

CRITICAL FACTORS OF SUPPLY CHAIN MANAGEMENT AND PERFORMANCE OF MEDIUM SCALE INDUSTRIES IN SOUTH-EAST, NIGERIA

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ABSTRACT

The twenty-first-century organizations are required to provide accurate, on-time deliveries in addition to providing high-quality products and services at low cost-effectively and efficiently. This can be achieved if only the organizations are not in any way affected by some critical factors like Information technology, environmental uncertainties, supply chain relationship, value-added process, SCM performance, business management, and customer satisfaction. The study was conducted to evaluate how critical factors affect supply chain management performance of (PZ industries) Medium Scale Industries in South East, Nigeria. The study is composed of an introduction and discussions on critical factors affecting supply chain management. The study employed a descriptive survey design. Data were generated through questionnaires administered to staff of the PZ industries. Data collected were analyzed using the regression analyses with the aid of SPSS Version 18. Results confirmed that SCM critical factors affecting SCM are very significant in enhancing both business and operational performance.

Keywords: Supply Chain, Management, Critical Factors, Information Technology, Operational Performance.

1.0 INTRODUCTION

Supply Chain Management (SCM) comprises of movement and storage of raw materials that are involved in work in progress, inventory, and fully furnished goods. Every firm strives to match supply with demands in a timely fashion with the most efficient use of resources. Since SCM is a process used by companies to ensure that their supply chain is efficient and cost-effective, it is applied by companies across the globe due to its demonstrated results such as delivery time reduction, improved financial performance, greater customer satisfaction, building trust among suppliers, and others (D' Amours, Ronnqvist, and Weintraub, 2008) cited in (Quesada, Gazo and Sanchez 2012). Effective supply chain management practices are important to build and sustain a competitive advantage in the products and services of the firm. Mwale (2012) stated that the performance of the supply chain is influenced by managing and integrating key elements of information into its supply chain. SCM practices impact not only organizational performance but also its competitive advantage. They are expected to improve an organization's business and operational performance through

information technology, environmental uncertainties, supply chain relationship, value-added process, business management, and customer satisfaction.

2.0 STATEMENT OF THE PROBLEM

Supply chain management is the management of the flow of products and services, which begins from the origin of products and ends at the product's consumption. Companies resort to supply chain practices to improve their performance. Companies at the same time use different strategies and approaches to view the entire chain and work efficiently at each and every step involved in the chain. This is a result of some critical factors that impact the supply chain process. The extent to which operators of medium scale industries in South-East, Nigeria consider these critical factors in managing their Supply Chain seems vague and lacks empirical evidence for this region. This study is conceived in furtherance of this fact.

3.0 OBJECTIVES OF THE STUDY

The objective of the study is to examine the effect of critical factors on Supply Chain Management and Organizational Sustainability. The specific objectives are to:

- i. Determine the influence of critical factors on supply chain operational performance.
- ii. Assess the effect of critical factors on supply chain business performance.

Research Questions

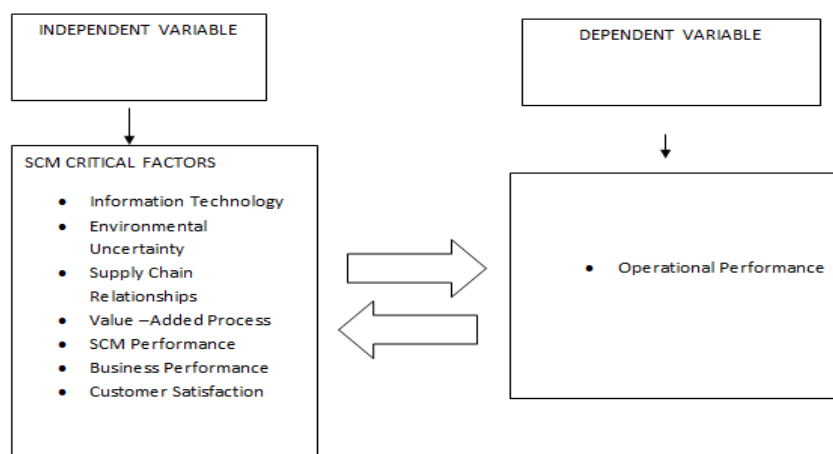
- i. What is the influence of critical factors on supply chain operational performance?
- ii. To what extent do critical factors affect supply chain business performance?

