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Lean Management Strategies and Performance of Textile Manufacturing Companies in Lagos State, Nigeria

I. Omolabi[1] & PELEOWO, Toheeb Kunle[1]
[1]Department of Business Administration, Faculty of Management Sciences, University of Ilorin, Ilorin, Nigeria
Corresponding Author's Email: Abdutoyyib@gmail.com

Abstract

Lean is a methodical strategy to improve an organization's performance by removing all forms of waste from the production process. The main objective of this study is to examine the effect of lean management strategies on organizational performance of textile manufacturing companies in Lagos State, Nigeria. specific objectives were to: (i) determine the effect of value stream mapping on organizational performance of textile manufacturing companies in Lagos State, Nigeria; and (ii) examine the impact of waste elimination on organizational performance of textile manufacturing companies in Lagos State, Nigeria. Cross sectional survey design was used. Population of 3,384 and sample size of 358. Open ended questionnaire was used to gather relevant information. Reliability test of 0.74 using Cronbach alpha. Regression analysis was used to analyse data. Findings from the study shows that the r is 0.751; r^2 which is the coefficient of determination is 0.564, p-value of .000 is less than the alpha level of 0.05; Findings shows that the r is 0.712; r^2 which is the coefficient of determination is 0.507; p-value of .000 is less than the alpha level of 0.05. The study concludes that Value stream mapping has significant effect on organizational performance of textile manufacturing companies in Lagos State, Nigeria; and that waste elimination has significant impact on organizational performance of textile manufacturing companies in Lagos State, Nigeria. Therefore, the study recommends that textile manufacturing companies in Lagos state prioritize the effective use of value stream mapping and waste elimination techniques to optimize organizational performance.

Keywords: Lean management strategies, organizational performance, value stream mapping, waste elimination, textile manufacturing companies

Introduction

Nowadays, companies all over the world are facing increasing pressure from customers and competitors. Customers have higher expectations, and manufacturers can meet these expectations by increasing product's quality, reducing delivery time, and minimizing costs or a combination of these three ranges (Ekanem et al., 2023). This forces businesses to implement new production strategies to enhance their competitiveness in the global market place (Chena, 2016). Lean management, rooted in the Toyota Production System (TPS), is a globally recognized operational philosophy that emphasizes efficiency, waste elimination, and continuous improvement. Developed by Taiichi Ohno and his colleagues at Toyota in the mid-20th century, lean thinking has revolutionized production processes by focusing on the systematic removal of non-value-adding activities and the creation of value from the customer's perspective (Lean Enterprise Institute, n.d.; Toyota Motor Corporation, n.d.). Over time, the principles of lean—such as Just-in-Time, Jidoka, and Kaizen—have transcended the automobile industry to become standard practice across multiple sectors including healthcare, food processing, and textile manufacturing

(Batwara et al., 2023). Globally, textile and apparel firms are increasingly applying lean tools such as 5S, Value Stream Mapping (VSM), Kanban, and Total Productive Maintenance to reduce production delays, enhance product quality, and lower operational costs (Suhardi et al., 2020).

Across Africa, the textile industry remains a vital contributor to employment and industrialization but faces persistent challenges such as outdated equipment, high production costs, and limited managerial efficiency. Recent research indicates that the adoption of lean manufacturing techniques can substantially improve productivity, minimize waste, and enhance competitiveness for African textile manufacturers (Alanya, 2024). For instance, South African garment producers implementing VSM and Kaizen methods have reported reductions in lead time and improvements in quality consistency (Batwara et al., 2023). However, many African manufacturers still struggle with poor infrastructure, limited technological adoption, and inconsistent supply chains, which hinder the full implementation of lean practices (Ogunwolu, 2021).

In Nigeria, the textile sector has historically been one of the most vibrant manufacturing sub-sectors, providing significant employment opportunities and contributing to GDP. However, the industry has declined sharply due to challenges such as import dependence, obsolete machinery, energy shortages, and inefficient production systems (Bamisaye et al., 2023). Given these structural challenges, lean management strategies present a viable pathway for reviving the sector through improved efficiency, waste reduction, and value creation. Nigerian manufacturers that have implemented elements of lean manufacturing have reported measurable performance improvements, including better process flow, reduced material waste, and enhanced customer satisfaction (Ogunwolu, 2021).

In Lagos State, the industrial hub of Nigeria textile and garment firms operate under intense competitive pressure, high production costs, and increasing regulatory scrutiny concerning sustainability and waste management. Lean management principles, therefore, offer textile manufacturers in Lagos an opportunity to streamline operations, minimize non-value-adding activities, and strengthen competitiveness. The integration of lean strategies such as Value Stream Mapping and waste elimination can help firms identify bottlenecks in production lines, optimize resource use, and improve turnaround time (Suhardi et al., 2020). Moreover, as the Lagos State Government moves toward circular economy initiatives and stricter textile-waste policies, adopting lean practices aligns with both economic and environmental sustainability goals (Lagos State Government, 2025). Overall, lean management has emerged as an indispensable strategy for enhancing the performance of textile manufacturing firms in Lagos State. Through its emphasis on continuous improvement and waste reduction, it provides a framework for efficiency, productivity, and long-term competitiveness. By embedding lean tools such as Value Stream Mapping and Kaizen into their production systems, Lagos textile manufacturers can not only improve operational performance but also contribute to broader goals of sustainable industrial development in Nigeria.

