

## Lean Management and Firms Competitive Advantage

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### Abstract

*This study focused on lean management and firms' competitive advantage in Akwa Ibom State. Two hypotheses and two research questions were developed for the study, using a survey methodology. The population consisted of 59 employees in top management, middle management, and lower management positions at particular manufacturing companies in the state of Akwa Ibom. Utilizing census techniques, data on the total population was gathered. The two hypotheses were tested at the 0.05 level of significance using the Ordinal Regression Tool Analysis. The findings indicated that the Lean Management dimension (employee involvement: 8.298,  $PV = 0.003$ ; Just-in-Time: 7.246,  $PV = 0.002$ ) and firms' competitive advantage in Akwa Ibom State were significantly correlated. Just-in-time and employee involvement are relational characteristics that might improve enterprises' competitive advantage and organizational performance in Akwa Ibom State. The study's management was advised to improve their policies to support manufacturing and operations by figuring out what the customer values, mapping out the value stream the complete sequence of steps necessary to deliver a good or service—and analyzing the value stream to find and get rid of wasteful practices like overproduction, waiting times, needless motion, defects, and excess inventory. To boost overall cost efficiency, it was also advised that manufacturing companies integrate waste elimination into their operational processes.*

**Keyword:** Lean management, Just-in-Time, Employee involvement and Competitive Advantage

### Introduction

The concepts of lean management allow businesses the flexibility and responsiveness required to adapt to changing market demands and achieve sustainable growth in today's cutthroat and quickly changing business climate. By focusing on value creation and waste elimination, lean management serves as a powerful framework for achieving long-term success and enhancing competitive advantage (Uwa, 2022). Due to this, companies are forced to adopt new manufacturing techniques to become more competitive in the international market (Anthony, 2021). Lean is a unified system of concepts, practices, tools, and techniques that assumes no resource is used for any purpose other than providing value to the end user. When non-value-added tasks are eliminated, businesses become more flexible, competitive, and customer-responsive because they reduce expenses and set times (Alukal, 2023).

According to Uwa (2022), lean management is critical to an organization's success because it ensures that every employee contributes to the process of growth, fosters shared leadership and accountability and is committed to continual development. This management style serves as a roadmap for building a robust and successful company that continuously advances, recognizes and resolves real problems, and above all retains its competitive edge.

Lean management aims to reduce organizational inefficiencies in order to increase overall productivity and quicker response to customer needs. Henry Ford is still considered a major role in the manufacturing business since he incorporated production steps into his full process, even though Taiichi Ohno is credited with creating lean manufacturing after introducing the concept at Toyota Automotive (Srivastava, 2016). Thus, Ohno believed that by reducing waste, they would gain a

competitive edge through time and quality savings (Srivastava, 2016). Despite the developments in modern methods, Ohno's viewpoint has endured. Thus, methods such as "just in time" can be considered as an illustration of how to improve the efficiency of processes.

Just-in-Time (JIT) is applied in corporate operations to maximize effectiveness and minimize waste. By delivering goods and supplies exactly when required for production or distribution, it seeks to reduce the risks and expenses associated with keeping excess inventory. This strategy is frequently applied in supply chain management, manufacturing, and other sectors to optimize resource consumption and streamline operations. Employee satisfaction and commitment to lean management initiatives are measured through employee engagement. Employee engagement increases the likelihood that they will support innovation and ongoing development. Therefore, the goal of this research is to find out how lean management impacts certain manufacturing companies in Akwa Ibom State's competitive advantage.

### **Statement of the problem**

Despite the proven benefits of lean management in enhancing organizational performance, many organizations struggle to effectively implement and sustain lean principles to achieve competitive advantage. Challenges often arise from a lack of understanding of lean concepts such as just-in-time, resistance to change, insufficient leadership commitment, and inadequate employee engagement. Besides, firms may face difficulties in identifying and eliminating waste, as well as in maintaining continuous improvement initiatives over time. The transition to a lean culture requires significant shifts in mindset and behaviour, which can be hindered by entrenched practices and siloed departmental structures.

Furthermore, the absence of robust measurement and feedback mechanisms can impede the ability to track progress and make necessary adjustments. Without a clear strategy and sustained effort, lean management initiatives risk becoming superficial, yielding minimal impact on overall performance. These issues are crucial for firms aiming to leverage lean management to achieve operational excellence, enhance efficiency, and drive competitive advantage. These, amongst others, inform the study of lean management and organizations' competitive advantage of selected manufacturing firms in Akwa Ibom State.