Research Hypotheses

- i. Critical factors significantly do not influence supply chain operational performance.
- ii. Critical factors significantly do not affect supply chain business performance.

4.0 REVIEW OF RELATED LITERATURE

4.1 Conceptual Framework



Source: The Researcher 2022

Supply Chain Management Critical Factors

According to Quesada and Meneses (2010), to understand how the supply chain works, it is important to identify the generic and sub-factors affecting supply chain management.

- Information Technology: communication tools, planning tools, information flow (mobility)
- Environmental Uncertainty: company environment, Government support, Uncertainty aspects from Overseas
- SUPPLY Chain Relationships: relationships with suppliers, relationships with customers
- Value- Added Process: Flexibility, quality, production system
- SCM Performance: Logistics, supplier markets, supplier performance, material sourcing
- Business Management: Process strategy, process performance, marketing strategy, innovation
- Customer Satisfaction: Customer service

4.2 Information Technology (IT)

Communication between actors is effective and efficient in the supply chain because of the impact of telecommunication and information technology. Handfield and Nichols, (1999) posit that the use of information technology allows suppliers, manufacturers, distributors, retailers, and customers to reduce lead time, paperwork, and other necessary activities. Effective use of information technology enables managers of organizations to experience considerable advantages, enjoy the flow of information in a coordinated manner, access information and interchange data, improved customer and supplier relationships, and inventory management not only at the organizational level but also internationally (Quesada, et al 2012).

With the impact of information technology on SCM, contracts are supplied via the internet, distribution of strategies, outsourcing, and procurement (Simchi-Levi, Kaminsky, and Simchi-Levi, 2003 cited in Obialor, 2020). Companies that are information technology compliant enjoy lead time and cost reductions with the purpose of improving the level of operation and enhancing inter-organizational relationships (Humphreys, Lai, and Sculli, 2001 cited in Obialor, 2020). Tim (2007) opines that through the use of communication tools, such as websites, industrial organizations can build value in their supply chain relationships. Similarly, another key to supply chain management success is the use of planning tools.

Turner (1993) cited in Quesada, et al (2012), indicates that firms cannot effectively manage cost, offer high customer service, and become leaders in supply chain management without the incorporation of top-of-the-line information technologies. Li (2001) identified and grouped information technology tools into three groups in terms of their primary purpose to include; communication tools, resource planning tools, and supply chain management tools.

4.3 Environmental Uncertainty (EU)

Environmental uncertainty according to Dwivedi and Butcher (2009), refers to the environmental issues in the product chain described as the unexpected changes in the customer, supplier, competitor, and technology by Ettlie and Reza (1992) in Quesada, et al (2012). Environmental uncertainty is an important factor in the realization of strategic supply management plans. The increase of outsourcing activities in the organization raised the awareness of the importance of strategic supply management, which leads to the better relationships among organizations (Paulraj and Chen 2007a). Organization environment, government support, and uncertainty aspects from overseas are some of the sub-factors of environmental uncertainty.

4.4 Supply Chain Relationship (SCR)

Supply chain management is directly related to relation management, which includes suppliers and customers (Fraza 2000). Supply chain relationships play an important role in achieving the firm's goals. Thus, the coordination and integration of activities with suppliers and understanding of customers' needs result in greater benefits for companies. Li, Rao, Ragu-Nathan, and Ragu-Nathan (2005) insist that strategic supplier partnership and customer relationships are the main components in the supply chain management practices, leading to information sharing, which is one of the five pillars in achieving a defined supply chain relationship. Relationships with customers and relationships with suppliers are some of its sub-model relationship factors.

4.5 Value-Added Process (VAP)

Bishop (1990) cited in Quesada et al (2012) sees the value-added process as "adding those manufacturing or service steps to a commodity product which the customer perceives as increasing its value". Value-added products can be commodity processes or products that already exist, however, customers always want to pay the cost that they think is correct and if they get something added to the product, they got value-added. Flexibility and quality are two significant factors of a good value-added process (Becker and Weltring 2009 in Quesada et al 2012).