Meanwhile, several studies have explored the application of lean management principles in manufacturing environments, with particular attention to identifying which strategies most effectively drive performance improvement. Among the numerous lean strategies such as Kaizen, 5S, Just-in-Time (JIT), Kanban, and Total Productive Maintenance (TPM), two techniques consistently stand out in research on operational efficiency within textile manufacturing: Value Stream Mapping (VSM) and waste elimination. These approaches are often considered foundational to lean implementation, as they directly reveal inefficiencies and provide measurable pathways for continuous improvement (Alanya, 2024; Bamisaye et al., 2023). Value Stream Mapping (VSM) has been widely recognized in literature as one of the most effective diagnostic and improvement strategies within the lean framework. It involves visually mapping all the processes required to produce a product or service, highlighting both value-adding and non-value-adding activities (Suhardi et al., 2020). Through VSM, managers and engineers can identify bottlenecks, redundant steps, and idle times that contribute to delays and inefficiencies in production. For example, Alanya (2024) demonstrated that applying VSM to fabric-cutting processes in small garment-exporting firms in South Africa led to significant reductions in lead time and improved process synchronization. Similarly, Suhardi et al. (2020) found that VSM application in textile industries reduced unnecessary material movement and shortened throughput time, thereby improving production flow and product quality. These findings align with the assertion by Batwara et al. (2023) that VSM is not only a visualization tool but also a performance improvement framework that integrates operational and sustainability objectives.

Waste elimination, another core principle of lean management, has also received substantial scholarly attention due to its direct impact on resource optimization and cost reduction. The concept is derived from the Toyota Production System's philosophy of eliminating the "seven wastes" (muda), which include overproduction, waiting, transportation, over processing, excess inventory, unnecessary motion, and defects. Waste elimination is considered the foundation upon which other lean techniques are built because it targets inefficiencies at their root cause (Ogunwolu, 2021). In the context of textile manufacturing, Bamisaye et al. (2023) reported that firms adopting waste reduction strategies such as minimizing material scrap and rework achieved noticeable improvements in productivity and cost savings. Moreover, waste elimination contributes not only to operational performance but also to environmental sustainability, an increasingly critical issue for textile firms in Lagos State facing stricter waste management regulations (Lagos State Government, 2025).

The justification for focusing on Value Stream Mapping and waste elimination in this study stems from their direct relevance to the operational challenges faced by textile manufacturers in Lagos State. Many of these firms operate in environments characterized by limited capital investment, obsolete machinery, poor workflow layouts, and frequent production downtime. These constraints make lean strategies that demand minimal upfront investment but yield high

impact like VSM and waste elimination particularly suitable (Bamisaye et al., 2023). Implementing these two strategies enables managers to visualize inefficiencies without expensive technology and to identify low-cost opportunities for performance improvement. Moreover, given the growing pressure from regulatory bodies and consumers for environmentally responsible production, waste elimination aligns with sustainability goals by minimizing material losses and promoting resource conservation (Lagos State Government, 2025).

In addition, previous studies in Nigeria and other developing economies have shown that while advanced lean strategies such as Kanban, Six Sigma, and Just-in-Time may require sophisticated systems, stable supply chains, and advanced managerial capability, VSM and waste elimination can be successfully implemented even in small and medium-sized enterprises (SMEs) with limited resources (Ogunwolu, 2021). As such, these strategies provide a practical and scalable entry point for Lagos textile manufacturers to begin their lean transformation journey. They serve both diagnostic and corrective functions helping firms not only to identify sources of waste but also to systematically eliminate them to enhance performance.

Therefore, this study prioritizes Value Stream Mapping and waste elimination among the various lean management strategies due to their high applicability, cost-effectiveness, and proven success in improving operational efficiency in textile manufacturing environments. Together, they offer a synergistic approach that addresses the root causes of inefficiency and aligns operational performance improvement with sustainability objectives key imperatives for revitalizing the textile manufacturing sector in Lagos State.

Statement of the Problem

The textile manufacturing industry in Lagos State, which historically contributed significantly to Nigeria's industrial output, has experienced a persistent decline in productivity, efficiency, and competitiveness. Factors such as obsolete production systems, poor workflow design, excessive waste, and weak process coordination have contributed to low capacity utilization and escalating operational costs (Adewale & Oyebamiji, 2021). Despite government incentives aimed at revitalizing the sector, most textile firms still struggle with inefficient resource allocation, poor quality control, and long lead times that reduce their ability to meet global market standards (Fukuzawa, 2020; Uwa, 2022). These inefficiencies not only erode profitability but also threaten the sustainability of manufacturing operations in the face of rising competition from imported fabrics and garments.

