



The Effect of Supply Chain Management on Performance in Selected Private Hospitals in Delta State, Nigeria

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ABSTRACT: The study sought to establish the effect of supply chain management (SCM) practices on the performance of selected private hospitals in Delta, Nigeria. The study is guided by the specific objectives of examining the relationship and influence of SCM practices (Lean Management (LM), Information Quality and Sharing (IQS), Customer Relationship Management (CRM), and Suppliers' Strategic Partnership (SSP)) on private hospital performance in terms of cost efficiency and quality of care; and to identify key challenges and opportunities of implementing SCM practices. The study sampled 103 supply chain partners from 16 private hospitals in Delta State as listed on the List of Coded Health Facility in Delta State of Nigeria [12]. A simple random sampling technique was adopted to select the sample size appropriate. The study adopted a descriptive research design and a multiple linear regression to examine the relationship between the variables. The study used primary data, collected through the use of structured and unstructured questionnaires with Five-point Likert Scale. The study findings indicated that LM, IQS, and CRM have significant role in boosting private hospital, while Suppliers' Strategic Partnership (SSP) has no significant effect, suggesting that it doesn't directly influence cost efficiency and quality of care without being complemented by other supply chain practices, hence, a need for deeper exploration. The study also identified lack of technology integration and resource constraints as major barriers to effective SCM practice, and showed clear opportunities through technology adoption, and customer collaborations to enhance hospital performance. The study recommended private hospitals to re-evaluate their existing supplier partnership to identify weak areas and explore opportunities for improvement which will help ensure quality of goods and services while reducing cost.

KEYWORDS: Supply Chain Management Practices, Hospital Performance, Strategic Supplier Partnership, Information Quality and Sharing.

I. INTRODUCTION

1.1 Background of the study

The healthcare industry constitutes one of the most significant segments of the service sector, with high potential to contribute further towards Nigeria economy. It provides care through continuous prevention, diagnosis and treatment of diseases. Hence, it is important to look into the elements that will improve healthcare organizational performance. Among others, supply chain management practices have been viewed as the vital determining factor to improve overall healthcare performance, and have become an essential factor for low performing firms to remain competitive [5]. Supply chain management practices, which include information quality and sharing, lean practices, strategic supplier partnerships, customer relation and top management support, could be regarded as the various activities undertaken by the management of an organization towards improved efficiency and the ultimate objective of its integrated supply chain. Organizations are beginning to realize that their success depends on their capacity to design and manage their supply chain management system effectively, in order to reap maximum benefits and sustain their competitive advantage [23]. This situation is also the same in the health care industry which has become one of the fastest growing industries, with most hospitals, except few highly specialized ones, providing similar types of services [38].

1.2 Statement of the problem

The World Health Organization (WHO)'s statistical estimates revealed that about one third of people in the world do not have access to vital medicines. In 2011, the United Nations Conference on Trade and Development (UNCTAD) provided evidence confirming that almost two billion of the world's population, many of whom live in less developed nations, lack access to life-saving medicines [28]. About one million Nigerians under the age of 24 died in 2020 due to healthcare



challenges in the country; these deaths were likely consequences of strained and under-resourced health systems (UNICEF, 2021). In a survey carried out by the Federal Ministry of Health in 2010, the medical supply system was described as poorly coordinated and fragmented, resulting in wastage of resources, and denying the populace access to essential drugs and medications. Limited access to improved healthcare, shortage in supply of life-saving commodities and medical products; and the increased costs of handling medical stocks and equipment remain the major operational challenges. [41] Accordingly, health care product shortage is a multifaceted and global problem, affecting both developing and developed countries.

In Nigeria, healthcare is delivered by public and private health institutions, as well as traditional and herbal medical practitioners. However, about 70% of modern healthcare services are rendered by the private sector, with the public health sector being severely underfunded and resourced. [32] Services offered by Private hospitals appeared to be superior to those of the Public Hospitals, and patients perceived private hospitals to be more dependable than public hospitals. Patients are ready to abandon free health care services in public hospitals for expensive better health care in Private hospitals [8] and [19]. Private healthcare delivery still remains costly; however, it has become an unavoidable choice for patients or consumers of healthcare, due to the persistently low quality and inadequate health services provided in public facilities.

Bhavana carried out research on Healthcare Supply Chain Management, and found that efficient supply chain management practices play a critical role on the overall organizational performance [5]. It suggests that inadequate supply chain practices, such as delayed procurement, poor inventory management, and weak supplier partnerships, can lead to operational inefficiencies, stock shortages, and increased operational costs. These inefficiencies can negatively impact on hospital performance, particularly in areas such as quality of care delivery and financial stability. Although the significance of efficient supply chain management in the healthcare sector is recognized, a significant knowledge gap exists on how SCM practices affect the performance of private hospitals in Nigeria, especially within Delta State.

