analyze them. (Saunders et al., 2009)

6 Population and sample:
There are several reasons why Medical Sector was selected. It is an important and visible service of the Sudan and world economies. The medical sector is the largest service activity in the world is also one of the most complex and diverse service activities in the world. The target respondents for the survey will be the middle- level managers at the medical service level. Middle-level managers (supply chain managers, logistics managers. Procurement and Marketing, operations managers) are in the best position to answer the questions of this survey because of their experience, expertise, and access to operational and performance data would be the most appropriate to grasp the intent of the study, since the nature of the study requires knowledge about management policies, as well as detailed operational performances, the individuals in the middle-management are in the position. This study is focused on the Medical Sector includes (private hospitals, private medical services, private service institutions). In addition, the good performance of the medical sector could be a model for the other service sectors. (Ismail, et al., 1998) found that from the perspective of competitive advantage, firms are better management being big rather than small.

The Study population:
The study population means the total population in the study area, the results later will be generalized to the whole community. The study population include the top managers & supply chain managers in Sudanese service firms (Medical Sector) operating in Khartoum State, and represented in the sectors (private hospitals, private medical centers and private medical services) totaling (162) medical sectors, where the method of complete enumeration was used. The study choose this sector (Medical Sector) in service rather than other services because it’s biggest and important and it’s provide sensitive services to customers when it take
care to be health people so the study concerned about the supply chain management as it is one of the best managerial practice in organizations.

4.9 Measurements of the Variables:
There are two main types of variables are the independent variable (supply chain integration), the dependent variable (operational performance). Measures for all dimensions of constructs were taken from the existing literature. To measure the dimensions of variables, the study used the five point Likert scale type scale ranging from strong agreement with the question to strong disagreement (Sekeran,2003). The Likert scale is designed to examine how strongly subjects agree or disagree with statements on a 5-point scale. Moreover, the questionnaire items were adopted from different sources to suit the service firms (Medical Sector). Supply chain integration was measured by using three dimensions: the items of (internal integration) are measured using four-point scales adopted from (Flynn et al.2010). While. Moreover, customer integration is measured using five–point scales adopted from (Lii et al.2015). Operational performances were measured by using three dimensions: the service performance is measured using five-point scales were adopted from (Baea, 2017), cost performance is measured using four-point scales were adopted from (Baea, 2017).

Table (5.2) Response rate of questionnaire

<table>
<thead>
<tr>
<th>Total distributed questionnaires</th>
<th>330</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total questionnaires received from respondents</td>
<td>307</td>
</tr>
<tr>
<td>Valid questionnaires received from respondents</td>
<td>0</td>
</tr>
<tr>
<td>Invalid questionnaires</td>
<td>0</td>
</tr>
<tr>
<td>Questionnaires not received</td>
<td>23</td>
</tr>
<tr>
<td>Overall response rate</td>
<td>307</td>
</tr>
<tr>
<td>Useable response rate</td>
<td>307</td>
</tr>
</tbody>
</table>

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 samples of this study satisfy the requirement of using CFA to test the full measurement model simultaneously.

6.0 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 SCI and operational performance. For validate the constructed model the following tools used convergent and discriminate 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 modeling are investigated. All These tests in detail in the following sections.

6.2 Confirmatory factor analysis
CFA tests the measurement model of variables. Therefore, SCI, operational performances were 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 X ²=1262.195 with DF=71; CFI=0.941; CMIN=102.024; SRMR =0.05; 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 correlations between each couple of variables in the model construct have to be less than the AVE of each variable construct. Comparing the correlation coefficients given in Table 1, it can be can conclude that none of the squared correlations is greater than the AVE for each variable construct. These output 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>
<thead>
<tr>
<th>Construct</th>
<th>Service</th>
<th>Cost</th>
<th>internal</th>
<th>customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service</td>
<td>0.500***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>0.490***</td>
<td>0.524***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td>0.437***</td>
<td>0.559***</td>
<td>0.720</td>
<td></td>
</tr>
<tr>
<td>Customer</td>
<td>0.457***</td>
<td>0.522***</td>
<td>0.471***</td>
<td>0.567</td>
</tr>
</tbody>
</table>

Source: prepared by researcher from data (2018)

Table 4.8 Cronbach’s Alpha for Study Variables

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variable</th>
<th>Number of items</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply chain integration</td>
<td>Internal</td>
<td>4</td>
<td>.638</td>
</tr>
<tr>
<td></td>
<td>Customer</td>
<td>2</td>
<td>.715</td>
</tr>
<tr>
<td>Operational performance</td>
<td>Cost</td>
<td>3</td>
<td>.761</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td>5</td>
<td>.771</td>
</tr>
</tbody>
</table>

Source: prepared by researcher from data (2018)

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 such as (internal integration, customer integration) 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 (1), all the model fit indices for the structural model were not only significant but remain same as in the measurement model. The low index of R square (i.e. 0.22) justifies the underlying theoretical model.