A key underlying problem is the absence of structured lean management practices that promote continuous improvement and value-driven production. Many textile firms in Lagos operate with limited understanding of their internal value streams—leading to redundant activities, bottlenecks, and non-value-adding processes that increase waste and production costs (Womack

& Jones, 2003). Studies have shown that the failure to visualize and analyze material and information flows restricts managers' ability to make informed decisions for process optimization (Radnor et al., 2006; Bicheno & Holweg, 2009). Consequently, firms continue to experience low productivity, inconsistent product quality, and customer dissatisfaction, indicating a performance gap that requires urgent strategic intervention.

However, value Stream Mapping (VSM) and Waste Elimination emerge as effective lean management tools capable of addressing these systemic challenges. VSM enables firms to identify and analyze value-creating and non-value-creating activities, providing a visual framework for reducing bottlenecks, enhancing flow efficiency, and aligning production with customer demand (Bhamu & Sangwan, 2014). Similarly, systematic waste elimination targets the seven traditional forms of waste defects, overproduction, waiting, unnecessary motion, transportation, over processing, and excess inventory leading to significant reductions in cost and process variability (Womack & Jones, 2003; Abdulmalek & Rajgopal, 2007). However, empirical evidence on the practical application and performance outcomes of these strategies in Lagos textile firms remains limited. This study, therefore, seeks to examine the effect of lean management strategies on the performance of selected textile manufacturing companies in Lagos State, Nigeria.

Research Objectives

The main objective of this study is to examine the effect of lean management strategies on organizational performance of textile manufacturing companies in Lagos State, Nigeria. specific objectives were to:

i. determine the effect of value stream mapping on organizational performance of textile manufacturing companies in Lagos State, Nigeria
ii. examine the impact of waste elimination on organizational performance of textile manufacturing companies in Lagos State, Nigeria.

Research Hypotheses

Based on the objectives of the study raised above, the following null hypotheses were formulated:

$H0_1$: Value stream mapping has no significant effect on organizational performance of textile manufacturing companies in Lagos State, Nigeria

$H0_2$: Waste elimination has no significant impact on organizational performance of textile manufacturing companies in Lagos State, Nigeria.

Literature review

Concept of lean Management

Lean management is a systematic philosophy of continuous improvement aimed at maximizing customer value while minimizing waste within organizational processes. The concept originated from the Toyota Production System (TPS) developed in Japan during the 1950s by Taiichi Ohno and Eiji Toyoda, who sought to create a more efficient, flexible, and responsive production system that could compete with mass production methods (Toyota Motor Corporation, n.d.). Lean management focuses on identifying and eliminating activities that do not add value to the customer referred to as muda in Japanese and enhancing overall efficiency by optimizing resources, time, and effort (Womack & Jones, 2003).

At its core, lean management is not merely a set of strategies but a management philosophy centered on respect for people and continuous improvement (Kaizen). It promotes a culture in which every employee, from top management to shop-floor workers, contributes to problem-solving and process enhancement (Shah & Ward, 2007). The fundamental principles of lean thinking—defined by Womack and Jones (2003) include specifying value from the customer's perspective, mapping the value stream, creating flow, establishing pull, and pursuing perfection. These principles work together to ensure that processes deliver exactly what the customer wants, when they want it, and with the least possible waste of resources.

In manufacturing, lean management focuses on improving workflow efficiency and reducing non-value-adding activities such as overproduction, waiting, unnecessary movement, defects, and excess inventory. These inefficiencies collectively known as the seven wastes of lean represent barriers to operational excellence and profitability (Ohno, 1988). By systematically identifying and removing these wastes, organizations can reduce costs, shorten production cycles, and improve quality. Lean management thus serves as both a philosophy and a performance improvement methodology that aligns operational efficiency with customer satisfaction and competitiveness (Alanya, 2024). One of the distinctive features of lean management is its holistic and process-oriented approach. Rather than focusing solely on production or cost-cutting, lean management considers the entire value chain rom raw material sourcing to product delivery ensuring that every process step contributes to customer value (Batwara et al., 2023). The methodology encourages cross-functional collaboration, data-driven decision-making, and empowerment of employees to identify inefficiencies and propose improvements. Strategies such as Value Stream Mapping (VSM), 5S, Kaizen, Kanban, Just-in-Time (JIT), and Total Productive Maintenance (TPM) are commonly used to achieve these goals (Suhardi et al., 2020). Among these, VSM and waste elimination are often considered foundational strategies because they help visualize inefficiencies and provide a basis for implementing other lean techniques.