4.6 Supply Chain Management Performance (SCMP)

Simchi-levi et al (2003) see supply chain management performance as the operational excellence to deliver a leading customer experience. SCM performance features present ineffective performance measurement systems include; inclusiveness (measurement of all pertinent aspects), universality (allows for comparison under various operating conditions), measurability (data required are measurable), and consistency (measures consistent with organization goals). Similarly, the strategic goals include; key elements such as the measurement of resources (generally cost), output (generally customer responsiveness), and flexibility. To effectively build up an integrated supply chain requires the management of material flow from three perspectives: strategic, tactical, and operational (Stevens 1990) cited in (Quesada et al 2012). Critical sub-factors of supply chain management performance are logistics, supplier markets, supplier performance, and material sourcing.

4.7 Business Management (BM)

Business management that involves managerial functions of planning, organizing, leading, and controlling to achieve organizational goals is further described by Ford and Mouzas (2010) as the process of managing networking between companies. Global changes in customer demand, recent globalization of markets, and changing technology require companies to focus their effort on improving competitiveness, trying to achieve customer satisfaction by adding more value to their products (Hung 2010). Thus, the following sub-factors of process strategy, process performance, marketing strategy, and innovation are tools used to improve performance and confront problems before the organization (Leavy, 2010).

4.8 Customer Satisfaction (CS)

Kurata and Num (2010) maintain that manufacturers and retailers are always looking for practical after-sales policies that will permit them to enhance customer satisfaction levels. Customer service which is defined by demand forecasting, service levels, order processing, parts/service support, and aftermath operations are sub-factors of customer satisfaction.

5.0 METHODOLOGY

The study adopted a cross-sectional research design. The Taro Yamane formula was used to determine a sample size of 310 samples from a population of 1425 employees. The reliability of the test instrument was determined through a pilot study. Data generated from respondent responses were analyzed through regression and correlation analyses using statistical packages for social sciences (SPSS) version 20.

Table.1

	Description	No of Respondents			
		Yes	%	No	%
1	Does information technology positively affect SCM performance of medium scale industries.	256	83	54	17
2	Does environmental uncertainties negatively affect SCM performance of medium scale industries.	247	80	63	20
3	Does supply chain relationship positively influence operational performance of medium scale industries.	240	77	70	23
4	Does value- added process positively affect supply chain operational performance.	254	82	56	18
5	Does business Management of medium scale industries positively affect customer satisfaction	256	83	54	17
6	Does SCM performance positively affect customer satisfaction of medium scale industries	246	79	64	21

Source: Field Data, 2022

In question 1, the result showed that 256 responses representing 83% of the total respondents for the study assert that information technology positively affects supply chain management performance of medium scale industries in South East, Nigeria, while 54 responses representing 17% of the total respondents for the study said no that information technology

positively does not affect supply chain management performance of medium scale industries in South-East, Nigeria.

In question 2, it is clear that 247 responses representing 80% of the total respondents for the study said yes that environmental uncertainties negatively affect supply chain management performance of medium scale industries in South-East Nigeria, while 63 responses representing 20% of the total respondents for the study said no, that environmental uncertainties negatively do not affect supply chain management performance in medium scale industries in South-East, Nigeria. Therefore, it can be deduced that any percentage decline in performance is a result of environmental uncertainty.

In question 3, it is clear that 240 responses representing 77% of the total respondents from the study said yes that supply chain relationships positively influence the operational performance of medium scale industries in South-East, Nigeria, while 70 responses representing 23% of the total respondents said no that the supply chain relationship positively does not affect supply chain operational performance of medium scale industries in the south-east, Nigeria. Therefore, it can be affirmed that supply chain relationships positively influence the operational performance of medium scale industries in South-East, Nigeria.

In question 4, the result shows that 245 responses representing 82% of the total respondents for the study assert that the value-added process positively affects supply chain operational performance of medium scale industries in South-East, Nigeria, while 56 responses representing only 18% of the total respondents for the study said no that value-added process positively does not affect supply chain operational performance of medium scale industries. From the findings, it can be affirmed that the value-added process positively affects the supply chain operational performance of medium scale industries in South-East, Nigeria.

In question 5, findings show that 256 responses representing 83% of the total respondents for the study said that business management of medium scale industries positively affects customer satisfaction. Hence business management of medium scale industries positively affects customer satisfaction.