1.3 Objectives of the Study

The purpose of this study is to examine the effect of supply chain management practices on the

performance of selected private hospitals in Delta, Nigeria. It aims to examine essential supply chain management practices (such as lean management practices, strategic supplier relationships, information quality and sharing, and customer relationship management), while evaluating the effects of such practices on private hospitals' performance in terms of cost efficiency and quality of care. For the study, SCM practices are considered as Lean Management (LM), Strategic Supplier Partnership (SSP), Customer Relationship Management (CRM) and Information Quality and Sharing (IQS). Specifically, the study sought to determine:

RQ1: Is there a relationship between lean management practices and the performance of private hospitals in terms of cost efficiency and quality of care?

RQ2: How does information integration in supply chain management affect the overall performance of private hospitals in Delta State?

RQ3: To what extent does strategic supplier relationship affects quality of care and cost efficiency in private hospitals in Delta State?

RQ4: How does customer relationship management contribute to quality of care and cost efficiency in private hospitals in Delta State?

RQ5: What challenges and opportunities do private hospitals in Delta state encounter in implementing effective supply chain management practices?

II. LITERATURE REVIEW

2.1 Theoretical Perspective

According to Halldorsson [14], there are four theories of managing supply chains and these include: Principal Agent Theory, Transaction Cost Analysis, the Network Theory and the Resource Based View (RBV). He stated that there is no such thing as a unified theory of SCM, and depending on the situation, one can choose one theory as the dominant explanatory theory and then complement it with one or several of the other theoretical perspectives.

For this study, the Resource Based View (RBV) is adopted, and complemented by the Dynamic Capability Theory (DCT). The RBV is a major theory that focuses on gaining an edge over others by using internal resources (Bohnenkamp, 2013). In healthcare, it means using unique skills, technology, and processes, and it helps to improve supply chain operations and patient care. The aspect of Dynamic capability was first introduced by Teece, Pisano and Shuen in 1997. The theory describes an

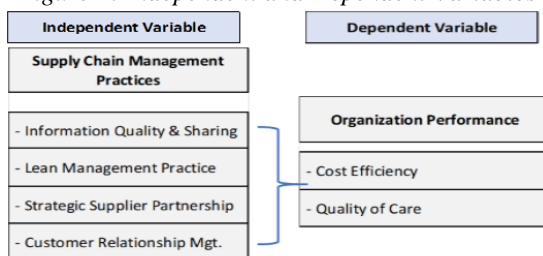


organization's ability to deliberately organize its resources in an effort to improve performance [31]. Kumar [25], examined dynamic capabilities in healthcare supply chain integration, focusing on how organizations can adapt and respond to changing environments through effective supply chain practices. Accordingly, the theory enables healthcare organization to adjust supply chain processes and resources and build the capacity to respond to the changing environmental conditions. The two theories serve as appropriate and relevant to this study.

2.2 Conceptual Perspective and Literature Review.

For this study, the supply chain management practices are the independent variables while the dependent variable is the Organization Performance:

Figure 1: Independent and Dependent Variables



Overview of Supply Chain Management (SCM) in healthcare

The concept of Supply Chain Management which is traditionally applicable to manufacturing industry, has the scope to streamline the entire dynamics and operations of service industry, especially the healthcare industry. The Healthcare industry cannot get high operational efficiency without implementing supply chain management (SCM) practices because of large product variety, variable product life cycles, increased outsourcing, and new trends in information technology [30]. A supply chain in healthcare can be defined as the sequence of physical and technical resources required in order to deliver a good service to patients with complete satisfaction in a cost-optimized manner. According to Shou, SCM in healthcare involves both the internal and external chain [35]. The internal chain includes patient care unit, hospital storage and patients, etc, while the external chain includes the vendors, manufacturers, distributors, etc. The SCM processes in healthcare are physical product, information, and financial flow. SCM in healthcare is a multifaceted network that includes processes such as procurement, inventory control and transfer of medical supplies and pharmaceuticals. It is a special kind of Supply Chain which begins with suppliers of

drug manufacturer and finish at patient (basically customer) to fulfill the need through a definite delivery channel.

The integration of SCM in healthcare plays a vital role in ensuring timely delivery of medical goods and services, which directly influences patient care and operational efficiency. According to [1] and [9], the peculiar challenges (such as demand fluctuation, regulatory requirements, High quality service delivery) confronting the healthcare organizations need effective SCM practices. Improving hospital supply chain practices is an enabler for improving operational efficiency and reducing costs. While healthcare providers' energies have been justly spent on identifying and eliminating waste in clinical operations, an effective and imperative approach to further shrink healthcare costs, is to adopt healthcare supply chain management practices [25] and [10].