### **Objectives of the Study**

This study's primary goal was to determine how lean management and businesses' competitive advantage relate to each other in Akwa Ibom State.

### **Research Questions**

- i. What is the relationship between Just in Time and the competitive advantage of selected manufacturing firms in Akwa Ibom State?
- ii. what is the relationship between employee involvement and competitive advantage of selected manufacturing firms in Akwa Ibom State?

### **Hypotheses of the Study**

**H<sub>01</sub>:** There is no significant relationship between Just in Time and organizational performance in selected manufacturing firms in Akwa Ibom State.

**H<sub>02</sub>:** There is no significant relationship between employee involvement and the competitive advantage of selected manufacturing firms in Akwa Ibom State.

## Review of Relevant Literature

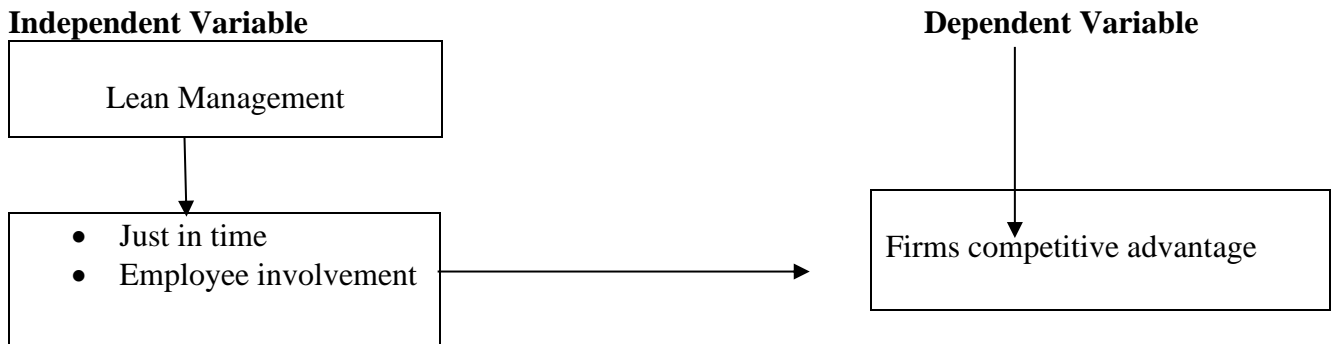


Figure (2.1): Conceptual model of lean management and firms' competitive advantage.

Source: Researcher, 2024.

### Lean Management

Lean management, originating from the Toyota Production System, emphasizes efficiency and the creation of value by eliminating waste and optimizing processes. Since its development in the mid-20th century, lean management principles have been widely adopted across various industries, proving their versatility and effectiveness in improving firms' competitive advantage. The core philosophy of lean management revolves around the continuous pursuit of perfection through the systematic reduction of non-value-added activities. This involves identifying and eliminating waste in all forms, whether as excess inventory, unnecessary motion, overproduction, waiting times, defects, or inefficient processes (Uforo et al., 2023).

Lean management-adopting organizations usually see notable improvements in customer satisfaction, cost savings, product quality, and operational efficiency. Simplifying processes and promoting a continuous improvement culture are two benefits of implementing lean techniques like value stream mapping, Kaizen (continuous improvement), and just-in-time production.

William (2023) defines lean management as an approach to management that aims to reduce waste and boost production. The two definitions make it clear that continuous improvements targeted at increasing output and efficiency through waste elimination are what lean management is all about. Businesses have tried using rewards to increase productivity, but lean implementation has produced even better results since it values and empowers workers, allowing them to take responsibility for their work. The core of the problem with lean management is culture. Maintaining positive public relations, receiving professional training, and influencing employees' attitudes are all highly valued aspects of lean management (Lichtarski 2014). The company's personnel department of the organization might give significant thought to this approach. This document offers a succinct summary of several important elements that managers need to be aware of. These are:

**Positive Work Environment:** Promoting a positive work environment is the employer's duty. Apart from aiding employees in fulfilling their everyday tasks, a contented workplace fosters relationships between colleagues and the company. As a result, the employees are motivated to the extent of professional dedication, even if it requires them to work longer hours to complete a task that has been given to them (Ekanem et al., 2023).

**Setting the objectives:** The goals of the assignment must be understood in order to perform well. It is consequently essential to set both short- and long-term goals for the personnel. While the latter would prioritize being aware of the duties they undertake daily, the former would be more concerned with the growth of their professional careers.