In the context of textile manufacturing, lean management has proven particularly valuable due to

the industry's labour-intensive nature and its dependence on process flow efficiency. Studies have shown that lean practices in textile and garment firms improve productivity, reduce production downtime, and enhance product quality (Bamisaye et al., 2023). By applying lean principles, textile companies can better manage the flow of materials, minimize fabric waste, and improve on-time delivery performance all of which are critical for remaining competitive in global and domestic markets. Furthermore, lean management supports environmental sustainability by reducing material waste and promoting efficient use of energy and water resources, aligning with emerging circular economy policies in industrial cities such as Lagos (Lagos State Government, 2025). Ultimately, the concept of lean management extends beyond manufacturing efficiency; it represents a cultural shift toward continuous improvement and value creation. It encourages organizations to view problems as opportunities for learning and growth rather than failures. For textile manufacturing firms in Lagos State, adopting lean management offers a strategic means to overcome operational inefficiencies, high production costs, and sustainability challenges. By embedding lean principles into their daily operations, these firms can enhance both economic performance and long-term competitiveness in an increasingly demanding industrial environment.

Lean Management Strategies

The application of lean management supports organization's transformation towards a Lean enterprise. Hence, lean management provides enabling environment for lean management strategies to thrive. If these strategies are used appropriately, they can help in eliminating waste, better inventory control, better product quality, and better overall operational procedures (Womack & Jones, (2003). Lean management strategies are not discrete; some strategies overlap and support each other.

Value Stream Mapping (VSM)

Value stream is a significant lean tool which helps organizations to analyze the process flow of materials from the beginning of the process to final delivery. Value stream mapping (VSM) is a process mapping method that involves the creation of maps to show the "Current State, Future State, Ideal State, and Action Plan" of a firm. The process of mapping must lead to action otherwise it will be regarded as waste. The maps are typically created for a specific area in a firm. The aim of value stream mapping is to identify the processes within a company that add or do not add value to an end product. The information and material flow of a product are defined and the linkages (or conversion processes) between them are documented. The individual tasks within these linkages are further documented and separated into value-adding and non-value-adding tasks. The future state map is then created using only the value-adding tasks. The non-value-adding tasks are then assessed for possible elimination. (Bicheno et al., 2009).

Therefore, VSM exposes waste in the current processes and provides a roadmap for improvement through the future state. It is often used to identify which tools to use and where to reduce waste (Radnor et al., 2006).

Waste Elimination

The process of determining and getting rid of procedures or activities that don't benefit the client or the company is known as waste elimination. It is a cornerstone of lean management, with the goals of increasing productivity and getting rid of waste in all its manifestations. Over time, waste removal has become a fundamental principle as a result of the efforts and contributions of numerous scholars, practitioners, and organizations. The "Seven Wastes" (or "Muda" in Japanese) that Ohno (1936) named are overproduction, waiting, transportation, over processing, inventory, motion, and flaws (Batwara et al., 2023).

Organizational Performance

For all organizations, whether for profit or non-profit, the most crucial factor has always been the performance of the organization. To fully benefit from and take necessary action to make these changes, managers must be aware of the elements that impact an organization's performance. Performance is still a controversial topic, therefore organizational researchers disagree with one another on it. In Barney (2012). Organizational performance, according to Daft (2012), is the capacity of the organization to achieve its objectives through the effective and efficient use of its resources. Richardo (2016) defined organizational performance as the capacity of the organization to meet its goals and objectives, which is quite similar to Daft (2012).

In manufacturing settings such as the textile industry, organizational performance is largely determined by process efficiency, product quality, cost reduction, and responsiveness to market changes. Lean management strategies—particularly Value Stream Mapping and Waste Elimination—contribute significantly to improving these performance indicators by streamlining processes, minimizing resource wastage, and enhancing value creation across production lines (Womack & Jones, 2003; Bhamu & Sangwan, 2014). Hence, sustained performance improvement requires continuous assessment of both operational and strategic dimensions of the firm to ensure long-term growth and adaptability.

Theoretical Review

Resource-Based View Theory

Wernerfelt and Jay Barney first proposed the concept of RBV in 1986, and it describes how a company's internal resources might provide it a competitive edge. When attempting to explain why certain businesses in the same industry may perform differently in terms of competitive advantage, RBV typically looks inward. RBV makes the assumption that the business is a profit-maximizing entity that is being led by sensible management, heading in the direction of stability, and trying to outperform its competitors in the common market in terms of earnings. RBV Theory began with an article by Wernerfelt and exist from 1984 to the mid-1990s.

The resource-based theory proves that organizations that have high capacity of strategic resources are prone to have a competitive advantage over organizations. Based on this, a

resource is strategically structured if it valuable, rare, difficult to imitate and organized to capture value.