Healthcare Organization Performance

The effectiveness of a healthcare organization's supply chain practices is ultimately measured by its impact on patient care and overall organizational performance. Healthcare performance is related to providing health care to all patients, with the highest level of humanity, at the best prices and providing the best quality of services while keeping pace with the developments in health knowledge [26]. According to Koh, Organization performance could be referred as "How well an organization meets its financial goals and market criteria" [17]. He further stated that from the perspective of SCM, organization performance includes increased sales, organization-wide coordination and supply chain integration. Organizational performance has been measured using a variety of criteria, including financial, non-financial, innovation performance, market share, and customer satisfaction [33] in terms of the relative importance of the performance measures to the organization (Flynn et al., 2010). In healthcare industry, the organizational performance is measured both financially and clinically. For financial measurement the variables used are return on investment, return on asset and market share, whereas, the clinical measurement variables are length of stay & customer satisfaction [13].

For this study, our interest is drawn to an aggregate assessment of organizational performance that is relevant to private healthcare. The primary service measures of hospital performance are based on the quality of care, cost, safety, effective and efficient diagnosis and treatment, reduced process/procedure times, internal customer satisfaction, Total Quality Management (TQM)



methodology, technology and innovation, patient satisfaction, etc. (Acharyulu & Shekhar, 2012). According to Mayer, healthcare performance measure is based on the two objectives of costs and the quality of care [24]. Cost efficiency implies getting the best results from healthcare services while utilizing fewer resources (man, money and materials). On the other hand, the quality of care can sometimes be judged from patients' perspective and sometimes from physicians' point of view [36], and it could be described as the degree to which the healthcare services meet the desired or expected health outcomes. There are six domains to quality of care and they include: Safety, Effectiveness, Patient-centeredness, Timeliness, Efficiency and Equity [3]. Based on the extant literature, this study will adopt cost efficiency and the quality of care as the measures for healthcare organization performance in the context of private hospitals in Delta State, Nigeria.

Supply Chain Management (SCM) Practices

Supply chain management practices could be regarded as the various activities undertaken by the management of an organization towards improved efficiency and the ultimate objective of its integrated supply chain. This concept has received different definition by different researchers. [17], SCM practices involve a set of activities that organizations undertake to promote effective management of its supply chain. From a broader perspective, Ibrahim and Hamid (2014) coined it as such that provides a set of activities undertaken in an organization that helps the organization in effective management of its supply chain by integrating its stakeholders such as Manufacturers, Distributors, Suppliers and Customers, thus increasing effectiveness of supply chain performance and overall organizational performance. A review of past literatures shows different dimensions to SCM practices by different researchers, as shown in **Figure 2**. [22], conceptualized and validated six dimensions of SCM practices: strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, internal lean practices and postponement. Accordingly, Strategic supplier partnership represents the long-term relationship between the organization and suppliers; Customer relationship speaks to the practices on complaint handling, and customer satisfaction; Information sharing refers to the information communicated between partners while the quality of information is about the accuracy, adequacy, and timeliness of information; Lean practices represents the elimination of waste, low inventory, small lot sizes and JIT delivery; and Postponement is described as

the delayed differentiation of products on the supply chain. In his study, Bayraktar et al. (2009) identified a set of 12 SCM practices, however, as related to manufacturing SMEs. These practices were categorized into 3, which are: Strategic Collaboration and Lean Practices (Close partnership with suppliers, Close partnership with customers, Just-in-time supply, Strategic planning, Supply Chain Benchmarking, Holding Safety Stock); Suppliers' Selection Practices (Few Suppliers, Many Suppliers); and Procurement Practices (e-procurement, Outsourcing, Subcontracting, 3PL).

Figure 2: Dimensions of Supply Chain Management Practices

Min and Mentzer (2004)	Li et al. (2005)	Burgess et al. (2006)
<ul style="list-style-type: none"> - Agreed vision and goals - Information sharing - Risk and award sharing - Cooperation - Process integration - Long term relationship - Agreed supply chain leadership 	<ul style="list-style-type: none"> - Strategic supplier partnership - Customer relationship - Information sharing - Information quality - Internal lean practices - Postponement 	<ul style="list-style-type: none"> - Leadership - Intra-organizational relationships - Inter-organizational relationships - Logistics - Process improvement orientation - Information systems - Business results and outcomes
Bayraktar et al. (2009)		Zhou and Benton (2007)
<p>Strategic collaboration and lean practices</p> <ul style="list-style-type: none"> - Close partnership with suppliers - Close partnership with customers - Just in time supply - Strategic planning - Holding safety stock - Supply chain benchmarking 	<p>Suppliers' selection practices</p> <ul style="list-style-type: none"> - Many suppliers - Few suppliers <p>Procurement practices</p> <ul style="list-style-type: none"> - E-procurement - Outsourcing - Subcontracting - 3PL (Third Party Logistics) 	<ul style="list-style-type: none"> - Supply chain plan - JIT production - Delivery practices