**Communication:** All managers have to set up a system that permits workers in a certain region to communicate with each other regarding information. Employee meetings should be scheduled daily to improve communication.

The staff members may share updates, discuss how they are doing with their assignments, or routinely discuss challenges during the meeting.

**Appropriate Motivation:** The "lean management" style of management recommends managers abandon the "carrot-and-stick" strategy and other conventional methods of motivating employees that only produce temporary results. Instead, managers should look for internal motivators inside specific employees (Blikle, 2011).

**Wasting Human Potential:** Numerous businesses strive to continuously enhance their processes. Numerous techniques are used to achieve this state. Sometimes external companies are brought in to improve the operations of the target company. Occasionally, bosses impose rules without first accessing their employees. These processes are viewed as unnecessary (Kingsley, 2021). It is advisable for modern firms to have regular discussions about adjustments with employees who are directly involved in the problem they are tackling. A "suggestion system" that integrates employee suggestions is a very helpful tool (Masaaki, 2006).

**Employee Development:** Most businesses consider workers who assist production and indirect labour to be among their most valuable resources. Managers should thus make use of all available resources to provide opportunities for personal development to their employees. It is common to minimize or ignore the argument that investing in human capital is equivalent to investing in the business and that doing so would yield positive results (Kingsley, 2021). A few specialized tactics help to accomplish the goal of having incredibly effective management. The competence matrix and development projects are the most well-known.

## Measures of Lean Management

### Just-in-Time Practices

Just-in-Time (JIT) seeks to manufacture and deliver items or services precisely when needed, never too early or too late. The Toyota Production System (TPS) is credited with developing and popularizing this fundamental tenet of lean management. Just-In-Time (JIT) manufacturing aims to reduce or eliminate inventory by aligning output with customer demand. The fundamental principle is to meet customer needs with the appropriate amount of goods or components at the appropriate time and location, while avoiding needless expenses related to carrying excess inventory (Hayes, 2017).

The implementation of Just-In-Time (JIT) production has resulted in significant enhancements to manufacturing enterprises' production processes (Hayes, 2017). In his analysis of a Chinese company, Manoochehri (2014) found that the use of JIT resulted in a 16–45% reduction in inventory and a 50–80% improvement in employee efficiency. High quality, productivity, and inventory reduction have been noted as JIT's primary achievements since time in recollection. According to Ohno (2015), JIT plays the right role in the right amount of time when it comes to gathering. Collar, et al. (2022) claim that JIT provides the knowledge necessary to produce goods in the precise quantity and time required as well as to eliminate operational waste. On the other hand, JIT production uses a simple production process to remove waste. Furthermore, JIT is based on the notion of cutting waste via simple production processes, such as getting rid of unnecessary big lot sizes and supplies, and unnecessarily prolonging customer time cycles (Ohno 2015).

### Employee Involvement

The successful adoption of any new dynamic changes, including employee involvement, is one of the most crucial aspects of any organization's effectiveness. Employee engagement, according to Welling

& Concelman (2004), is characterized by high-performance levels and the development of commitment, loyalty, productivity, and ownership among staff members. Employee engagement, according to Uwa, (2021), is a combination of intellectual and emotional dedication to the company. Employee engagement was defined by Robinson et al., (2017) as a collection of favourable sentiments that workers have about the output and advantages of the company. Srivastava (2022) attributes employee happiness to "contentment," whereas staff engagement is associated with "commitment" and the readiness to go above and beyond the call of duty to forward the goals of the company.

Employee engagement, as defined by Ghuman (2016), is defined as an employee's willingness and capacity to willingly put in extra work regularly to subsidize the success of the association. As a result, it shows how much discretionary effort workers put into their employment. As per the 2003 Towers Perrins Report on Employee Engagement, cultivating employee engagement is an ongoing effort that enhances the work experience on an emotional level. Making people happy or giving them more money is not the goal. According to Havill (2015), understanding the degree of employee participation within the company is essential to the effectiveness of change. Employee engagement is one of the key elements that management must prioritize to reap the benefits of the LM. When it comes to implementing lean manufacturing, people are the most crucial component (Mann, 2005). The degree of employee involvement is influenced by several individual and organizational factors.