Table 4.9 Regression Weights: (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service &lt;--- Internal</td>
<td>.517</td>
<td>.134</td>
<td>3.856</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>Service &lt;--- Customer</td>
<td>.234</td>
<td>.088</td>
<td>2.656</td>
<td>.008</td>
<td>Supported</td>
</tr>
<tr>
<td>Cost   &lt;--- Internal</td>
<td>.692</td>
<td>.178</td>
<td>3.877</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>Cost   &lt;--- Customer</td>
<td>.081</td>
<td>.112</td>
<td>.724</td>
<td>.469</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>

Source: prepared by researcher from data (2018)

The table (1) 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 customer in the prediction of Service is significantly different from zero at the 0.01 level. In addition, 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 Service is significantly different from zero at the 0.01 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 customer in the prediction of Service is not significantly different from zero at the 0.05 level.

Table 4.10 testing hypotheses

<table>
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</table>
Table (4.10.) summarizes the Findings of testing hypotheses concerning the relationships between supply chain integration and operational performance.

The table showed that two of the hypotheses fully supported (service, cost) with internal integration that mean the medical institutions were integrated internally which lead to provide a good service to customers, one are supported service with customer this mean that some of the customers are not satisfied to the service that some of the medical institutions provide it and there is one not supported cost with 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 show significant positive relationship on 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 hypotheses are fully supported.

### 7. 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 significant importance of the supply chain integration among Medical Sector institutions. The researcher refers 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 independent variables have high degree of integration (internal), (customers) 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 is related to the customer integration, which is actually 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.

2. The study showed that there are strong inter-relationships and interactions between 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.

3. Results indicated that the internal integration was having the highest effect on OP, followed by customer integration. These results are going with line with the most of previous studies, such as [69] who showed that there is a positive relationship between supply chain integration dimensions and operational performance dimensions as well. [70] Also showed that the integration positively related to operational performance and firm performance - primarily through its influence on productivity and customer service, [71] showed that the trust with customers significantly influence supply chain integration. Customer integration significantly improved financial performance [72], [32] [73], [74] showed that internal, and customer integration affects the competitive performance and related to the firms performance as well.

4. The study result shows that the supply chain integration have an impact on operational performance at Medical Sector institutions Organizations. This result is go in line with different previous studies, such as [75] showed that that there was a positive impact of supply chain strategies (outward strategies) on competitive advantage, while [76] [77], [78] found that there was a significant impact of supply chain integration on business and organizational performance as well.

4.1 - The study shows that internal integration has an impact on operational performance at Medical Sector institutions. This result is supported by [79] and [78] [80] showed that aligning marketing strategies of partners throughout the supply chain improves operational performance, and [71] 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.

<table>
<thead>
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<td>.112</td>
<td>.724</td>
<td>.469 Not supported</td>
</tr>
</tbody>
</table>

Source: prepared by researcher from data (2018)
4.2- The study shows that customer integration has an impact on operational performance at Medical Sector institutions. This result is matching with result of [81] that 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 [82] showed that information technology was supporting supplier integration and customer integration as well. [83] who showed that top management support and information technology are two vital enablers of supply chain integration, while [84] indicated that logistics /supply chain strategy was the main driver of logistics and supply chain integration and logistics decisions. In addition, [71] showed that that trust with customers significantly influence supply chain integration.

7.1 Theoretical and Managerial Implication

7.1.1 Theoretical

Conceptually, in this study and based on the SCI, two factors (internal integration, customer integration) were found. It can be observed that the most factor of SCI in Sudanese services institutions (Medical Sector) Indeed, this suggests that the SCI construct could be considered in the future operationalization of SCI in Sudan context. the study extend 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 service sector specially in Medical Sector. In addition, the present study confirms the notion that SCI will have a strong positive effect on operational performance. These study support calls of earlier studies, which emphasize on that SCI require 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 much Studies has 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 about supply chain integration efforts. The overarching theoretical contribution relating to the role of SCI is demonstrating that SCI is responsible for external environment behaviors that are unattainable via integrative mechanisms.

7.1.2 Managerial Implication

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

7.3 Limitation and Suggestion for future research

As previous studies there are some limitations in this work, which may encourage future research, the study was cross-sectional study, which is, provides some evidences 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 holist view for supply chain management, future research may consider the other factor supply chain integration, The sample included Medical Sector in 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 dimension (internal and customer) as constructs while some suggestion consider trust as one of dimension 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) a future research would have to expand the dimensions or should tested with another performance such as institutional performance, financial performance.
References:


