

Lean Manufacturing Approach and Operational Efficiency of Nigerian Pharmaceutical Companies in Anambra State

Chizoba Bonaventure Okolocha^{1*}, Chika Clara Anugwu Ph.D¹

¹Department of Entrepreneurship Studies, Nnamdi Azikiwe University, Along Enugu-Onitsha Expressway, Ifite Road, 420110, Awka, Nigeria

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*Corresponding author: Chizoba Bonaventure Okolocha

Department of Entrepreneurship Studies, Nnamdi Azikiwe University, Along Enugu-Onitsha Expressway, Ifite Road, 420110, Awka, Nigeria

Abstract

This study validates the relevance of Lean strategy in Nigerian pharmaceutical companies in Anambra State. Specifically, the study ascertained the effect of lean manufacturing approach on efficiency of pharmaceutical companies in Anambra State and determine the effect of lean manufacturing approach on competitiveness of pharmaceutical companies in Anambra State. The study adapted a descriptive survey research design since the study is to distribute questionnaires to the respondents. The population of the study consists of 80 staff of 6 selected pharmaceutical companies in Anambra State. Data were collected through the questionnaires administered to respondents. T-test statistical tool was used to test the two hypotheses with the aid of SPSS version 20.0 at 5% level of significance. The study revealed that lean manufacturing approach has effect on operational efficiency of Pharmaceutical Companies in Anambra State. Findings of the study provided support that lean contributed in integrated value chain supply and competitiveness in manufacturing companies. Therefore, the study concluded that lean manufacturing approach has effect on efficiency and competitiveness of pharmaceutical companies in Anambra State. Based on the findings, the study recommended that manufacturing companies should strive to adopt lean thinking approaches, principles and practices so as to reduce inherent variations with suppliers and demand from customers for greater effectiveness of the company.

Keywords: Lean manufacturing approach, Efficiency and Competitiveness.

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INTRODUCTION

Today's business environment is highly volatile and as such the life span of products and services offerings to the market is highly reduced as a result of increased competition from rivals. In the face of these modern realities, it has become crucial for organizational managers to adopt practices and strategies to combat effectively so as to sustain fair performance levels that will ultimately yield to the bottom line of their establishments. Production processes involving flexibility, reduced operation costs, minimized wastages on human and non-human resources invariably determine to a great extent the effectiveness of any given organization (Onwughalu, Okeke & Henry-Chibor, 2017). With the continuous advancement in technology around the world, globalization has been institutionalized through the

emphasis on the knowledge and usage of telecommunication, satellite and internet facilities and services. Technologizing trade has compressed the world to what a Canadian scholar, Marshal Mchihan, called the "global village" in (Udeze, 2012). The recommendation of free-trade has popularized trade that in the recent times many economies now depend largely on trade; people daily consume in large quantities, products made in their nations and other nations. To a large extent, countries now depend on one another for goods and services. More business organizations evolve as international trade and transactions became popular; thus increased global competitiveness which has forced firms to look for measures to improve performance while sustaining competitiveness (Udeze, Ugbam & Ugwu, nd).

The concept of lean manufacturing is increasingly gaining a global prominence both in theory and in practice across several sectors like the Automobile, Manufacturing, Construction and the Service sector. The reasons adduced for this development are obvious: firms want to optimize values, gain and sustain competitive advantage in the intensely competitive global economic space (Grant, 2010). Indeed, the increasing level of competition is driving firms to seek survival strategies, to keep abreast of the changing economic landscape, as well as stay competitive (Amin & Karim, 2013). The Lean Manufacturing System (LMS) gained prominence after the work of Womack and Jones in 1990 on the book —The machine that changed the world which explained how the Toyota company imbibed and recorded tremendous success from the adoption of the Toyota Production System (TPS) which is also known as the LMS (Amos, Adebola, Asikhia & Abiodun, 2018).