### **Competitive Advantage**

Competitive advantage within the framework of lean management is a comprehensive measure of an establishment's ability to deliver value to customers while optimizing resources and processes in a more better or cheaper way than its rivals (Uwa, et al., 2018). These advantages enable a firm to generate more sales, achieve higher profit margins and retain more customers than its competitors in the market. Competitive advantage can come from various sources, and lean management is one. Lean management, rooted in the Toyota Production System, has revolutionized how organizations approach efficiency and continuous improvement since its development in the mid-20th century. The adoption of lean principles across various industries reflects its versatility and effectiveness in enhancing performance. Main lean observations, such as just-in-time production, Kaizen (continuous improvement), and value stream mapping, focus on identifying and eliminating waste, thereby streamlining operations and improving quality. A critical component of lean management is the engagement and empowerment of employees at all levels. By fostering a culture where workers are encouraged to identify inefficiencies and propose improvements, organizations can drive performance improvements and enhance job satisfaction.

According to Barney (1991), a company has a competitive advantage if it can put into practice a value-creating strategy that no competitor 'real or imagined' is utilizing simultaneously. A company's competitive edge, according to Cascio (2014), is the extent to which its customers, intangible assets, work production, and high-quality services enable it to accomplish its purpose in a way that its competitors cannot. According to Kaplan & Norton (2015), a company's capacity to employ its human and physical resources to accomplish its goals more quickly and effectively than its competitors gives it a competitive advantage. This idea provides businesses with the justification to use objective performance criteria as the foundation for their work-based performance evaluations. A company's competitive advantage can be expressed through a well-rounded set of metrics that characterize the results and how they were achieved. To have a positive competitive advantage, at least four forces need to be in balance (Kaplan & Norton, 2015): Production process efficiency, shareholder needs met, customer contentment, and staff skills (training, satisfaction), level of innovation, and opportunity utilization are the four main factors that affect a company's ability to grow and flourish.

### **Employee Involvement and Firms Competitive Advantage**

Employee involvement is a cornerstone of lean management, profoundly impacting firms' competitive advantage. Ingrained in the Toyota Invention Scheme, lean management emphasizes the importance of



empowering workers at all stages to actively participate in the continuous improvement of processes. "Kaizen," a participatory approach, encourages staff members to spot inefficiencies, make suggestions for enhancements, and put new ideas into practice that increase operational quality and efficiency. Worker's participation in lean management efforts has several advantages that enhance company performance (Uto et al., 2024). First, it promotes an ownership and responsibility culture in which staff members take ownership of their work and the organization's overall success. Employees who feel a sense of ownership are more inclined to aim for excellence and solve problems on their own (Uto et al., 2024).

Second, employee involvement enhances the firm's ability to identify and eliminate waste. Frontline workers who are intimately familiar with daily operations, often have valuable insights into inefficiencies and areas for improvement. By leveraging this knowledge, organizations can implement more effective solutions that drive performance improvements. Third, engaging employees in lean practices promotes collaboration and teamwork. When employees work together to achieve common goals, they share knowledge and skills, leading to more innovative and effective solutions. This collaborative environment also strengthens relationships among employees, improving communication and reducing conflicts (Uforo et al., 2022). Furthermore, employee involvement in lean management leads to higher job satisfaction and morale.

### **Just-in-Time Practices and Firms Competitive Advantage**

Lean management techniques such as Just-in-Time (JIT) procedures are essential for improving firms' competitive advantage since they minimize inventory, cut down on waste, and match production schedules to demand. JIT ideas, which date back to the Toyota Invention Scheme in the middle of the 20th century, have been widely embraced by a variety of industries, completely changing the way businesses handle their supply chains and manufacturing procedures. Producing and delivering goods in the precise amounts needed at the precise time of need is at the heart of the Just-In-Time (JIT) methodology. This strategy differs from conventional manufacturing techniques, which depend on keeping big stocks to protect against unforeseen circumstances. Firms can drastically lower their expenses associated with carrying inventory, use less storage space, and lower their risk of obsolescence by implementing JIT processes (Ekanem, et al, 2023).

Implementing JIT practices leads to several key benefits that contribute to firms' competitive advantage such as enhanced efficiency, cost reduction, improved quality, increased agility, and stronger supplier relationships: In the hectic and cutthroat business world of today, JIT practices offer organizations a strategic advantage by promoting leaner operations and a more responsive production system. By minimizing waste, reducing costs, and improving quality, JIT enhances overall organizational performance, enabling companies to achieve sustainable growth and long-term success.

### **Theoretical Review**

#### **Dynamic capabilities (DC) Theory by Teece and Pisano (1994)**

The concept of dynamic capacities (DC) took the place of some of the drawbacks of RBV theory (Tondolo & Bitencourt, 2014). Lean management and dynamic capabilities (DC) are two strategic frameworks that companies use to increase their competitiveness and adaptability in a fast-paced, increasingly complex business environment. An organization's "dynamic capabilities" are its ability to identify opportunities and threats, seize those possibilities, and realign processes and resources to maintain a competitive advantage. On the other hand, lean management prioritizes continuous improvement, reduces waste, and streamlines operations to maximize value to the customer.