Finally, in question 6, results showed that 246 responses representing 79% of the total respondents for the study said yes that supply chain management performance positively affects customer satisfaction of medium scale industries of South-East Nigeria, while 64 responses representing only 21% of the total respondents for the study said no that supply chain management performance positively affects customer satisfaction of medium scale industries in South-East, Nigeria.

Test of Hypotheses

In testing hypotheses, question 1 was used to test the hypothesis. 1, while question 4, was used to test hypothesis 2.

Decision rule:

HO: $> t_{cal}$, 0.05 reject

Hi: < tcal, 0.05 accept

Hypothesis.1,

H01: Critical factors significantly do not influence the supply chain operational performance of medium scale industries.

The first objective of this study is to determine the influence of critical factors on the supply chain operational performance of medium scale industries in South-East, Nigeria. Therefore, the empirical data associated with this regression results are as stated below:

$$Y = f(X) \dots\dots\dots\text{model 1}$$

$$Y = b_0 + b_1 x + u_1$$

Regression results of the relationship between critical factors and supply chain operational performance.

Dependent Variable: Y

Method : Ordinary Least Square (OLS)

Sample : 1-10

No of observations : 10

Table.2

Variable Prob.	Coefficient	Std. Error	t- Statistic
C 0.057	12.081	5.447	2.218
X 0.014	2.504	0.803	3.117

Source: Researcher's Computation (2022)

$$r^2 = 0.548$$

$$r = 0.741$$

$$\text{Durbin Watson} = 2.96$$

The coefficient of the constant term is 12.08. The associated sign is positive, implying at zero performance of the independent variable, supply chain operational performance (Y) will be influenced by 12% approximately. The regression coefficient of critical factors (X) carries a positive sign and the t-value (3.117) is statistically significant at 5%. The significance is ascertained as the 0.014 (5% level of significance) is greater than the p-value of the regression

coefficient of critical factors ($x = 0.014$). The computed coefficient of determination ($r^2 = 0.548$) shows that 54.8% of the total variation in supply chain operational performance (Y) is accounted for by the independent variable, (critical factors: X) The influence of other factors that are not included to the regression function. However, the computed correlation coefficient is 0.741, implying that there is a strong positive relationship between supply chain operational performance (Y) and critical factors (X). The volume of Durbin Watson (DW) is 2.96, using 5% level of significance, and $K1=1$ (one) and $N = 10$ degree of freedom, the tabulated lower (DL) and upper limits of Durbin Watson statistics (2.96) is greater than the upper limit (1.320), there is no evidence of autocorrelation in the model.

Hypothesis 2

H02: critical factors significantly do not affect supply chain business performance.

Regression result of critical factors on supply chain business performance of medium scale industries in South-East, Nigeria. The second objective of the study is to assess the effect of critical factors on the supply chain business performance of medium-scale industries in South-East, Nigeria. The second objective of the study is to assess the effect of critical factors on the supply chain business performance of medium-scale industries in South East, Nigeria.

$Y = f(x)$ model. 2

$Y = b_0 + b_1x + U_1$

Dependent Variable: Y

Method : Ordinary Least Square (OLS)

Sample : 1-10

No of observations : 10

Table.3

Variable Prob.	Coefficient	Std. Error	t- Statistic
C 0.111	7.188	4.008	1.793
X 0.001	3.252	0.595	5.467

Source: Researcher’s Computation (2022)

$r^2 = 0.789$

$r = 0.888$

Durbin Watson = 1.65

The coefficient of the constant term is 7.188. The associated sign is positive, implying at zero effect of the independent variable, supply chain business performance (Y) will affect an increase by 7% approximately. The regression coefficient of critical factors (X) carries a positive sign and the t- value (5.467) is statistically significant at 5%. The significance ascertained as the 0.05 (5% level of significance) is greater than the p-value of the regression coefficient of critical factors (X) (0.001), the computed coefficient of determination (r^2 0.789) shows that 78.9% of the total variation in supply chain business performance (Y) is accounted for, by the independent variable (critical factors) while 21.1% of the total variation in 'Y' is attributed to the influence of other factors that are not included in the regression function.

However, the computed correlation coefficient (R) is 0.888, implying that there is a strong positive relationship between supply chain business performance (Y) and critical factors (X). The value of Durbin Watson (DW) is 1.65. Using a 5% level of significance and $K1 = 1$ and $N = 10$ degree of freedom, the tabulated lower (dL) and upper limits of Durbin Watson statistics (1.65) is greater than the upper limit (1.320), there is no evidence of autocorrelation in the model.