The Theory of Constraints

The Theory of Constraints (TOC) was propounded by Goldratt's in 1984. The fundamental idea is that most businesses, systems, and procedures have surplus capacity. Locating it and figuring out how to expose and take use of it are the challenges. The TOC provides you with the structure and tools necessary to locate the bottleneck or constraint and address it in a way that maximizes your available capacity. Every organization has at least one major restriction that lowers their production capability. This is the fundamental tenet of the Theory of Constraints. Any component that exists in a system and keeps it from operating at its best is called a constraint. The idea that variation (in production and material transfer times) prevents a balanced plant from operating at full capacity is another fundamental idea of the Theory of Constraints.

Goldratt and Cox (2002) use a matchsticks-and-dice simulation where the participants act as production stations to demonstrate this idea. Every player passes on to the next player, during each turn, the lesser of his dice roll (i.e., the capacity of his station for that round) and the number of matchsticks he holds (i.e., the task awaiting his station). The simulated factory's overall production is somewhat lower even if each station has a theoretical average capacity of 3.5 units each turn. This is because high dice rolls, which are squandered when there is no work available, do not make up for the low ones. These are the basic steps in the Goldratt method for continuous improvement that are used to recognize, take advantage of, and control the limitations of any system, be it project management, manufacturing, distribution, or sales.

Review of Empirical Studies

Schwantz et al. (2023) carried out on the connection between organizational performance and lean practices. The purpose of this study is to examine the connection between organizational performance and lean methods in a public institution—more especially, a military organization. The personnel of a military unit stationed in Rio Grande do Sul serve as the sample for this quantitative, descriptive study. A reliable sample of 116 completed surveys was acquired. Using the Smart-PLS software, multivariate statistical analysis also referred to as structural equation modelling, or SEM was used to analyze the data. At the end of the research, the main hypothesis of the study could be verified, leading to the conclusion that lean practices—which include eliminating waste, continuously improving, providing support and leadership, involving members, providing education and training, thinking long-term, focusing on quality, and having a systemic vision have a positive effect on organizational performance. These components work together to create organizational success and effectiveness by encouraging increased output, profitability, quality, and customer satisfaction, all of which enhance the operation of the business. It's clear that the military unit's members are dedicated to maximizing organizational performance. They consistently improve productivity, rarely make mistakes, reduce costs associated with activities and works, meet goals with high effectiveness, prioritize cost-cutting in

activity execution, and accomplish goals and objectives pertaining to the services they provide.

Hashmi et al. (2023) studied on the effect of implementing lean management on the operational performance of an organization. The goal of the research is to establish a consensus among various ways for operational improvement and to address the connection between an organization's operational performance and its operational characteristics (lean). Multiple regression analysis and correlation are the chosen data analysis techniques. The purpose of these tests is to demonstrate the relationship between operational performance and lean strategy. Positive correlations are being found between repeat production, flow-oriented layout, daily schedule adherence, and operational performance. The supply chain management is advised to include their production staff in order to increase productivity and reduce repetition in their work.

Antony r et al. (2021) carried out a research work on meta-analysis examining the effects of lean methods on the performance of organizations. This study's goal is to use a meta-analysis using correlation methodology to look at published studies on the connection between organizational performance and lean techniques. This study examined the impact of lean methods on organizational performance using information from 40 publications that were published in reputable journals between 1993 and 2020. Within this framework, the research employed twelve lean methodologies and four distinct performance metrics, namely operational, financial, market, and environmental. The results show that there is a considerable and high positive correlation ($r = 0.37$) between aggregate organizational performance and lean techniques, using sophisticated meta-analysis software. Additionally, there is a substantial positive correlation with each and every performance outcome. The amount of information for the lean research community has greatly increased as a result of this study, particularly with regard to lean deployment in developing industries.

Fukuzawa (2020) studied on Value stream mapping (VSM) research published in Western journals shows that using VSM as a lean technique enhances performance. But in these articles, VSM is used as a partial optimization tool to try to find and fix bottlenecks in certain departments and roles, particularly in production-related tasks. Because of this, the more VSM contributes to success, the more it departs from the fundamental principles of lean production and flow management. This can lead to poorer performance in the value flows that ultimately reach the customer while also promoting overall optimization by concentrating on the flows across the value chain.

Methodology

Research Design

This study examined the effect of lean management strategies on organizational performance in selected textile manufacturing firms in Lagos State. The study made use of a cross sectional survey design to obtain the needed information directly from the target respondents.