The confluence of lean management with dynamic capabilities is highly relevant, as both emphasize the importance of flexibility and response to change. While lean management provides the tools and procedures to streamline operations and increase output, dynamic capabilities ensure that these benefits align with the broader strategic objectives of the company. By leveraging dynamic capabilities, organizations can boost the effectiveness of lean management techniques and improve

their responsiveness to shifts in consumer expectations, market conditions, and technological advancements.

This combination gives organizations the ability to achieve operational excellence and sustain it through continuous innovation and evolution while also guaranteeing long-term competitiveness and resilience. With the aid of dynamic capabilities, lean companies can surpass incremental gains and accomplish revolutionary innovation. Using DC, lean management may help businesses integrate DC and optimize existing processes while also developing entirely new ways to deliver value (Teece, et al., 1997).

In summary, lean management techniques are closely related to the concepts of Dynamic Capabilities Theory. Lean management facilitates the growth and improvement of dynamic capabilities, allowing businesses to prosper in a dynamic business environment by encouraging flexibility, ongoing learning, resource optimization, strategic alignment, resilience, customer focus, and teamwork.

### Empirical Review

Mahlaha (2020) examined the influence of lean strategies on organizational performance. This research aimed to look at how organizational performance in a public institution (a military organization) relates to lean approaches. The study used a quantitative methodology with a descriptive focus and a sample of military personnel stationed in Rio Grande do Sul. It was possible to gather a sample size of 116 completed surveys. To assess the data, multivariate statistical analysis was employed. It was found that the application of lean techniques—which involve eliminating waste, iterative improvement, providing leadership and support, and engaging members—improves the performance of businesses. They focus on minimizing expenses while completing tasks, effectively fulfilling goals, lowering expenditures related to tasks and activities, and continuously increasing productivity.

Usma & Ragi (2023) looked at how implementing lean practice affected a company's ability to compete. Multiple regression analysis and correlation analysis were the methods employed to scrutinize the effects of lean operational features on the operational performance of the organization. These experiments were designed to demonstrate the relationship between a company's competitive advantage and lean methodology. It was discovered that daily schedule adherence is strongly correlated with operational success. It was recommended that to increase productivity and reduce task duplication, the supply chain management team work in tandem with their production team.

### Methodology

This study employed a survey research approach to explain the association between lean practice and firms' competitive advantage in a subset of firms in Akwa Ibom State. The population under investigation comprises 59 top, middle and lower-level management staff of the selected manufacturing firms in Akwa Ibom State, adopted as the target population for the study. The study adopted the census technique by using a total population of 59 as a sample size because the population is sizeable to handle.

**Table 1.1 Population Sample**

Name	No. of Employees	Percentage
Paragon Paint industry Offort Street Uyo	35	59%
Afro paint and Chemicals Km 3 Abak/Ekparakwa Rd.	10	17%
Alphastar Paints & Industries Ltd, Ikot Ekpene	14	24%
<b>Total</b>	<b>59</b>	<b>100%</b>

A stratified sampling procedure was used to distribute questionnaire copies proportionately to the various employee cadres within the study organization. The structured, closed-ended questionnaire was the main tool the researcher created and employed to collect data. The questionnaire items were evaluated using the Likert scale, which includes five points: Strongly Disagree (SD)= 1, Disagree (D)= 2, Neutral (N)= 3, Agree (A)=4, and Strongly Agree (SA) =5. Within the parameters of the conceptual model, three null hypotheses were utilized for this inquiry. The theories were tested using Ordinal Logistic Regression Analysis.

**Model Specification**

Model Specification: The functional model used in this investigation is assigned as;

$$Y = f(X_1, X_2, X_3) \dots\dots\dots \text{equation 1}$$

recoded to reflect the variables that are displayed;

$$OP = f(SF, SP, SR)$$

$$Y = a_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 \dots\dots \text{equation 2.}$$

**Data Presentation**

**Table 1.2: Number of Questionnaire Administered and Returned**

Staff of selected Firms	Frequency	Percentage (%)
Number of questionnaire administered	59	100%
Number of questionnaire returned	50	84%
Number of questionnaire not returned	9	16%

**Source: Field survey (2024).**

Table 1.2 showed that 59 copies of questionnaire were administered to the management staff of the selected firms. This represents 100% of the total number of questionnaire administered to the (59) management staff of selected manufacturing firms. From the table above 59 copies of the questionnaire representing 84% administered to were received while 9 were not returned which represents 16%.

