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WASTE REDUCTION PRACTICES AND SUSTAINABLE OPERATIONS OF FOOD AND BEVERAGE COMPANIES IN SOUTH-SOUTH NIGERIA

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ABSTRACT

The study investigated waste reduction practices and sustainable operations of food and beverage companies in South-South Nigeria. The specific objective is to examine the effect of lead time on customer satisfaction and examine the effect of waste reduction on commitment of food and beverage companies in South-South Nigeria. The researcher made use of primary source of data. The total population of the study was one thousand five hundred and ten (1510). The sample size was four hundred and twenty-nine (429) derived from Godden (2004) formula. A purposive sampling technique was adopted. Pearson correlation coefficient and regression model was used to test the hypotheses of the study. A total number of three hundred and fifty eight (358) questionnaire was administer to the respondents at the selected foods and beverage firms in South-South, Nigeria seventy-one (71) questionnaire were lost with the percentage ratio of 16.6%, while three hundred and fifty eight (358) questionnaire were retrieved with the percentage ratio of 83.4% which was suitable for the study to carry out the analysis. The findings of the study found out that there is a positive significant relationship between lead time on customer satisfaction of food and beverage companies in South-South Nigeria. Waste reduction has a significant effect on commitment of food and beverage companies in South-South Nigeria. The study concluded that organizations that adopt lean management practices often experience improved quality, increased efficiency, reduced costs, and higher customer satisfaction. The study recommended that food and beverage companies should reduce lead time by streamlining order processing, improving kitchen workflow, and using technology such as real-time tracking this will help to improve efficiency in the organization.

Keywords: *Lean, Waste Reduction, Lead Time, Sustainable Operations*

Introduction

Backfround of the Study

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, Akpan, Ekanem, & Edem, 2023). This forces businesses to implement new production strategies to enhance their competitiveness in the global market place (Chena, 2016). Lean is an integrated set of ideas, procedures, instruments, and methods that presupposes the use of all resources for any reason other than generating value for the final user. Organizations become more competitive, flexible, and responsive to customers when non-value added tasks are eliminated since they cut costs and cycle times (Alukal, 2023). Lean management is essential to the success of firms because of its ability to promote shared leadership and accountability as well as its dedication to promoting continuous development, which guarantees that every individual contributes to the advancement process. This management approach acts as a guide for building a strong and productive business that consistently advances, identifies and fixes actual issues, and, most importantly, maintains competitiveness (Uwa 2022).

Over the past three decades, lean management has been proven as a successful business strategy in achieving world-class manufacturing performance. Lean management is recognized as a business system that combines various lean tools to help identify and consistently eliminate waste to improve quality, flexibility, responsiveness, production time and reduce costs (Wilson, 2020). This is seen as a way for firms to create customer value to build and maintain the position of their products in competitive markets. That is carried out by integrating all business processes through the application of lean management strategies (Kennedy & Brewer, 2018).

Lean management has become a philosophy and even an ideology for the firms that want to achieve success. Lean management is referred to as an integrated socio-technical system in which its primary goal is to eliminate waste by reducing or minimizing internal variability, customers and suppliers (Shah & Ward, 2017). The key focus of the application of lean management is the creation of value through continuous improvement and eliminating waste (Womack & Jones, 2023). This will be enormously beneficial for the firm because that will create an effective and efficient production process, and enabling the firm to respond quickly to customer needs. Therefore, this study examined the effect of lean management on the sustainable operations of foods and beverage firms in South-South Nigeria.

Statement of the Problem

Despite increasing competition and changing consumer expectations, many food and beverage companies struggle to achieve optimal operational performance, often facing challenges such as long lead times, inefficient workflows, underutilized equipment, high levels of waste, and poor coordination of tasks. These inefficiencies reduce productivity, increase operational costs, and negatively affect customer satisfaction. While lean management principles have been shown to improve efficiency and sustainability in manufacturing and service sectors, their adoption in the food and beverage industry remains inconsistent and poorly structured. Antony, Manville, and Greatbanks, (2022) posited that there is a need to prescribe systematic lean management practices, including lead time reduction, workflow optimization, equipment capacity planning, waste minimization, pull-based work systems, and value stream mapping, to enhance operational performance. Without the integration of these lean strategies, food and beverage companies risk persistent inefficiencies, limited scalability, and reduced competitiveness in the market.