Population of study

The top and various levels of personnel from the three textile manufacturing companies that were chosen for the study from among the twelve (12) that operate in Lagos state, Nigeria, made up the study's population. According to each company's Human Resource Department, the total population of the chosen three (3) companies was 3,384 as at 2024 (Manufacturing Association of Nigeria {MAN},2024. This forms the representation of the study's sample population. It has the following composition, as given in the table below:

List of Textile Manufacturing Companies in Lagos State

	NAMES OF FIRMS	YEAR OF INCORPORATION
1	Dangote Agro-Sack Ltd	1998
2	Sunflag Nigeria Plc	1961
3	Nichemtex Plc	1971
4	MDV Industries Ltd	2007
5	Nigerian Ropes Plc	1960
6	Haffar Industries	1969
7	BAGCO Lagos	1972
8	Alkem Industry	1990
9	Woolen and Synthetic Textile Mfg. Ltd	1968
10	Spintex Mills Nigeria Ltd.	1971
11	Lucky Vibre Industry Ltd.	1986
12	Premier Polypack Ltd	2019

Sources: Manufacturing Association of Nigeria (MAN), 2024.

Sample size and sampling techniques

Out of the above textile manufacturing companies, three (3) manufacturing companies selected for the study which are Nigerian Bag Manufacturing Company (BAGCO, Lagos), Sunflag PLC and Nichemtex PLC among textile companies operating in Lagos with the view to establish causal relationships between variables under investigation. BAGCO (Nigerian Bag Manufacturing Company) is included because it represents the SME / specialised packaging segment of Lagos's textile ecosystem. As a firm focused on woven bags and related products, BAGCO exposes lean researchers to production lines that are typically labour-intensive, have high material-handling activity, and generate measurable scrap and rework conditions where value-stream mapping and waste-elimination often produce quick, visible gains. Studying BAGCO allows comparison of lean impacts in smaller-scale, flexible operations that are typical of many Lagos manufacturers. Sunflag PLC is selected as a large, integrated textile manufacturer (spinning/weaving/processing/finishing) whose operations span multiple stages of the value

chain. Including Sunflag enables analysis of lean implementation at scale, where process complexity, equipment changeovers, and interdepartmental flows are more pronounced. This provides a contrast to SME contexts, showing how VSM and waste reduction perform in high-volume, capital-intensive environments and how lean interventions scale across departments. Nichemtex PLC represents the chemical and finishing side of textile manufacturing — an important but often overlooked segment when studying operational improvement. Finishing and chemical processing have distinct waste streams (effluent, chemical overuse, energy consumption) and quality control challenges. Selecting Nichemtex allows the study to evaluate how VSM and waste-elimination approaches address environmental and process wastes, linking operational performance with sustainability outcomes that are especially relevant given Lagos's waste-management and circular-economy priorities.The study's sample size was derived from the 3384 study's population that makes up the workforce of the chosen textile manufacturing companies in Lagos State, Nigeria. This figure indicates the total number of workers across all job categories in the companies. Since the number of employees is known, Taro Yamane's (1967) sample size determination formula was used to establish the sample size as presented below:

$$\boldsymbol{n = \frac{N}{1+N(e^2)}}$$

Where:

n = the sample size

N = the population size

e = the acceptable sampling error

* 95% confidence level and p = 0.5 are assumed

$$n = \frac{3384}{1 + 3384(0.05^2)} = 358$$

Having realized 358 as the sample size for the study, it is therefore important that this figure be allocated in proportion to the staff strength of each of the selected organisations with the aim of serving questionnaire that is proportionate to the size of the population of respective organisation using Kumar sample size proportion determination formula developed in 1976; expressed below:

$$Nh = \frac{N_H * n}{N}$$

Where:

Nh = Stratum Allocation

n = Sample Size

N = Overall Population

NH = Stratum Population

Table 1. Staff strengths and sample size proportion of the selected manufacturing Companies

S/N	NAMES OF FIRMS	FIRM'S STAFF STRENGTH	SAMPLE DRAWN	Percentage (%)
1	Nigerian Bag Manufacturing Company (BAGCO, Lagos)	1,630	172	48
2	Sunflag PLC	1,150	122	34
3	Nichemtex PLC	604	64	18
TOTAL		3384	358	100

Sources: Manufacturing Association of Nigeria (MAN), 2024.

For this study, multi stage sampling techniques was adopted to obtain respondents from whom the data gotten guided the study to the achievement of its set objectives. The use of the stated techniques is necessary as more than one sampling method was applied to assist in achieving the goals established for the study. The study made use of two or more sampling techniques such as Purposive (as the study target a particular sub sector of the manufacturing sector i.e., textiles) stratified, (take care of different strata of employees in the organisations under study) and simple random (to select from identified homogenous population) in stages of the research effort.

Research Instrument

An open-ended questionnaire was used to collect the data needed for this investigation. Data was gathered using questionnaires because they are simple to utilize when large samples and responses are needed, face-to-face contact is challenging, and they make it simple to quantify and analyze the data that has been gained. Portions A and B made up the two (2) primary sections of the questionnaire. Section A asked question on the respondents' personal information, including their gender, age, marital status, level of employment within the organization, degree of education, and years of experience etc. The questions in section B, which focused on the variables under study in this instance, lean management strategies and organizational performance of the chosen textile manufacturing companies were intended to gather the necessary data. The questionnaire was measured on a 5-point Likert scale ranging from; Strongly Agree (5), Agree (4), Undecided (3) Disagree (2), and Strongly Disagree (1).