**Table 1.3 Percentage Analysis of Responses on Just-in-Time**

Just-in-Time	Extent of Agreement				
	SA	A	UD	D	SD
Smaller lead times indicate efficient production and delivery processes.	13 (26%)	26 (52%)	1 (2%)	4 (8%)	6 (12%)
JIT aims to reduce cycle time to avoid overproduction and minimize work-in-progress inventory.	17 (34%)	23 (46%)	4 (8%)	2 (4%)	4 (8%)
Higher turnover ratios indicate more efficient use of inventory, aligning with JIT principles.	19 (38%)	21 (42%)	2 (4%)	2 (4%)	6 (12%)
JIT aims for high-quality production and reducing defects that can cause waste and delays.	27 (54%)	16 (32%)	1 (2%)	3 (6%)	3 (6%)

**Source: Field survey (2024).**

Table 1.3 shows the frequency of responses and their percentages on the Just-in-Time dimension. Of a proportion of 50 respondents, 13 (26%) strongly agreed to questions, 26 (52%) agreed, 1(2%) were undecided, 4 (8%) disagreed and 6 (12%) strongly disagreed, thus concluding that smaller lead times indicate efficient production and delivery processes.



Of a proportion of 50 respondents, 17 (34%) strongly agreed to questions, 23 (46%) agreed, 4(8%) were undecided, 2 (4%) disagreed and 4 (8%) strongly disagreed, thus concluding that JIT aims to reduce cycle time to avoid overproduction and minimize work-in-progress inventory.

Of a proportion of 50 respondents, 19 (38%) strongly agreed to questions, 21 (42%), agreed, 2 (4%) were undecided, 2 (4%) disagreed, and 6 (12%) strongly disagreed, thus concludes that higher turnover ratios indicate more efficient use of inventory, aligning with JIT principles.

JIT aims for high-quality production and reducing defects that can cause waste and delays. Of a proportion of 50 respondents, 27 (54%) strongly agreed to questions, 16 (32%) agreed, 1 (2%) were undecided, 3(6%) disagreed and 3 (6%) strongly disagreed.

From the descriptive analysis, it was concluded that 92% of the respondents showed positive agreement with the questions raised on Just-in-Time while 8% did not, showing that Just-in-Time positive relationship with firm competitive advantage.

**Table 1.4: Percentage Analysis of Responses on Employee Involvement**

Employee Involvement	Extent of Agreement				
	SA	A	UD	D	SD
There is employee participation in decision-making	16 (32%)	24 (48%)	-	6 (12%)	4 (8%)
We invest in employee training and development opportunities foster a culture of involvement and show a commitment to employee growth.	17 (34%)	23 (49%)	3 (6%)	2 (4%)	3 (6%)
We recognize and reward employees who actively contribute ideas and initiatives can motivate others to get involved and participate.	19 (38%)	21 (42%)	2 (4%)	2 (4%)	6 (12%)
Employee turnover can indicate low levels of involvement and engagement.	27 (54%)	16 (32%)	1 (2%)	3 (6%)	3 (6%)

**Source: Field survey (2024).**

Table 1.4 shows the frequency of responses and their percentages of employee involvement. A proportion of 50 respondents, 16 (32%) strongly agreed to the question, 24 (48%) agreed, none were undecided, 6 (12%) disagreed; and 4 (8%) strongly disagreed that there is employee participation in decision-making.

Of a proportion of 50 respondents, 17 (34%) strongly agreed to question, 23 (48%) agreed, 3(6%) were undecided, 2 (4%) disagreed; 3 (6%) strongly disagreed that they invest in employee training and development opportunities foster a culture of involvement and show a commitment to employee growth.

Of a proportion of 50 respondents, 19 (38%) strongly agreed to questions, 21 (42%), agreed, 2(4%) were undecided, 2 (4%) disagreed, and 2 (4%) strongly disagreed, thus concludes that they recognize and reward employees who actively contribute ideas and initiatives can motivate others to get involved and participate.

Employee turnover can indicate low levels of involvement and engagement. Of a proportion of 50 respondents, 27 (54%) strongly agreed to questions, 16 (32%) agreed, 1 (2%) were undecided, 3(6%) disagreed and 3 (6%) strongly disagreed.