Based on the extant literature, a set of 4 SCM practices as the most frequently used practices in the healthcare are considered in the study and they include: information integration, strategic supplier partnerships, customer relationship management, and lean management practices:

1. **Information Integration (Quality & Sharing):** Adoption of information technologies such as Electronic Data Interchange (EDI), have led to numerous impacts on the performance of organizations [11]. Information sharing can be viewed from two aspects: quantity and quality. Both aspects are important for the practices of SCM. Hospital effectiveness can be achieved through providing quality services to patient at reduce cost, maintaining patient history, providing referral and pre-certification service, case management, medical record and maintaining close cooperation with their suppliers. For speed and accuracy, information integration plays an important role in healthcare [20].
2. **Lean Management:** This practice significantly reduces unnecessary expenses, but not at the expense of patient care, decrease hospital length of stay (LOS), and turn-around time (TAT) [34]. Although it originates from Toyota's production



system, lean practices now transform operations across industries, including healthcare, driving quality care and customer satisfaction.

3. *Strategic Supplier Partnership*: This describes a long-term relationship between a firm and its suppliers that aims at enhancing operational and strategic capabilities of participating firms to help them attain considerable ongoing benefits [17]. Within the healthcare industry, a strategic partnership with key suppliers is essential in ensuring the availability of materials and supplies where and when it is needed with minimal wastes and costs.

4. *Customer Relationship Management*: It provides healthcare organizations with a one-to-one communication solution that improves care delivery, lowers costs, and increases loyalty among the key stakeholders most necessary to organizational success [27]. The customer is the decisive element in building the reputation and prestige of any institution. Therefore, it's worth for any institution that seeks excellence to pay all the attention to how to build a strong and cohesive relationship with customers, which will enable the institution to stand out and make it always at the forefront among its peer institutions [2].

III. RESEARCH METHODOLOGY

The study adopted a descriptive research design. The goal is to explain or describe the findings from the analysis, and then measure the relationship of SCM practice with the hospitals' performance [18]. The target population for the study is private hospitals in Delta, Nigeria offering both inpatients and outpatients care as listed on the List of Coded Health Facility in Delta State of Nigeria (<https://rb.gy/0ix4w9> ; Directory of Health Facility, Nigeria, 2011). Sixteen (16) private hospitals were selected randomly based on their location, years of existence, and number of beds (size). The study used primary data which was collected through use of structured and unstructured questionnaires with Five-point Likert Scale. Two research assistants were contracted to collect data. The reliability and consistency of the questionnaires for the study was tested using the Cronbach's Alpha model. Statistical Package for Social Sciences (SPSS) and Microsoft excel were used to analyze the data that was collected. Multiple regression analysis was used to test the research questions aimed at evaluating the effects of the Supply Chain Management Practice on the performance of selected private hospitals in Delta State, Nigeria.

Model: $Y = \beta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$ Where,

Y = Performance of private hospitals in Delta State, Nigeria

X1 = Lean management

X2 = Information quality and sharing

X3 = Customer relationship management

X4 = Strategic Supplier Partnership

While β_1 , β_2 , β_3 and β_4 were coefficients of determination and ϵ was the error term

IV. DATA ANALYSIS RESULT AND DISCUSSION

4.1 Data Analysis Result

The study was aimed to collect data or information from 140 respondents (SC Managers, Hospital Administrators, Finance Manager, and Medical Personnel) from 20 private hospitals in Delta State. However, the study collected information from 103 key respondents from 16 private hospitals in Delta State, and this represents a response rate of 74% and 80% respectively. According to [18], a response rate of more than 70% is good to conduct data analysis.

The first section of the questionnaire collated information regarding the respondents' demographic data and data related with their work. **Table 1** Shows the results of the data collected in the first section. The results of demographic data indicate that 50% of the private hospitals had a bed capacity of less than 50; 38% had 50-100 beds while 13% had above 100 beds. This implied that 50% of the private hospitals had above 50 bed capacity

The private hospitals were randomly selected from 5 local government areas in Delta State. Respondents were drawn from various healthcare supply chain partners, majority of which were medical personnel (made up of Doctors and Nurses (51%)) and the supply chain managers (20%). Respondents were asked about the years of experience with their current employer, and it was found that majority (68%) were above 5-years of experience.