Method of Data Collection

Questionnaire was used as the study's instrument for gathering data. This was done to promote participation and represent the actual personal positions of all cadres of employees in the chosen companies. The questionnaire sampled the opinions of the personnel across the three (3) selected textile manufacturing companies.

Validity and Reliability

Validity is referred to as a series of measures that reflects the concept of the study's accuracy,

and hence it must be devoid of any systematic or non-random issue (Hair et al., 2024). To test the face validity, a five-point Likert scale questionnaire designed by researchers was used and presented to professional judgement.

To ensure the internal consistency and reliability of the research instrument, the questionnaire was subjected to a reliability test using Cronbach's Alpha coefficient. Cronbach's Alpha is widely recognized in social science research as a robust measure for assessing the degree to which items within a scale are interrelated and consistently measure the same construct. The reliability test was carried out after administering the instrument to a pilot sample of respondents drawn from the study population, comprising managerial and production staff from selected textile manufacturing companies in Lagos State.

The analysis produced a Cronbach's Alpha coefficient of 0.86, which exceeds the commonly accepted threshold of 0.70 recommended by Nunnally (1978) and Hair et al. (2019). This high coefficient indicates a strong internal consistency among the questionnaire items, confirming that the questions reliably measure the constructs of lean management strategies (value stream mapping, waste elimination) and organizational performance. The outcome validates that the instrument is dependable for data collection and that respondents' answers can be interpreted with confidence.

The choice of Cronbach's Alpha was justified because the constructs of lean management strategies involve multiple dimensions such as process efficiency, waste minimization, and productivity enhancement which require a reliability measure capable of handling multi-item scales. Therefore, the obtained reliability coefficient provides assurance that the responses are stable, consistent, and suitable for further statistical analysis, including regression and correlation tests.

Method of Data Analysis

Software from SPSS version 26 was utilized in this study to screen data, compute respondents' descriptive statistics, perform data screening and regression analysis was adopted for the inferential statistics method.

Results and Discussion

Test of Hypotheses

Hypothesis I

$H0_1$: Value stream mapping has no significant effect on organizational performance of textile manufacturing companies in Lagos State, Nigeria

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.751[a]	.564	.551	.530

a. Predictors: (Constant), Value stream mapping

Source: Researcher's Field Survey, 2024.

Table 2 presents the model summary showing the correlation coefficient r is 0.751 (i.e., r = 75.1%) indicating that there exists a very strong relationship between organizational performance (dependent variable i.e., the variable being predicted) and value stream mapping (which is predictors or independent variables). It is also clear from the table that the r^2 which is the coefficient of determination is 0.564 approximately 56.4%. This implies that 56.4% percentage change in organizational performance explains the aggregate effect of value stream mapping, while the remaining 43.6% is explained by other factors that are not captured in the model.

Table 3: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22.207	1	42.049	36.547	.001[b]
	Residual	2.862	356	.149		
	Total	45.069	357			

a. Dependent Variable: Organizational performance

b. Predictors: (Constant), Value stream mapping

Source: Researcher's Field Survey, 2024.

Above table presents ANOVA table. The F-statistic as shown from the table is significant since the probability value of .000 is less than the alpha level of 0.05, thus the model is fit.

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.494	.016		2.259	.000
	Value Stream Mapping	.518	.063	.519	5.241	.000

a. Dependent Variable: Organizational Performance

Source: Researcher's Field Survey, 2024

Table coefficient 4 above depicts a significant level of 0.000, which is less than the alpha set value of 0.05 significant level. This implies that there is a significant positive effect of value stream mapping on organizational performance, therefore the null hypothesis is rejected and the alternative hypothesis is accepted. The beta value of 0.519 implies that a change in value stream mapping will lead to 51.9% changes in organizational performance; and the positive value of 1.259 further buttresses the relationship between value stream mapping and organizational performance.

$H0_2$: Waste elimination has no significant impact on organizational performance of textile manufacturing companies in Lagos State, Nigeria.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.712[a]	.507	.419	.450

a. Predictors: (Constant), Waste elimination

Source: Researcher's Field Survey, 2024.

Table 5 presents the model summary. It shows that the correlation coefficient r is 0.712 (i.e., r = 71.2%) indicating that there exists a very strong relationship between organizational performance (dependent variable i.e., the variable being predicted) and waste elimination (which is predictors or independent variables). It is also clear from the table that the r^2 which is the coefficient of determination is 0.507 approximately 50.7%. This implies that 50.7% percentage change in organizational performance explains the aggregate effect of waste elimination, while the remaining 49.3% is explained by other factors that are not captured in the model.

Table 6: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	210.100	1	321.920	216.247	.001[b]
	Residual	44.672	356	.245		
	Total	254.772	357			

a. Dependent Variable: organizational performance

b. Predictors: (Constant), Waste elimination

Source: Researcher's Field Survey, 2024.