Food and beverage companies operate in highly competitive and dynamic environments where operational efficiency, cost control, and timely service are critical for business survival and growth. However, many of these companies face persistent challenges such as long lead times, inefficient workflows, underutilized or overburdened equipment, excessive waste, and disorganized task allocation. These operational inefficiencies often result in delays, increased costs, inconsistent product quality, and reduced customer satisfaction. The application in the lean management in food and beverage sector remains limited. Many companies have not fully integrated these practices into their operational processes, leading to suboptimal performance and limited sustainability. The food industry is one of the most dynamic and competitive sectors globally, driven by changing consumer preferences, technological advancements, and rising expectations for quality and timely service. Companies operating in this sector are under constant pressure to deliver high-quality products efficiently while minimizing operational costs and waste. Despite these pressures, many food and beverage organizations continue to face

significant operational challenges that limit their performance and competitiveness. The problem is further compounded by the lack of empirical studies that link lean management adoption to measurable performance outcomes in food and beverage companies. Existing research has predominantly focused on manufacturing and service industries, leaving a gap in understanding how lean strategies can specifically enhance productivity, reduce operational waste, improve equipment utilization, and streamline workflow processes in food and beverage operations. Without a clear framework for implementing lean principles, many organizations risk operational stagnation, reduced profitability, and diminished market competitiveness. It is against this backdrop that this study tends to the effect of lean management on sustainable operations of foods and beverage firms in South-South Nigeria.

Objectives of the Study

The broad objectives of the study examined waste reduction practices and sustainable operations of food and beverage companies in South-South Nigeria. The specific objective is to:

i. examine the effect of lead time on customer satisfaction of food and beverage companies in South-South Nigeria.
ii. examine the effect of waste reduction on commitment of food and beverage companies in South-South Nigeria.

Research Questions

i. What is the effect of lead time on customer satisfaction of food and beverage companies in South-South Nigeria?
ii. To what extent does waste reduction affect commitment of food and beverage companies in South-South Nigeria.

Research Hypotheses

Ho_1: There is no positive significant relationship between lead time on customer satisfaction of food and beverage companies in South-South Nigeria

Ho_4: Waste reduction has no significant effect on commitment of food and beverage companies in South-South Nigeria.

Review of the Related Literature

Conceptual Framework

Lead Time Management

According to Bloemer and Kasper (2015), lead time is the amount of time that elapses between placing an order and receiving it; however, Boulding et al. (2013) provide a more thorough definition, stating that lead time includes the following: order preparation by the customer; sending/order communication or placement; order receipt by supplier or provider; shipment; and customer receipt and verification of the receipt in comparison to the placement. When referring to the definition of the service organization, lead time is defined as the duration of time that a customer needs a service and submits a request to the service provider, the amount of time that organization officers spend processing the request, obtaining the resources required to provide the service, and the time invested in any additional tasks necessary to fulfil the client's request . Regular maintenance and significant or minor repairs may be requested at an auto repair shop.

Jezuita (2017) claims that "timely responsiveness to customer needs" is the best definition of being competitive on time. The word "timely" is stressed. This timely response to clients' quality, variety, and price needs. As the foundation of competitive advantage, it is suggested that the service provider focus on speed (responsiveness) while closely monitoring its subsequent impacts. This is because many services are time-

sensitive. Thus, an organization's creativity, variety, and price without responsiveness may only sometimes satisfy clients. The lead time notion can be linked to consumer perceptions of performance since it is evident that lead time is the time a customer has to wait between placing an order and receiving the order.

As defined by Cook and Thompson (2020), lead time is the interval between placing an order and receiving the ordered products. It depends on the product's characteristics, such as whether it is produced to order or off the shelf. Planning, supply chain management, logistics services, and the distance to suppliers and customers affect lead times. The idea of lead time management is familiar to the service industry. Several constraints affect the service lead time, including geographical restrictions and excessive and unspecified demand. An organization must make lead time reduction a part of its corporate strategy to cut lead times. Effective management techniques are crucial to reducing lead times for service providers since they will allow the business to handle lead times more effectively. There is no denying that lead time management significantly impacts customer satisfaction in any corporate setting, and everyone involved needs to comprehend this impact fully. The following are some main justifications for why lead time management is crucial. It provides a competitive edge for products and services. It plays a significant part in demand forecasting, directly influences customer satisfaction, and provides an alternative overview of business performance.