From the descriptive analysis, it was concluded that 92% of the respondents showed positive agreement with the questions raised on employee involvement while 8% did not, showing employee involvement relationship with a firm competitive advantage.

**Test of Hypotheses**

The following were the null statements of the hypotheses:

- Ho1:** There is no significant relationship between Just in Time and firms competitive advantage in Akwa Ibom State
- Ho2:** There is no significant relationship between employee involvement and firms competitive advantage in Akwa Ibom State.

**Table 1.5: Model Fitting Information**

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	874.693			
Final	675.494	198.199	2	.000

Link function: Logit.

Since the model's fit data shows that it has outperformed the null model by a significant margin, the model is exhibiting a strong match. In this instance, the model is significant with  $p = 0.000$ . There should be a large divergence between the final model and the intercept-only model.

**Table 1.6: Goodness-of-Fit**

	Chi-Square	Df	Sig.
Pearson	2574.548	1843	.510
Deviance	645.785	1843	1.410

Link function: Logit.

A poor fit is showed by the goodness of fit statistic if the significant value is less than 0.05. In this instance, the data were properly predicted by the model ( $P > 0.05$ ). Both 1.410 and .510 are highly important values. A score of 0 denotes little to no discrepancy between the fitted (supposed) model and the observed data.

**Table 1.7: Pseudo R-Square**

Cox and Snell	.879
Nagelkerke	.784
McFadden	.548

Link function: Logit.

The variation cannot be explained by the pseudo-R-square model, even though it can be used to simulate the fluctuation in the criteria variable. In ordinal regression, the McFadden value of R2 will be utilized. In this case, we can say that, in comparison to the null model, the result prediction produced utilizing the predictors has improved by 42.8%.

**Table 1.8: Parameter Estimates**

		Estimate	Std. Error	Wald	Df	Sig.	95% Interval Lower Bound	Confidence Upper Bound
Threshold	[CA = 1.00]	20.100	17.664	1.295	1	.001	-14.522	54.721
	[CA = 2.00]	32.897	19.412	2.872	1	.004	-5.149	70.944
	[CA = 3.00]	39.851	19.684	4.099	1	.000	1.272	78.431
	[CA = 4.00]	53.935	23.217	5.397	1	.002	8.431	99.440
Location	Just-In-Time	3.246	3.069	1.119	1	.002	-2.769	9.260
	Employee Involvement	3.298	2.969	1.235	1	.000	-2.520	9.116
		7.246	5.069	1.119	1	.002	-2.769	9.260
		8.298	3.969	1.235	1	.000	-2.520	9.116

Link parameter function: Logit.

a. This is set to zero because it is redundant.

**Table 1.9: Test of Parallel Lines<sup>a</sup>**

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Null Hypothesis	332.212			
General	312.203 <sup>b</sup>	20.009	4	.352

The location parameters, or slope coefficients, are the identical for all answer categories, according to the null hypothesis.

a. Link function: Logit.

b. The log-likelihood value is practically not zero.

**Interpretations of Results**

All response types have constant location parameters, or slope coefficients, in accordance with the null hypothesis. The parameter estimations and a summary of the impact of each predictor are shown in Table 1.4. Significant hints on the impact of the model's predictors can be found in the relative values of the component level coefficients and the sign of the covariate coefficients. The criterion variable and the predictors have a positive (inverse) connection when the variables have positive (negative) coefficients.

The intercepts, coefficient values, standard errors, t-values, and p-values from the table show Just-in-Time (7.246), Employee Involvement (8.298), The new coordinates are Firms Competitive Advantage (4.323) and PV (0.000). This shows that there is an anticipated increase in the log probabilities of failing at a higher level of the dependent variable for every unit rise in the independent variable.

A covariate's positive coefficient value increases when it represents a greater likelihood of belonging to a group that has a "higher" cumulative outcome. A higher probability of falling into one of the "upper" cumulative result groups is indicated by a bigger coefficient at the factor level. The sign of a coefficient for a given factor level is determined by its impact on the reference categories. According to Table 1.4, the most significant influencing factor is the variable with the highest coefficient and a p-value less than the significance level of 0.05. The p-value for each independent variable is therefore less than 0.05. This implies that every independent variable is statistically significant at a 5% level of significance.

**H<sub>01</sub>:** There is no significant relationship between Just in Time and firms competitive advantage in Akwa Ibom State.