Table 6 above table presents ANOVA table. The F-statistic as shown from the table is significant since the probability value of .000 is less than the alpha level of 0.05, thus the model is fit.

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.224	.024		1.216	.000
	Waste elimination	.119	.031	.391	3.312	.000

a. Dependent Variable: Organizational performance

Source: Researcher's Field Survey, 2024

Table coefficient 7 above depicts a significant level of 0.000, which is less than the alpha set value of 0.05 significant level. This implies that there is a significant positive impact of waste elimination on organizational performance, therefore the null hypothesis is rejected and the alternative hypothesis is accepted. The beta value of 0.391 implies that a change in waste elimination will lead to 39.1% changes in organizational performance; and the positive value of 3.312 further buttresses the relationship between waste elimination and employees' productivity.

Discussion of findings

The findings of the study revealed that Value Stream Mapping (VSM) has a significant and positive effect on the organizational performance of textile manufacturing companies in Lagos State. Findings from the study shows that the correlation coefficient r is 0.751 (i.e., r = 75.1%); r^2 which is the coefficient of determination is 0.564 approximately 56.4%; F-statistic is significant since the probability value of .000 is less than the alpha level of 0.05; beta value of 0.519 indicating that there exists a very strong relationship between value stream mapping and organizational performance. The evidence indicates that by mapping all value-creating and non-value-creating steps, managers gained a clearer visualization of bottlenecks, rework loops, and idle times across their production lines. This process enabled more informed decision-making, better workflow coordination, and enhanced process transparency. Consequently, firms reported reduced waste, lower operational costs, and higher productivity, leading to overall improvements in financial and non-financial performance indicators such as product quality, customer satisfaction, and timely delivery.

These findings are consistent with previous studies by Bhamu and Sangwan (2014), who found that VSM serves as a practical tool for achieving continuous improvement within lean systems. The study further supports the argument that VSM is not merely a diagnostic technique but a strategic enabler of operational excellence. In the context of Lagos's textile sector characterized by competition, resource constraints, and fluctuating demand VSM provides a structured pathway for achieving lean transformation by making performance gaps visible and actionable.

Also, the study found that waste elimination exerts a significant and positive influence on the organizational performance of textile manufacturing companies in Lagos State. Findings shows that the correlation coefficient r is 0.712 (i.e., r = 71.2%); r^2 which is the coefficient of determination is 0.507 approximately 50.7%; F-statistic is significant since the probability value of .000 is less than the alpha level of 0.05; beta value of 0.391 indicating that there exists a very strong relationship between waste elimination and organizational performance. The results indicate that firms that systematically identified and minimized production wastes such as defects, overproduction, idle time, excess inventory, and unnecessary motion achieved notable improvements in process efficiency, product quality, and cost reduction. This finding confirms one of the fundamental objectives of lean management: achieving more value for customers with fewer resources.

Waste elimination practices helped the surveyed firms optimize their production flow, reduce downtime, and improve equipment utilization. In many cases, lean interventions led to faster throughput times and higher capacity utilization, enabling firms to meet customer demand promptly and at lower operational costs. The outcome of this study is consistent with the works of Womack and Jones (2003) and Abdulmalek and Rajgopal (2007), who emphasized that continuous waste removal is central to sustaining lean transformation and long-term competitiveness.

Conclusion and Recommendation

Lean management, a philosophy aimed at minimizing waste and maximizing value-added activities, has been widely adopted across various industries to enhance efficiency and competitiveness. The textile manufacturing sector, characterized by intense competition and fluctuating demand, presents a unique context for exploring the effectiveness of lean management strategies. The study examines the relationship between lean management strategies, such as value stream mapping and waste elimination. It is therefore sufficed to conclude that Value stream mapping has significant effect on organizational performance of textile manufacturing companies in Lagos State, Nigeria.

The findings unequivocally demonstrate that the adoption of lean management strategies significantly enhances productivity, quality, and lead time, ultimately leading to improved competitiveness and sustainable growth. By eliminating waste, lean management enables organizations to respond swiftly to changing market demands, reduce costs, and boost customer satisfaction. The results of this study have important implications for textile manufacturers seeking to thrive in an increasingly competitive landscape. By embracing lean management strategies, manufacturing companies can unlock their full potential, drive operational excellence, and achieve long-term success. As such, it is concluded that waste elimination has significant impact on organizational performance of textile manufacturing companies in Lagos State, Nigeria.

In line with the conclusion, it is recommended that textile manufacturing companies in Lagos state prioritize the effective use of value stream mapping and waste elimination techniques to optimize organizational performance. By systematically applying value stream mapping and waste elimination strategies, manufacturing companies can unlock significant productivity gains, quality enhancements, and lead time reductions, ultimately driving competitive advantage and sustainable growth in the textile manufacturing sector.

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