Waste elimination (MUDA)

Waste elimination is one of the most effective ways to increase the profitability of any business. Processes either add value or waste to the production of a good or service. The seven wastes originated in Japan, where waste is known as “muda." "The seven wastes" is a tool to further categorize “muda” and was originally developed by Toyota’s Chief Engineer Taiichi Ohno as the core of the Toyota Production System, also known as Lean Manufacturing. To eliminate waste, it is important to understand exactly what waste is and where it exists. While products significantly differ between factories, the typical wastes found in manufacturing environments are quite similar. For each waste, there is a strategy to reduce or eliminate its effect on a company, thereby improving overall performance and quality (Pettersen, 2019)..

Lean Waste Management

Lean is a way of achieving more with less resources, creating an organization that responds to greater flexibility with shorter lead time and where the focus is on the customer, both external and internal.

The principles and the opportunities are applicable irrespectively of industry or type of activity. It is all about “learning to see” and elimination of all various types of waste that is built into our systems, and to look at what is value creation for the customer. In principal, all organizations have major underutilized potentials. Now we have got to make use of it, and to stop the trend whereby all too many slip behind as it concerns long -term profitability and competitiveness. The key for success is to start a process whereby the knowledge and ideas of all employees is fully utilized, and driven by a Lean philosophy. Positive result will be achieved immediately. The Lean concept is a business strategy and should be practiced throughout the whole organization. It is practiced in widely different businesses such as manufacturing industry, healthcare and the service sector. The results are speaking for themselves. As from the first step, which may only cover a small

part, and every step there after.To fully exploit the competitive advantages of the Lean concept, all parts (both main and supporting processes) of the organization need to be included, as well as suppliers and customers from raw material to end user (Total value chain)

Objectives of Lean Waste Management

1. To explain how the basic elements of Lean Eliminate waste create flow and continuously improve operations
2. To assess the benefits of lean, as well as the difficulties in implementing lean systems
3. To analyse how the complementary concepts of lean and six sigma work together for process improvement
4. To construct and intrepret a value stream map
5. To create strategies for implementing lean in service industries
6. To use lean concepts and techniques to enhance environmental initiatives (Hanna, 2017).

Lean Value Chain

After the initial steps are taken by an organization in the implementation of the Lean philosophy into its own internal processes, it usually starts becoming apparent that there is an outside world, which is not quite aligned to your own activities. This is the time to address the outside world, suppliers and customers, and see how they can become part of the value chain approach and how they can be aligned in the same way the internal processes are aligned.

1. Overproduction

Simply put, overproduction is to manufacture an item before it is actually required. Overproduction is highly costly to a manufacturing plant because it prohibits the smooth flow of materials and actually degrades quality and productivity. The Toyota Production System is also referred to as "Just in Time" (JIT) because every item is made just as it is needed. Overproduction manufacturing is referred to as "Just in Case." This creates excessive lead times, results in high storage costs, and makes it difficult to detect defects. The simple solution to overproduction is turning off the tap; this requires a lot of courage because the problems that overproduction is hiding will be revealed. The concept is to schedule and produce only what can be immediately sold/ shipped and improve machine changeover/set-up capability (MacInnes, 2017).\.

2. Waiting

Whenever goods are not moving or being processed, the waste of waiting occurs. Typically more than 99% of a product's life in traditional batch-and -queue manufacture will be spent waiting to be processed. Much of a product's lead time is tied up in waiting for the next operation; this is usually because material flow is poor, production runs are too long, and distances between work centers are too great. Goldratt (Theory of Constraints) has stated many times that one hour lost in a bottleneck process is one hour lost to the entire factory's output, which can never be recovered. Linking processes together so that one feeds directly into the next can dramatically reduce waiting (Sim, & Rogers, 2018).