In the recent years, many manufacturing and service companies have been challenged to increase their focus on quality of products and customer satisfaction; putting into consideration the challenges of global competition, many organizations have been compelled to find ways of reducing costs, improving quality and meet the ever changing needs of a more informed class of customers. Womack and Jones (2003) discussed the reasons why organizations are trying to copy TPS and applying Lean thinking in their own environments. The top five business factors according to these authors are continued pressure to improve operational performance, maintain competitive advantage in price and service, pressure to improve profit, customers demanding shorter order-cycle times and customers demanding reduced prices. So by adopting lean production practices, some of these objectives are met. Studies have been inconclusive on how the lean system affects the operational efficiency of firms adopting it. Several researchers have investigated the nexus between Lean Manufacturing System and efficiency, especially in organizations that are manufacturing based. Evidence obtained from extant reviews of literature pointed out unanimous support for the notion that lean manufacturing supports Manufacturing Efficiency (Okpala, 2013, Wince-Smith, Echevarria and Allen, 2013). Amos, Adebola, Asikhia, and Abiodun (2018) discovered that a positive and a significant relationship exist between the Lean Manufacturing System (LMS) and the operational efficiency of the system. Onwughalu, Okeke, and Henry-Chibor (2017) documented that lean practices adopted had significant relationship with minimized variations associated with suppliers, processing time and demand; thus concluded that lean manufacturing principles and tools help to achieve leanness in operations hence eliminating several forms of wastes. On the other hand, Moneme (2016) concluded that Lean business strategy is a management technique that supports manufacturing firms to fundamentally

reposition their business processes to optimize resources, cut operational costs, become responsive, and customer focused. To this end, Lean business strategy has been considered as a management technique that has the potential to support Nigerian manufacturing firms to fundamentally reposition their business processes to optimize resources, cut operational costs, become responsive, flexible and customer focus. Therefore, this study validates the relevance of Lean strategy in Nigerian Pharmaceutical companies in Anambra State. The specific objectives include;

1. To ascertain the effect of lean manufacturing approach on efficiency of Pharmaceutical Companies in Anambra State.
2. To determine the effect of lean manufacturing approach on competitiveness of Pharmaceutical Companies in Anambra State.

Review of Related Literature

The history of Lean business strategy can be traced back to Henry Ford who invented a Mass Production system that first integrated an entire production processes. Mass production is the production of large amounts of standardized products, especially on assembly lines. Replacing craft production, mass production dramatically lowered manufacturing costs and time for most products in all types of industries. However, over the years, customers' needs changed and the market required more product varieties and the mass production was unable to meet the new demands of the market. Contrary to the advantages gained from mass production, it is considered inflexible way of production, because firms now need to compete on product differentiation, product quality, price, delivery performance, and time for development so that they can introduce new and improved products to the market (Moneme, 2016). Atkinson (2004) defined the Lean system as a concept, a process, a set of tools, techniques and methodologies that allows for successes in bringing about effective resource allocation. He argues that although lean manufacturing is a cost reduction mechanism, this should not be the sole aim of adopting the lean strategy else it will never take its rightful role as a preventive methodology. According to Amin and Karim (2013), a lean manufacturing system is defined as a multi-dimensional approach that includes a variety of effective manufacturing practices, such as just-in-time (JIT), Total Quality Management (TQM), standard work processes, work groups, manufacturing cells, Total Productive Maintenance (TPM), and supplies involvement in an integrated environment.

Lean manufacturing has become a widely recognized philosophy that aims at reducing waste and non-value added activities to improve performance in cost-efficiency, conformance quality, productivity and reduce inventory levels and throughput times (Deflorin & Scherrer-Rathje, 2012). Therefore, a lean manufacturing system is a manufacturing system that aims at achieving more with less in such a way that

value is optimized for the customer, organization, suppliers, and the society at large (Amos, 2018). Manufacturing firms across the globe are faced with the challenge of managing waste and sustaining the operational efficiency of their system. Openda (2013) assert that the operational performance of the manufacturing or service sector is greatly affected by the manufacturing practices adopted which can either result in strategic gain or strategic loss for the firm. The Lean Manufacturing System (LMS) is a Japanese concept which started off initially with the work of Ford when he first designed his production line for the model T- Ford but became known after the success story of Toyota which led to the adoption of the Toyota Production system as an alternative name for the LMS (Womack & Jones, 1996). The LMS was introduced as an alternative to mass production technique in the Toyota factory which gave rise to increased productivity, improved quality, and greater flexibility, with minimum waste in the production system. The implementation of lean practices involves using less of everything (raw materials, labour, time and other resources) in an optimal manner to improve the production system (Oliver, Delbridge, & Lowe, 1996).