Reliability Test Result:

The reliability of the questionnaires for the study was tested using the Cronbach's Alpha model. The result indicates consistency and reliability of the scale for both the independent variables (Customer Relationship Management (CRM) = **0.88**; Information Quality and Sharing (IQS) = **0.87**; Strategic Supplier Partnership (SSP) = **0.88**; Lean Management (LM) = **0.88**) and the dependent variable (Healthcare Organizational Performance = **0.71**).



Descriptive Analysis Findings:

Descriptive statistics was used to test the second and third objective of the study which are to examine the challenges and opportunities in implementing SC practices and the current SC practice in the selected private hospitals.

Table 2 shows the current practices of supply chain management within four dimensions namely Customer Relationship Management, Information Integration (Quality & Sharing), Strategic Supplier Partnerships and Lean Management Practices, using

a likert scale 1-5 where 1 = No Extent; 2 = Small extent; 3 = Moderate Extent; 4 = Large Extent; 5 = Very Large Extent. The decision-making threshold was established as the weighted average mean of 2.36 (25.95/11). Practices with ≥ 2.36 are considered acceptable while practices with ≤ 2.35 requires improvement.

The above data analysis shows that selected private hospitals moderately focus on customer relationship management, demonstrating a reasonable degree of meeting the needs and requirements of customers ($\bar{x}=2.77$)

Table 1: Descriptive Statistics on Demographic Data

VARIABLES	FREQUENCY	%	Participants' Current Position	Frequency (By Experience)			%
	No. Hospitals			1-5 years	< 5 years	Total	
Bed size							
> 50 Beds	8	50%	Hospital Admin	9	5	14	14%
50 - 100 Beds	6	38%	Medical Personnel (Doctor/Nurse)	11	42	53	51%
101 and above	2	13%	SC. Manager	7	14	21	20%
Locations (LGA)			Finance Manager	5	5	10	10%
Sapele	1	6%	CEO	1	4	5	5%
Ubeji	1	6%	Total	33	70	103	
Ughelli	3	19%	%	32%	68%		100%
Uvwie	4	25%					
Warri South	7	44%					

Source: Author Field Work (2024)

Table 2: Current SC Practices in selected private hospitals

CURRENT SCM PRACTICE								
SN	SUPPLY CHAIN MANAGEMENT PRACTICE	NE 1 (%)	SE 2 (%)	ME 3 (%)	LE 4 (%)	VLE 5 (%)	Mean	SD
1	Customer Relationship Management							
	The hospital manages and timely respond to customer needs, complaints and queries	6 (5.8%)	29 (28.2%)	51 (49.5%)	17 (16.5%)	0	2.77	0.79
	The hospital creates long term relationships with its customers, and track their satisfaction level	6 (5.8%)	31 (30.1%)	51 (49.5%)	14 (13.6%)	1 (1.0%)	2.74	0.80
2	Information Integration (Quality & Sharing)							
	The hospital utilizes & integrates Inventory Management System/technologies (e.g. Vendor Managed Inventory, Electronic Data Interchange, other solutions) to manage medical supplies & equipment	14 (13.6%)	35 (34.0%)	46 (44.7%)	7 (6.8%)	1 (1.0%)	2.48	0.85
	The hospital has adopted Enterprise Resource Systems (ERP) to support real-time visibility into inventory levels and related supply chain information for decision making process	14 (13.6%)	47 (45.6%)	37 (35.9%)	5 (4.9%)	0	2.32	0.77
	The hospital provides training for employees to utilize information system effectively	19 (18.4%)	46 (44.7%)	37 (35.9%)	1 (1.0%)	0	2.19	0.74
3	Strategic Supplier Partnerships							
	The hospital collaborates with its suppliers and other stakeholders to ensure timely supplies/service delivery and for continuous improvement.	14 (13.6%)	42 (40.8%)	43 (41.7%)	4 (3.9%)	0	2.36	0.77
	The hospital creates and maintains good relationship with their partners such as suppliers, distributors and customers	14 (13.6%)	45 (43.7%)	40 (38.8%)	4 (3.9%)	0	2.33	0.76
	The hospital cooperates with partners (other hospitals, suppliers, customers) in implementing its services or specialized services	18 (13.6%)	52 (50.5%)	31 (30.1%)	2 (1.9%)	0	2.17	0.73
4	Lean Management Practice							
	The hospital applies lean management tool (5s, Root Cause Analysis, Fish Bone Diagram, etc.) to streamline patients' flow; reduce waiting time; reduce medication error, etc	25 (24.3%)	44 (42.7%)	29 (28.2%)	3 (2.9%)	2 (1.9%)	2.16	0.89
	The hospital consistently seeks to eliminate waste while sustaining value for the customer	16 (15.5%)	48 (46.6%)	35 (34.0%)	3 (2.9%)	1 (1.0%)	2.27	0.79
	The hospital adopts system of monitoring expenditures to avoid unnecessary costs or transactions	19 (13.6%)	51 (49.5%)	30 (29.1%)	2 (1.9%)	1 (1.0%)	2.17	0.78