6.0 DISCUSSION

It is observed that the t- the calculated value of the regression coefficient of critical factors (X) in the first model is 3.117 while the t – tabulated value is 2.306. Since the t –calculated (3.117) is greater than the t- tabulated value (2.306), H_0 is rejected and the study concludes that critical factors significantly influence supply chain operational performance of medium scale industries in the South East, Nigeria.

Using a two tail test, the t- the calculated value of the regression coefficient of critical factors (X) in the second model (2.306), H_0 is rejected and the study concludes that critical factors significantly affect the supply chain business performance of medium scale industries in South East, Nigeria.

7.0 CONCLUSION

Supply chain management is the flow of products and services, which begins from the origin of products and ends at the consumption of the product. It also comprises movement and storage of raw materials that are involved in work in progress, inventory, and fully furnished goods. The main objective of supply chain management is to monitor and relate the production, distribution, and shipment of products and services. Results of the first hypothesis tested showed that critical factors significantly influence supply chain operational performance of medium scale industries in South East, Nigeria. The result of the second research question and hypothesis also revealed that critical factors significantly affect supply chain business performance of medium scale industries in South East, Nigeria.

8.0 RECOMMENDATIONS

The study confirmed that critical factors affecting supply chain management are very significant in enhancing both business and operational performance. Therefore, medium-scale

industries and other organizations should embrace and manage appropriately these critical factors so that business and operational efficiency and effectiveness would be achieved.

REFERENCES

- DWivedi, A. and Butcher,T.(2009). Supply Chain Management and Knowledge Management.
- Ford, D. and Mouzas. S. (2010) Networking Under Uncertainty: Concepts and Research Agenda. *Journal of Industrial Marketing Management*, 39:956.
- Fraza, V. (2000) SCM FOR Small Distributors. *Industrial Distribution*, 89 :81.
- Handfield, R. B. and Nichols, E. L. J. (1999) Introduction to Supply Chain Management. New Jersey: Prentice Hall, Inc.
- Hung, H. (2010) Reconciling The Paradox Supply –Side and Demand –Side Strategies in Industrial Innovation. *Industrial Marketing Management*, 39 :342.
- Kurata, H, and Num, S.S (2010) After- Sales Service Competition in a Supply Chain: Optimization of Customer Satisfaction level or Profit or Both? *International Journal of Production Economics*.127: 136 - 146.
- Leavy, B. (2010) Design Thinking: A New Mental Model of Value Innovation. *Strategy and Leadership*, 38 :5.
- Li, S. (2001) An Integrated Model for Supply Chain Management Practice, Performance and Competitive Advantage in Manufacturing Management. Ohio, The University of Toledo, 1- 266.
- Li, S. Rao, S.S. Ragu- Nathan, T.S. and Ragu- Nathan, B. (2005) Development and Validation of a Measurement Instrument for Studying Supply Chain Management Practices.*Journal of Operations Management*.
- Mwale, H. (2012) Supply Chain Management Practices and Organizational Performance of Large Manufacturing Firms in Nairobi, University of Nairobi Press.
- Obialor, D.C (2020) Information Technology and Global Supply Chain Management. *International Journal of Innovative Research and Development*, ISSN 2278-0211 (Online) DOI No.: 10.24940/ijird/2020/v9/i8/AUG20058, Pp. 214-220
- Paulraj, A. and Chen, I.J. (2007a) Environmental Uncertainty and Strategic Supply Management: A Resource Dependence Perspective and Performance Implications. *Journal of Supply Chain Management*.
- Quesada, H. Gazo, R. and Sanchez, S. (2012) Critical Factors Affecting Supply Chain Management: A case Study in the US pallet Industry. Purdue University, USA.

Quesada, H. and Meneses, M. (2010) Determinacion de un modelo de Negocios para Apoyar el Desarrollo de la Pequena y mediana Empresa Basado en Casos de Exito. Costa Rica: Instituto Tecnologico de Costa Rica.

Tim, F. (2007) Into the Depths of the I.E.I Framework: Using the Internet to Create Value in Supply Chain Relationships. Supply Chain Management, 12: 96.