Lean means the improvement of value of products while eliminating as much waste as possible during production. Lean is a management philosophy that frowns at waste and promotes value during production. By “value”, it mean any product a consumer derives utility from enough to make him willing to pay for it (Vengopal & Yadhu, 2003). Lean theory is a process of reform that showcases principles that help any organization to cut down on wasteful expenditures, wasteful usage of time, workers and other organizational resources during production. When lean principles are incorporated in the processes of any firm (be it manufacturing or service oriented firm), it disciplines the system into having zero tolerance for unnecessary wasteful and non-value adding decisions, activities, programmes that could only result to high production costs and thereby limit the profitability and productivity of the firm (Petersen, 2009). However, organizational leanness involves series of activities where waste and non-value added (NVA) operations are being eliminated as much as possible from the entire production process, starting from the beginning to the end of production; that is from product planning and design, through the procurement of raw material up unto the end of the supply chain; with the aim of improving the value added (VA) process within the organization (Vengopal & Yadhu, 2003). Although management of many organizations is aware of the great value added to their organizations through leanness, they are yet to take the huge step from merely having the knowledge to implementing it in their supply chain.

Organizational efficiency implies that organizations achieve their production goals within the

lowest cost possible as they maximize the available resources. A good number of studies on organizational efficiency have shown that several factors improve or work against efficiency in organizations: Quality controls, profitability, organizational performance and productivity, which are in one way or the other related to staying, thinking and going lean. The efficient performance of every organization (in the amount of profit regenerated, the market share it has, sales volume, product quality and its competitiveness) is determined by the methodology, processes, philosophy and strategies adopted and approved by its management (Ahrens, 2006). Organizations are charged to ascertain spot areas in their supply chain where waste can be identified in form of time, costs or inventory and using unnecessary resources, which can be measured in Naira time or raw materials, in order to create leaner supply chain.

Organizational supply chain will only be successful if it is effectively integrated; hence a process which involves thorough monitoring and frequent review should be in place to ensure supply chain success. Integrating lean supply chain ensures that lean supply chain objectives are consideration of advancements in technology to improve the supply chain, to get rid of all waste in the supply chain so as to give reasonable room for only value, customer usage visibility to all members of the supply chain. However, some study like; the study of Amos, Adebola, Asikhia, and Abiodun (2018), examined how the implementation of Lean Manufacturing System (LMS) affects the operational efficiency of a leading company in the F&B industry (Nestle Nigeria Plc.). The study employed the usage of Data Envelopment Analysis (DEA) to access the operational efficiency of the system. It was discovered that a positive and a significant relationship exist between the Lean Manufacturing System (LMS) and the operational efficiency of the system. Onwughalu, Okeke, and Henry-Chibor (2017) ascertained the effect of lean production among selected manufacturing organizations in Port Harcourt, Rivers State. Using regression analytical the study revealed that lean practices adopted had significant relationship with minimized variations associated with suppliers, processing time and demand; thus concluded that lean manufacturing principles and tools help to achieve leanness in operations hence eliminating several forms of wastes. On the other hand, Moneme (2016) ascertained the influence of Lean Business Strategy on Performance of Nigeria’s Manufacturing Sector. Regression Analysis was used to determine the influence of Lean Business Strategy on Nigerian Manufacturing Sector Performance. It was concluded that Lean business strategy is a management technique that supports manufacturing firms to fundamentally reposition their business processes to optimize resources, cut operational costs, become responsive, and customer focused.

METHODOLOGY

Research Design

A research design is a master plan, specifying the methods and procedures for collecting and analyzing the required information. The study adopted a descriptive survey research design since the study is to distribute questionnaires to the respondents.

Population and Sample of the Study

The population of the study consists of 80 staff of 6 selected pharmaceutical companies in Anambra State using purposive sampling technique. This figure is summarized in Table 1 below.

Table 1: Pharmaceutical Companies in Anambra State

S/N	Pharmaceutical firms	Staff Numbers
1	Gauze pharmaceuticals and laboratory limited, Awka	10
2	Joez Pharmaceuticals Nigeria Ltd, Awka	11
3	Juhel Nigeria Ltd, Awka	7
4	Bichan Pharmacy Ltd, Awka	10
5	New Divine Favour Pharmaceuticals, Nkpor	14
6	Chez Resources Pharmaceuticals Limited, Onitsha	28
	Total	80

Data were collected through the questionnaires administered to respondents. The researchers used response options of 5 point scale. The total number of items in instrument with 2 sections made up of 8 items measuring leanness manufacturing approach. It was developed under 5 point scale response options of strongly agree, agree, neutral, disagree and strongly disagree.