Table 3: Challenges and Opportunities - SC practices

Challenges			Opportunities		
Description	Frequency	Percent	Description	Frequency	Percent
Lack of resources (Staffing, Materials, etc)	40	38%	Technology Adoption and Integration	40	39%
Poor Suppliers' Relationship	21	20%	Staff Training	36	35%
Lack of Technology Integration	43	42%	Strategic Supplier Partnerships	27	26%
Total	103		Total	103	

and developing or maintaining good relationship with them ($\bar{x}=2.74$). They utilize Inventory Management System ($\bar{x}=2.48$) for a streamlined and optimal management of medical supplies. However, there is need for significant improvement in the area of ERP adoption ($\bar{x}=2.32$) and capacity building through appropriate training to employee ($\bar{x}=2.32$). While there is likely collaboration with suppliers ($\bar{x} \geq 2.36$), there is weakness in developing and leveraging strategic partnerships, ($\bar{x}=2.33$, and $\bar{x}=2.17$). Lastly, the data shows there is very little or no implementation of effective lean methodologies ($\bar{x}=2.16$, $\bar{x}=2.27$, and $\bar{x}=2.17$).

According to the findings in Table 3, lack of technology integration ($f=43$; 42%) is the primary challenge, suggesting a significant need for effective technology integration to streamline supply chain operations. The next substantial challenge is the lack of resources ($f=40$; 38%). Most of the private hospitals are constrained with resources (man, material, money, etc.), and this impacts the capability to keep optimal inventory, procure timely and facilitate a smooth functioning of supply chain operations. Majority of respondents did not perceive poor suppliers' relationship ($f=21$; 20%) as a critical challenge in implementing SC practices, although it reflects a noteworthy challenge as it could lead to some issues such as delay and unreliable deliveries and lack of trust.

On the other hand, the analysis indicates that there is a great opportunity with technology adoption and integration ($f=40$; 39%) which implies a significant promise for the private hospitals to tap into improved efficiency and decision-making process using solutions like ERP systems, Inventory Management Solutions, real-time tracking, and so on. The next strong area of opportunities is staff training ($f=36$; 35%), emphasizing that a well-trained workforce or staff can attribute to the implementation of SC practices for improved efficiency and hospital

performance. Strategic partnership with suppliers ($f=27$; 20%) is not significant compared to technology adoption and staff training, however, it has the potential to ensure delivery of quality goods and services to patients.

Regression Analysis Findings:

Four dimensions of supply chain management practices such as Customer Relationship Management (CRM), Information Quality and Sharing (IQS), Strategic Suppliers' Partnership (SSP), and Lean Management (LM) are considered as the independent variables and hospital performance as the dependent variable. The regression coefficient shows the precision and measures the ability of the model to explain the variation in the dependent variable. A Pearson correlation coefficients analysis was also carried out to provide more insight into the relationship among the independent variables.

The regression analysis model was at 95% coefficient intervals. The result, as shown on Table 4, of F-change and the P-value, $F(4, 98) = 13.470$; and $p < .001$, indicates that the model demonstrates good fit and it is statistically significant. The adjusted $R^2 = 0.328$ shows that 32.8% of the variation in private hospital performance is explained by the independent variables (CRM, IQS, SSP and LM), not overfitting, hence, the model is good. The analysis shows that there is a positive and significant relationship ($R^2 = 0.355$; $p < 0.001$) between the supply chain management practices and private hospital performance, specifically in terms of cost efficiency and quality of care at 95% confidence level. The Durbin-Watson test of 2.218 indicates there is no autocorrelation, ensuring the independence of observations or errors in the model. The One-way ANOVA test revealed a statistically meaningful relationship between the supply chain management practices and the private hospitals performance ($sig.=0.000$).



Table 5: Pearson Correlation Analysis

		Correlations				
		Lean Mgt.	Information Q. S.	Customer R. Mgt.	Supplier Strategic P.	Hospital Performance
Lean Management	Pearson Correlation	1	.639**	.550**	.649**	.471**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	103	103	103	103	103
Information Quality & Sharing	Pearson Correlation	.639**	1	.633**	.667**	.534**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	103	103	103	103	103
Customer Relationship Management	Pearson Correlation	.550**	.633**	1	.644**	.472**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	103	103	103	103	103
Suppliers' Strategic Partnership	Pearson Correlation	.649**	.667**	.644**	1	.338**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	103	103	103	103	103
Hospital Performance	Pearson Correlation	.471**	.534**	.472**	.338**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	103	103	103	103	103