3. Transporting

Transporting product between processes is a cost incursion which adds no value to the product. Excessive movement and handling cause damage and are an opportunity for quality to deteriorate. Material handlers must be used to transport the materials, resulting in another organizational cost that adds no customer value. Transportation can be difficult to reduce due to the perceived costs of moving equipment and processes closer together. Furthermore, it is often hard to determine which processes should be next to each other. Mapping product flows can make this easier to visualize.

4. Inappropriate Processing

Often termed as "using a sledgehammer to crack a nut," many organizations use expensive high precision equipment where simpler tools would be sufficient. This often results in poor plant layout because preceding or subsequent operations are located far apart. In addition they encourage high asset utilization (over-production with minimal changeovers) in order to recover the high cost of this equipment. Toyota is famous for their use of low-cost automation, combined with immaculately maintained, often older machines. Investing in smaller, more flexible equipment where possible; creating manufacturing cells; and combining steps will greatly reduce the waste of inappropriate processing.

5. Unnecessary Inventory

Work in Progress (WIP) is a direct result of overproduction and waiting. Excess inventory tends to hide problems on the plant floor, which must be identified and resolved in order to improve operating performance. Excess inventory increases lead times, consumes productive floor space, delays the identification of problems, and inhibits communication. By achieving a seamless flow between work centers, many manufacturers have been able to improve customer service and slash inventories and their associated costs.

6. Unnecessary / Excess Motion

This waste is related to ergonomics and is seen in all instances of bending, stretching, walking, lifting, and reaching. These are also health and safety issues, which in today's litigious society are becoming more of a problem for organizations. Jobs with excessive motion should be analyzed and redesigned for improvement with the involvement of plant personnel.

7. Defects

Having a direct impact to the bottom line, quality defects resulting in rework or scrap are a tremendous cost to organizations. Associated costs include quarantining inventory, re-inspecting, rescheduling, and capacity loss. In many organizations the total cost of defects is often a significant percentage of total manufacturing cost. Through employee involvement and Continuous Process Improvement (CPI), there is a huge opportunity to reduce defects at many facilities.

In the latest edition of the Lean Manufacturing classic Lean Thinking, Underutilization of Employees has been added as an eighth waste to Ohno's original seven wastes. Organizations employ their staff for their nimble fingers and strong muscles but forget they come to work everyday with a free brain. It is only by capitalizing on employees' creativity that organizations can eliminate the other seven wastes and continuously improve their performance. Many changes over recent years have driven organizations to become world class organizations or Lean Enterprises. The first step in achieving that goal is to identify and attack the seven wastes. As Toyota and other world-class organizations have come to realize, customers will pay for value added work, but never for waste (Sim, & Rogers, 2018).

Theoretical Review

The Theory of Constraints (TOC) by Goldratt's (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. The theory of constraints (TOC), which acknowledges that the bottleneck resource dictates the throughput contribution of the plant as a whole, outlines strategies to

maximize operating profit by identifying bottleneck operations. The identification of businesses with significant stock backlogs that require attention might help locate the bottleneck. An overview of the theory's evolution can be found in Jones and Dugdale (1998). A method for controlling variables, organizational decisions, manufacturing processes, and circumstances where there are restrictions in the current state is called the Theory of restrictions, or TOC. A tool for corporate management called TOC connects various industrial methods. It is a scientific methodology that enables a company, regardless of size, to link solutions to its most pressing issues in order to maintain continuous progress. 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. Through the use of the Theory of Constraints, management can increase production capacity by managing the contribution margin and the product's unit production cycle in relation to its essential resources, or bottlenecks. A real-world system with more than three restrictions is improbable, according to TOC. This assertion is supported by linear programming models, which have the ability to resolve optimization issues for systems with hundreds or even thousands of constraints. Researchers discovered that all but a handful of these ideas would be totally unworkable in the noisy environment of a real-world system because they were so unstable. The quantity of limitations was strongly correlated with stability. There is less stability with additional limits. According to TOC practitioners, the practical limit is three restrictions. A significant implication of this is that managers can focus on optimizing performance in the areas of critical constraints or elevating the constraint (making it less restrictive) in order to manage a complex system or organization in a simpler and more efficient manner. This also results in a strategic perspective of the business, where all strategic choices are made based on the restriction.

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.

Empirical Review

Examine the effect of lead time on customer satisfaction of brewing plants in South-South Nigeria.