Hypothesis 1 result: 7.246 is the estimated location for Just in Time (JIT), with PV = 0.002. where PV stands for probability value, JIT is for just-in-time, and FCA (firm competitive advantage) is the threshold. Table 1.4 indicates that Just-in-Time and enterprises' competitive advantage have a noteworthy impact in Akwa Ibom State. This is because when PV = 0.000, the anticipated value stream mapping location is 7.246. The value of probability was below 0.05.

**H<sub>02</sub>:** There is no significant relationship between employee involvement and firms' competitive advantage in selected manufacturing firms in Akwa Ibom State.

The estimated site for waste removal, as determined by Hypothesis 2, is 8.298, with a PV of 0.003 where PV stands for probability value, FCA for firm competitive advantage (Threshold), and EI for employee involvement. The outcome showed that employee involvement significantly affects a company's ability to compete in Akwa Ibom State. This is because when PV = 0.003, the predicted location for employee engagement is 8.298. The value of probability was below 0.05.

## **Discussion of Findings**

This study looks at the connection between Akwa Ibom State businesses' competitive advantage and lean management. In Akwa Ibom State, an ordinal logistic regression analysis was done to find out how lean management and enterprises' competitive advantage relate to each other. Using  $df = 3$ , the ordinal logistic regression model demonstrated statistical significance ( $p < .05$ ).

An important portion of the organizational variance in a subset of Akwa Ibom State's industrial enterprises was explained by the model with its independent variables, according to the pseudo-R<sup>2</sup> values (Nagelkerke. = 0. 774=77%) displayed in Table 1.3. This shows even more that a model incorporating just-in-time and employee involvement is likely to be a very good indicator of a company's competitive advantage. Furthermore, a selection of Akwa Ibom State's manufacturing companies showed that just-in-time production and employee involvement were the primary drivers of competitive advantage, according to the results of the ordinal logistic regression analysis. The P-values, which were all less than the 0.05 level of significance, provided evidence for this. This suggests that assuming all other model variables remain constant, the probability of organizational success increases with each unit increase in Just-in-Time and Employee Involvement.

## **The Relationship Between Just-In-Time and Firms' Competitive Advantage in Selected Manufacturing Firms in Akwa Ibom State**

The result of the ordinal logistic regression analysis for hypothesis (H<sub>01</sub>) showed that just-in-time operations are linked to a firm's competitive advantage in a subset of Akwa Ibom State's manufacturing companies. This implies that a company's competitive edge will increase with a positive gain of just one unit in value stream mapping, providing all other model variables stay constant. Consequently, studies reveal that just-in-time and a business's competitive edge are greatly impacted. It was determined to reject the null hypothesis as a result. This is in line with studies conducted by Dong et al. (2001), who used structural equation modelling to assess the impact of cost savings from just-in-

time (JIT) purchasing. Regression models were used by Fullerton, McWatters, & Fawson (2003) to support their claim that US firms make more money when they use more Just-in-time (JIT) procedures.

### **To Ascertain the Relationship between Employee Involvement and Firms' Competitive Advantage in Selected Manufacturing Firms in Akwa Ibom State**

Employee involvement firms have a competitive advantage, according to the test of the null hypothesis ( $H_0$ ), since the P-value in Table 14 is less than the significance level (0.05). Therefore, our research suggests that waste minimization and firm competitive advantage have a remarkable and beneficial association in a subset of manufacturing companies in Akwa Ibom State. Consequently, the null hypothesis was deemed to be incorrect. This outcome is in line with past studies on the benefits of employee involvement that Kim et al. (2012) reviewed.

### **Conclusion**

The results of the study clearly show that, in some manufacturing firms in Akwa Ibom State, employee engagement and just-in-time are related elements that can affect a firm's competitive advantage. The following points are highlighted by the study's empirical findings:

- i. Employee engagement and just-in-time delivery are important positive factors that determine a company's competitive edge.
- ii. Businesses that take into account implementing lean management principles are probably going to see improvements in their Key Performance Indicator (KPI) within the company.
- iii. The two control variables were positively correlated, but Just-in-time was the strongest predictor of firms' competitive advantage at 0.883.

### **Recommendations**

- i. The organization should implement Just-in-Time (JIT) Practices: Introduce JIT principles to streamline production and inventory management. This includes implementing pull systems, where products are produced based on actual customer demand and reducing inventory levels through improved planning and synchronization of processes.
- ii. It was also recommended that organizations should encourage employee engagement: Involve employees in lean initiatives by creating cross-functional teams, providing opportunities for skill development and involvement in decision-making, and recognizing and rewarding contributions to lean practices. Empower employees to take ownership of their processes and drive continuous improvement.



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