** Correlation is significant at the 0.01 level (2-tailed).

Source: Research Data (2024)

The deductions from **Table 5** shows that the predictors themselves (Lean Management (LM), Information Quality & Sharing (IQS), Customer Relationship Management (CRM), and Suppliers' Strategic Partnership (SSP)) are positively and significantly intercorrelated, implying their ability to

influence each other, hence, these practices are most times implemented together towards achieving improved private hospital performance. Specifically, the analysis indicates that LM, CRM and IQS, compared to SSP, have strong and positive correlation with the outcome

Table 4: Regression Analysis on SC Practices and Selected Private Hospitals Performance

Model Summary ^b										
Model	R	R ²	Adjusted R ²	Std. Error of Estimate	Change Statistics					Durbin-Watson
					R ² Change	F Change	df1	df2	Sig.	
1	.596	.355	.328	.489	.355	13.470	4	98	.000	2.218

a. Predictors: (Constant), SSP, CRM, LM, IQS
 b. Dependent Variable: Hospital Performance

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.909	4	3.227	13.470	.000 ^b
	Residual	23.480	98	.240		
	Total	36.388	102			

a. Dependent Variable: Hospital Performance
 b. Predictors: (Constant), SSP, CRM, LM, IQS



Coefficients ^a										
Model		Unstandardized Coefficients		Standardized Coefficients	t-value	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Err.	Beta			Lower B	Upper B	Tolerance	VIF
1	(Constant)	2.347	.294		7.971	.000	1.763	2.931		
	LM	.190	.089	.244	2.122	.036	.012	.367	.496	2.015
	IQS	.255	.084	.374	3.049	.003	.089	.422	.438	2.283
	CRM	.192	.088	.250	2.184	.031	.018	.366	.504	1.983
	SSP	-.161	.087	-.230	-1.844	.068	-.334	.012	.422	2.371

a. Dependent Variable: Hospital Performance
 b. LM = Lean Management; IQS = Information Integration (Quality & Sharing); CRM = Customer Relationship Management; SSP = Strategic Suppliers Partnership

of private hospitals in terms of quality of care and cost efficiency. The weak, yet positive, correlation between SSP and private hospital performance ($r = 0.338$) suggests that the impact of SSP on hospital performance is more indirect, it might need the support from other variables in influencing private hospital performance. This is supported by its strong correlation coefficient with IQS ($r = 0.667$) and LM ($r = 0.649$), suggesting that the effect of SSP on hospital performance will be meaningful when complemented with strategies and improvement in information quality and effective lean management practices.

4.2 Discussion

The demographic data results (on Table 1) indicating 50% of the private hospitals with < 50 beds capacity, 38% for 50-100 beds and 13% had more than 100 beds, implied that most private hospitals in the region of investigation are small and medium-sized facilities. Although it represents a snapshot of private hospitals in the region. The data reflects the view of key stakeholders in healthcare supply chain management, with high level of experience, which suggest that the data is informed by professionals who quite understands the healthcare system. Our descriptive findings also show that while majority of the private hospitals moderately practice customer relationship management and utilize inventory management system, they have not adequately adopted information technologies and relevant capacity building program; developed and leverage on supplier partnership opportunities; and yet to implement lean methodologies for improved hospital performance. Hence, the lack of technology integration is a key challenge, which can be leveraged on to streamline supply chain operations for improved outcomes.

The nature of the relationship between supply chain management practices and the performance of private hospitals was tested using the Multiple Linear

Regression test. This was guided by the research questions:

RQ1: Is there a relationship between lean management practices and the performance of private hospitals in terms of cost efficiency and quality of care?

The regression analysis test shows that lean management significantly predicted hospital performance, Beta = 0.244. There is a moderate positive correlation ($r = 0.471$) between lean management practices and the private hospital performance. This is supported by the Unstandardized Coefficient and the P-value ($\beta = 0.190$; $p = 0.036 < 0.05$) indicating that lean management practices positively influence and significantly contribute to the private hospital performance in terms of cost efficiency and quality of care. This emphasizes the idea that reducing waste, streamlining operations, and focusing on efficiency directly benefit cost efficiency as well as quality of care. Hence, a better and effective implementation of lean management practices will improve hospital performance.

RQ 2: How does information integration in supply chain management affect the overall performance of private hospitals in Delta State?

The regression result revealed that Information Quality and Sharing, Beta = 0.374, is the strongest positive predictor of the private hospitals performance compared to the other practices (LM, CRM, SSP). This is supported by the Pearson correlation coefficient analysis indicating a very strong positive correlation ($r = 0.534$) between information quality & sharing in supply chain management and the performance of private hospitals, which signifies its essential role in improving efficiency and quality of care. Information Quality and Sharing has a positive and statistically significant relationship with private



hospitals performance ($\beta = 0.255$; $\rho = 0.003 < 0.05$). With the p-value of less than 0.05, it means that IQS meaningfully contributes to the enhancement of the overall private hospitals' performance. Hence, Improved decision making and streamlined inventory operations can be achieved through real-time information sharing, which could also impact patients' satisfaction and hospital outcomes.