Nkiendem, and Essome, (2024), carried out a study to enhance customer satisfaction, measuring and monitoring the lead-time management in microfinance institutions in Cameroon. The microfinance industry (MFI) emerging from the banking sector is highly dependent on recent technology and customer service efficiency, which can drastically reduce lead times. Customers are also highly informed, and their demand expectations are high. Customers want instant solutions when it

comes to financial or banking services. It is, therefore, essential for microfinance companies to effectively manage their lead times to achieve higher customer satisfaction. This study adopts the methodology of a hybrid approach consisting of a quantitative approach in examining the impact of lead time on customer satisfaction in microfinance industries in Cameroon. A sample size of 70 customers, primarily petty traders from about 25 microfinance institutions in Cameroon: The random sampling method was used to select the petty traders' sample size for the survey. The model specification was descriptive multiple linear regression, used to analyze the data, and the estimation technique was ordinary least square. The findings show a direct impact of lead time management on customer satisfaction in the MFI case of Cameroon, and recommendations were made.

Okyere, Annan, and Anning, (2025), assess the evaluating the effect of lead time on quality service delivery in the banking industry in Kumasi Metropolis of Ghana. Customers are becoming more attracted to quality service delivery and are being impatience and unsatisfied when they had to be delayed or wait for longer times before they are served. Hence, Quality Service Delivery is of utmost importance to every service organisation especially financial industry. Most financial institutions focus attention on product innovation at the expense of lead time management which is a major factor in ensuring service quality and customer satisfaction. Consequently, this research looks at evaluating the effect of lead time on quality service delivery in the Banking Industry in Kumasi Metropolis of Ghana.

The study relied on Primary data collected through questionnaires, observation and interview instruments, administered to staff and customers of some selected branches of a commercial bank in the study area. The data was analysed qualitatively. The researchers realised that despite the immense importance of lead time on quality service delivery, little attention is given to the concept. It was revealed that, customers were dissatisfied with the commercial bank's services as a result of the unnecessary delays and queuing at the bank premises. The long lead time was found to be attributable to plant/system failure, skill gap on the part of employees, ATM underutilization and frequent breakdowns, among others. This has consequently resulted into long lead time, waiting, queuing and unnecessary delay at the banking hall. It is recommended that Tellers should be provided with electronic card readers for verification of customer's data and processing to be faster.

Examine the effect of waste reduction on commitment of brewing plants in South-South Nigeria.

Harish, and Selvam, (2024) carried out a study on lean wastes: a study of classification from different categories and industry perspectives. Waste elimination is one of the most effective ways to increase the profitability of any business. Processes either add value or waste to the production of a good or service. The seven wastes originated in Japan, where waste is known as "muda." "The seven wastes" is a tool to further categorize "muda" and was originally developed by Toyota's Chief Engineer Taiichi Ohno as the core of the Toyota Production System, also known as Lean Manufacturing. To eliminate waste, it is important to understand exactly what waste s and where it exists. While products significantly differ between factories, the typical wastes found in manufacturing environments re quite similar. For each waste, there is a strategy to reduce or eliminate its effect on a company, thereby improving overall performance and quality.

Sasane, Adhav, and Limited, (2020), conducted a study to eliminate the MUDA in HPT in panel manufacturing. The purpose of this paper is the focus on Muda

improvement in an organization sustainability. The study used mixed method approach for Muda/waste identification, measurement and suggestions for controlling Muda/waste in the organization. This paper illustrates about Muda case study in Larsen and Toubro Company which produce Switchgear panel. Process improvement is a constant search for opportunities to improve the processes in the daily operations of the company and to enhance the relationships between processes. Waste elimination is one of the most effective ways to increase the profitability of any business. Lean management is the way to achieve the perfect level of the organization through gradual and ongoing, which is characteristic for continuous improve approach, eliminate waste and losses in all aspect of business. To eliminate waste it is important to understand what waste is and where its exits. Value stream mapping and line balancing was the main tool used to identify the opportunities for various lean techniques. Due to implementation of Muda it increased the quality morale, delivery time and reduced the cost. Keywords-Improve, Productivity, Muda, Lean.