Method of Data Analysis

To test the effect of the independent variable and dependent variables, t-test statistical tool was used to test the two hypotheses with the aid of SPSS version 20.0. at 5% level of significance.

Data Analysis and Results

Table 2: Summary of the Data Collected Respondents

No	Statements	Response Options				
		(SA)	(A)	(N)	(D)	(SD)
1.	Leanness ensures organizations achieve their production goals within the lowest cost possible	24	30	3	17	6
2.	Leanness help organization to cut down on wasteful expenditures	32	32	0	16	0
3.	Lean bring about quality controls, organizational performance and productivity	22	36	2	13	7
4.	It allows for successes in bringing about effective resource	24	31	0	14	11
5	Integrating lean supply chain ensures consideration of advancements in technology to improve the supply chain	34	33	3	7	3
6	Lean Integration gives reasonable room for only value, customer usage visibility to all members of the supply chain.	22	39	0	16	3
7	Leanness encourage frequent review to ensure supply competitiveness	32	34	2	10	2
8	There is room for waste reducing and non-value added activities to improve performance in cost-efficiency	28	27	2	15	8

Hypothesis One

Ho: Lean manufacturing approach has no effect of on efficiency of Pharmaceutical Companies in Anambra State.

Table 3: One-Sample Test

Questions	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
1 Lowest cost possible	3.108	4	.036	16.00000	1.7074	30.2926
2 cut down wasteful expenditures	2.236	4	.089	16.00000	-3.8666	35.8666
3 Quality control	2.663	4	.056	16.00000	-.6818	32.6818
4 Effective Resource allocation	2.987	4	.040	16.00000	1.1259	30.8741

The tables above revealed the extent lean manufacturing approach affect efficiency of an organization. The result shows that leanness ensures organizations achieve their production goals within the lowest cost possible, and allow for successes in bringing about effective resource are statistically significant, while cutting down on wasteful expenditures and bring about quality controls, organizational performance and productivity are not statistically significant. This means that leanness dwell more in minimizing cost and

ensuring effective allocation of resources to achieve efficiency in a company. Therefore, the study concluded that lean manufacturing approach has effect on efficiency of Pharmaceutical Companies in Anambra State.

Hypothesis Two

Ho: effect of lean manufacturing approach on competitiveness of Pharmaceutical Companies in Anambra State.

Table 4: One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
5. Advancements in technology	2.227	4	.090	16.00000	-3.9441	35.9441
6. Room for only value, customer usage visibility	2.274	4	.085	16.00000	-3.5340	35.5340
7. Encourage frequent	2.254	4	.087	16.00000	-3.7108	35.7108
8. Waste reducing and non-value added activities	3.120	4	.036	16.00000	1.7614	30.2386

The tables above revealed the extent lean manufacturing approach affect efficiency of an organization. The analysis shows that room for waste reducing and non-value added activities to improve performance in cost-efficiency is statistically significant, while Leanness encourage frequent review to ensure supply competitiveness, room for customer usage visibility to all members of the supply chain and ensures consideration of advancements in technology to improve the supply chain and productivity are not statistically significant. The result shows that lean contributed in integrated value chain supply and competitiveness in manufacturing companies. Therefore, the study concluded that lean manufacturing approach has effect on competitiveness of pharmaceutical companies in Anambra State.

CONCLUSION

The apparent escalating cost of production and scarcity of resources resulting from recent decrease in price and supply of oil has buttressed the need for Lean business strategy as an ideal strategic option to confront the conflicting problems facing the sector. Therefore, this study validates the relevance of Lean business strategy in Nigerian manufacturing sector and revealed that the successful lean implementation facilitates the manufacturing sector quest for achieving competitive advantage by limiting waste, improve manufacturing processes, increased productivity and equipment utilization, and achieve sustainable growth by creating synergistic value streams across a manufacturing environment.

The study found that lean manufacturing approach has a statistically significant effect on efficiency of Pharmaceutical Companies in Anambra

State. Also that lean contributed in integrated value chain supply and competitiveness in manufacturing companies. Therefore, the study concluded that lean manufacturing approach has effect on efficiency and competitiveness of pharmaceutical companies in Anambra State. Based on the findings, the study recommended that manufacturing companies should strive to adopt lean thinking approaches, principles and practices so as to reduce inherent variations with suppliers and demand from customers for greater effectiveness of the company.

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