RQ 3: To what extent does strategic supplier relationship affects quality of care and cost efficiency in private hospitals in Delta State?

From the regression analysis, Strategic Supplier Partnership (SSP) showed an unstandardized coefficient of **-0.161** ($\beta = 0.161$), which indicates that for every unit increase in SSP, private hospital performance in terms of quality of care and cost efficiency, decreases by **0.161 units** on average, while other variables remain constant. This shows that SSP has an adverse or negative effect on private hospitals performance, and it is supported by the Pearson correlation coefficient ($r = 0.338$) indicating that SSP has the weakest, although positive, correlation with the performance of private hospitals. This connotes its inability to directly influence the quality of care and cost efficiency in private hospitals. The standardized coefficient, t-value and the p-value ($Beta = -0.230$; $t = -1.844$, $\rho = 0.068 > 0.05$) respectively indicate that the relationship between SSP and the hospitals' performance is negative and not statistically significant, also suggesting a potential negative effect. Thus, there is no sufficient evidence to show or conclude that SSP has a meaningful impact on hospital performance. A further research would be needed to unravel the complexities of these relationships and determine the underlying factors.

RQ 4: How does customer relationship management contribute to quality of care and cost efficiency in private hospitals in Delta State?

The analysis shows that customer relationship management (CRM) has a notable and positive impact and prediction on private hospitals performance as suggested by $Beta = 0.250$, and supported by the standardized coefficient ($\beta = 0.192$). The Pearson correlation coefficient data ($r = 0.472$) indicates that CRM is positively correlated with private hospital performance, meaning that managing relationships with patients and stakeholders is pivotal to improving hospital performance. The p-value is less than 0.05 ($\rho = 0.031 < 0.05$), which strongly suggests that CRM

contributes significantly to private hospital performance. By improving communication, understanding patient needs, and addressing concerns, private hospitals can offer higher-quality care in a cost-efficient manner. Effective CRM practices helps reduce delays in care delivery, create an environment conducive to personalized care, reduces errors and optimizes resource utilization.

V. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The study establishes that SCM practices, particularly Lean Management (LM), Information Quality and Sharing (IQS), and Customer Relationship Management (CRM) have significant relationship with private hospital performance, meaning they play a significant role in boosting hospital performance in terms of cost efficiency and quality of care. Lean Management (LM) has a positive and significant impact, indicating that waste reduction, resource optimization and streamlining operations for improved efficiency greatly contribute to improved hospital performance in terms of quality of care and cost efficiency. The study shows that Information Quality and Sharing (IQS) is the most influential variable, suggesting the crucial role of technology adoption, real-time information sharing and effective inventory management system in enhancing the overall private hospital performance. Private hospitals that invest in high-quality and integrated information system can anticipate improved outcome, specifically in terms of cost efficiency and quality of care. According to the study, Customer Relationship Management significantly contribute to quality of care and cost efficiency in private hospitals. Building strong relationships with patients and stakeholders leads to higher satisfaction, fewer errors, and better resource utilization. However, the study shows that Suppliers' Strategic Partnership has a negative and insignificant impact on hospital performance. While SSP is positively related to other SCM practices, it doesn't directly influence cost efficiency and quality of care without being complemented by other supply chain practices and strategies, hence, a need for deeper exploration.

The study also identified challenges such as lack of technology integration and resource constraints as major barriers to effective SCM implementation. However, there exist clear opportunities through technology adoption, staff training, and strategic collaborations to enhance efficiency and hospital performance at large.



5.2 Recommendation

The study shows the need to enhance lean management practices, therefore recommended private hospitals to adopt lean tools (e.g. 5s, Root Cause, Analysis, etc.) to streamline patient flow, reduce waiting time, minimize medication errors, and eliminate waste while sustaining value for patients. The study also recommended investment in information quality and sharing strategies (e.g. advanced technologies) and quality training programs to improve decision-making and operational efficiency which in turn impact private hospital performance. In addition, the study recommended private hospitals to strengthen and maintain good customer relationship, and adopt strategies to improve communication with patients and stakeholders, ensuring their needs are met promptly and effectively. Our findings show that effective customer relationship management significantly contribute to quality of care and cost efficiency. Based on the findings, the study strongly recommended private hospitals to re-evaluate their existing partnership with suppliers to identify weak areas and explore opportunities for improvement and effective collaboration which will help ensure quality of goods and services while reducing cost.

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