Huenerfauth, (2024), investigated mobile technology applications for manufacturing, reduction of Muda (Waste) and the effect on manufacturing economy and efficiency. Mobile devices in the manufacturing setting offer mobility and information whenever and wherever it is needed; these advantages allow for a more efficient workflow and allow the user to make more informed decisions. Due to these advantages, companies are reducing muda (waste) by using mobile devices (implementing Lean Manufacturing) and therefore saving money. Some of the mobile applications discussed in this paper are the following: Augmented Reality for assembly training, pruefcubing, remotely-monitored shop floors, statistical process control (SPC), and change requests for construction, and the two types of muda (waste) reduced by these mobile applications are “unnecessary / excess motion and defects.”

Methodology

In this study, a survey research design was adopted by the researcher because it is an accessible and efficient way for respondents to share their perspectives relative to a particular concept or topic of interest was adopted to obtain accurate data based on the opinion of the respondents. The researcher made use of primary source of data. The total population of the study was one thousand five hundred and ten (1510). Therefore, the sample size was four hundred and twenty-nine (429)**.**

A purposive sampling and random sampling techniques was employed. The questionnaire was designed in a five (5) point Likert scale structure which consisted of closed-ended questions that was easier for the respondents to answer because of the fixed presentation of questions and responses. Each item required the respondent to indicate the frequency of his or her various opinions under Strongly Agree (SA) =5, Agree (A) =4, Undecided (UN) =3, Disagree (D) = 2 and Strongly Disagree (SD) =1. Regression model was used to test the hypotheses of the study. A total number of four hundred and twenty-nine (429) questionnaire was administer to the respondents at the selected foods and beverage firms in South-South, Nigeria seventy-one (71) questionnaire were lost with the percentage ratio of 16.6%, while three hundred and fifty eight (358) questionnaire were retrieved with the percentage ratio of 83.4% which was suitable for the study to carry out the analysis.

Data Presentation

Table 1: Examine the effect of lead time on customer satisfaction of food and beverage companies in South-South Nigeria. **N=358**

Statement	SA 5	A 4	UN 3	D 2	SD 1	TOTAL	MEAN	SD
Order Preparation Time improves customer satisfaction	177	101	12	41	27	1434	4.0	.987
Queue Time (Waiting Time) enhance customer satisfaction	212	89	11	32	14	1527	4.3	.884
Setup Time improves customer satisfaction	235	72	--	23	28	1537	4.3	.879
Processing Time (Production Time) improves customer satisfaction	252	74	5	11	16	1609	4.5	.784
Inspection or Quality Control Time improves customer satisfaction	167	112	24	27	28	1437	4.0	.1.25
Waiting or Storage Time boost customer satisfaction	156	121	7	40	34	1399	3.9	1.35
Move Time (Transportation Time) enhance customer satisfaction	198	102	11	33	14	1511	4.2	.908

Source; Field Survey, 2025

The result in Table 1 reveals the decision rule mean score of $\bar{x}$3.00 was used to take decision on all the five (5) statements aimed to determine the dependent and independent dimensions of examine the effect of lead time on customer satisfaction of food and beverage companies in South-South Nigeria. Majority of the respondents with the highest means of 4.5, 4.3,4.3, 4.2, 4.1, 4.0 and 4.0 strongly agreed that Order Preparation Time improves customer satisfaction, Queue Time (Waiting Time) enhance customer satisfaction. Setup Time improves customer satisfaction. Processing Time (Production Time) improves customer satisfaction, Inspection or Quality Control Time improves customer satisfaction. Waiting or Storage Time boost customer satisfaction. Move Time (Transportation Time) enhance customer satisfaction.

Table 2: Examine the effect of waste reduction on commitment of food and beverage companies in South-South Nigeria. **N=358**

Statement	SA 5	A 4	UN 3	D 2	SD 1	TOTAL	MEAN	SD
Overproduction improves commitment	247	74	10	11	16	1599	4.5	.818
Waiting enhance commitment	205	96	11	32	14	1520	4.2	1.02
Transportation improves commitment	220	72	15	23	28	1507	4.2	.989
Over-processing (Inappropriate Processing) improves commitment	250	71	10	11	16	1602	4.5	.818
Excess Inventory increases commitment	197	92	15	25	29	1477	4.1	1.12

Defects increases commitment	112	170	24	27	28	1394	3.9	1.30
Motion enhances commitment	226	71	-	31	30	1520	4.2	.988
	230	70	-7	23	28	1525	4.3	.879

Source; Field Survey, 2025

The result in Table 2 reveals the decision rule mean score of $\bar{x}$3.00 was used to take decision on all the five (5) statements aimed to determine the dependent and independent dimensions of examine the effect of waste reduction on commitment of food and beverage companies in South-South Nigeria. Majority of the respondents with the highest mean scores of 4.5, 4.5, 4.5, 4.2, 4.3 4.2, 4.1 and 4.0 strongly agreed that Overproduction improves commitment. Waiting enhance commitment. Transportation improves commitment. Over-processing (Inappropriate Processing) improves commitment. Excess Inventory increases commitment. Defects increases commitment. Motion enhances commitment.

TEST OF HYPOTHESES

Ho_1: There is no positive significant relationship between lead time on customer satisfaction of food and beverage companies in South-South Nigeria

Table 3: Correlation Matrix between lead time on customer satisfaction

`		Lead Time	Customer Satisfaction
Lead Time	Pearson	1	.933
	Sig (2-tailed)		.000
	N	358	358
	R^2	(0.870) 87%	
Customer Satisfaction	Pearson	.933	1
	Sig. (2-tailed)	.000	
	N	358	358

Source; Field Data, 2025

The table above showed the relationship between lead time on customer satisfaction, r = .87.0% with p-value = .000 < .05 significant level. We therefore reject the null hypothesis and accept the alternate hypothesis which states that there is a positive significant relationship between lead time on customer satisfaction of food and beverage companies in South-South Nigeria.

Ho_2: Waste reduction has no significant effect on commitment of food and beverage companies in South-South Nigeria.

Table 4: Regression analysis on waste reduction on commitment

Variable	Parameters	Coefficient	Std error	t – value	Sig
Constant	β_0	0.058	0.057	1.017	.000
Waste reduction (X_1)	β_1	0.082	0.072	1.139**	.015
R-Square		0.690			
Adjusted R – Square		0.546			

F – statistics	7.125***

Source: Field Data, 2025

Table above shows the coefficients of waste reduction on commitment. The coefficient of multiple determination (R2) was 0.690 which implies that 69.0% of the variations in dependents variables were explained by changes in the independent variable while 31.0% were unexplained by the stochastic variable indicating a goodness of fit of the regression model adopted in this study which is statistically significant at 1% probability level.

The coefficient of waste reduction was statistically significant and positively related to commitment at 5 percent level (1.139**). With p-value =.015<.05% significance level. This implies that waste reduction has a significant effect on commitment of food and beverage companies in South-South Nigeria.

Summary Of Findings

i. There is a positive significant relationship between lead time on customer satisfaction of food and beverage companies in South-South Nigeria (p-value = .000 < .05 significant level). This implies that a unit increase in lead time leads to a unit increase in customer satisfaction.

ii. Waste reduction has a significant effect on commitment of food and beverage companies in South-South Nigeria (p-value =.015<.05% significance level). This implies that a unit increase in waste reduction leads to a unit increase in commitment.

CONCLUSION

From the study conducted, it was concluded that lead time, and waste reduction are relational dimensions that can influence of food and beverage companies in South-South Nigeria. The empirical results of the study clearly underscore the following: waste reduction or elimination, are significant positive determinants of organizational performance. Firms that consider the application of lean management dimensions are likely to record a better Key Performance Indicator (KPI) in the organization. Lean management is important because it not only enhances operational efficiency and reduces costs but also fosters a culture of continuous improvement and customer-centricity. Organizations that successfully implement lean principles often experience long-term success and resilience in an ever-evolving business landscape. The study concluded that organizations that adopt lean management practices often experience improved quality, increased efficiency, reduced costs, and higher customer satisfaction.

RECOMMENDATIONS

i. Food and beverage companies should reduce lead time by streamlining order processing, improving kitchen workflow, and using technology such as real-time tracking this will help to improve efficiency in the organization.

ii. Companies should prioritize waste reduction by implementing efficient portion control, improving inventory rotation, and training staff on sustainable handling practices.

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