## Effect of Total Productive Maintenance on Employee Commitment of Brewing Firms in South-East, Nigeria

## Nwatu Isaac Chukwuemeka (Ph.D),

Department of Business Administration, Nnamdi Azikiwe University Awka, Anambra State Nigeria.

**Abstract:** The study focuses on the effect of Total Productive Maintenance on employee commitment of the Brewing Firms in South-East, Nigeria. The study sought to determine the relationship between total productive maintenance and Employee commitment in the Brewing Firms in South East, Nigeria. However, the study was anchored on Lean production theory which states that managing the flow of production through all the steps that add value to the final product should be focus of organizations. The study had a population size of 1528, out of which a sample size of 431 was realized using Cochran Formula at 5% error tolerance and 95% level of confidence. Instrument used for data collection was primarily questionnaire. Out of 431 copies of questionnaire that were distributed, 401 copies were returned while 30 copies were not returned. The survey research design was adopted for the study. The hypothesis were tested using Person Product Moment Correlation Coefficient statistical tools. The findings indicated that there was a significant positive relationship between total productive maintenance and employee commitment in the Brewing Firms in South East (r=0.895; p<0.05). The study concluded that TPM is a comprehensive, resource-based maintenance management system that strongly focuses on improving equipment effectiveness, productivity, eliminating production losses and encourage employee commitment. The study recommended that Brewing plant in South East Nigeria should always carry out total productive maintenance, because lack of equipment maintenance widely affects the speed of production and ultimately slows down the process of production. If production process gets slow down due to lack of appropriate maintenance of equipment it may cause quality defects and minor stoppages which usually retard employee motivation.

Keywords: Total Productive Maintenance, Employee Commitment and Breweries Firms

## INTRODUCTION

In today's highly competitive and dynamic global business environment, organizations all over the globe are required to deliver world class products and services(Ahuja & Kumar, 2009; Psomas & Fotopoulos, 2009). In pursuit of attaining this goal, Brewery Firms have been acquiring competitive strengths through the adoption of world class strategies like Total Productive Maintenance (TPM) (Leonard, 2010). Total Productive Maintenance (TPM) in the manufacturing industry has emerged as an important operational strategy to overcome the production losses due to equipment inefficiency. TPM is an innovative approach, which holds the potential for enhancing the efficiency and effectiveness of production equipment by taking advantages of abilities and skills of all individuals in the Breweries Firms

To increase competitiveness, Brewery Firms seek to reduce the activities that add no value to a product but generate cost, and in this sense, one way of reducing waste is to adopt a lean approach. The lean manufacturing (LM) approach aims to reduce the amount of non–value-added activities in the production process, although it also has reported benefits at the administrative level (Andersson; Manfredsson, Lantz 2015). LM relies on several tools to achieve its goal, and total productive maintenance (TPM) is one of the most important, because it helps brewery Firms to minimize waste, such as damaged machinery and unplanned work, and it encourages the development of production plans that prevent machine overload (Pettersen, 2009).

Total Productive Maintenance (TPM) has been viewed differently by different people, but what remains constant in their definitions is the fact that TPM involves everybody in the organization and it is proactive in nature (Venkatesh, 2006).Within the last few decades, there has been an evolution of perceptions on the concept of plant maintenance from a reactive perception of repairs to proactive perception of maintenance (Ahuja & Khamba, 2008). TPM is a plan, which concentrates on total involvement of everyone from top management to all employees to implement a comprehensive maintenance program for all productive equipment throughout its life (Campbell & Reyes-Picknell, 2006). However, TPM involves total engagement and commitment of everybody in the organization, and the maintenance is on a daily basis (Ahuja & Khamba, 2008). It is an approach to maintenance that optimizes equipment effectiveness, eliminates breakdown and promotes autonomous maintenance by operators through day-to-day activities involving total workforce (Bhadury, 2013). This culture of scheduled maintenance of equipment seems to be the reason these firms' witness regular packing and breakdown of productive equipment because faults are not detected early enough and employees possibly do not have the skills and knowledge to do so

TPM is a successful tested LM tool for planning the maintenance of organizational activities, which involve operators and maintenance staff working together as a team (Eti, Ogaji, and Probert,2004). In this sense, TPM is associated with human resources, and it integrates equipment maintenance in the production process to increase machine availability, as well as adding commercial

#### International Journal of Academic Management Science Research (IJAMSR) ISSN: 2643-900X Vol. 5 Issue 10, October - 2021, Pages: 69-77

value to the organization. In today's workplace, employees face more ambiguity in their daily activities and decreased job security. With no assurance of continued employment, workers have now raised their expectations in other areas. For instance, employees expect employers to demonstrate their commitment in terms of pleasant working conditions, access to training and development, provision of a safe working environment and a balance between work and employees' commitments outside the workplace. Committed employees do better work than uncommitted ones and organizations with committed workers do better financially than organizations with uncommitted ones. Yet, fewer than half the employees in today's workforce feel committed to their employer.

#### Statement of the Problem

The inability of the production managers of the companies in focus to employ a unique strategy geared towards ensuring the regular maintenance of their production equipment's and machines has necessitated this study. This is because observations made by the researchers revealed that in a bid to minimize cost, heads of the production department do not maintain their equipment's regularly according to the standard of their sister companies overseas. This by extension could impact the competitive position and by extension the overall performance level of the companies in focus.

#### **Objectives of the Study**

Determine the relationship between Total Productive Maintenance and Employee Commitment of Brewing Firms in South-East, Nigeria.

#### **Research Question**

With the above objective in focus, the study seeks to find answers to the question. What is the relationship between Total Productive Maintenance and Employee Commitment of the Brewing Firms in South-East, Nigeria?

#### **Research hypothesis**

The hypothesis for this study is:

There is no significant positive relationship between Total Productive Maintenance and Employee Commitment of Brewing Firms in South-East, Nigeria

### **Review of Related Literature**

#### **Conceptual Review**

Total Productive Maintenance is a tool to maximize the effectiveness of the equipment by setting and maintaining, the optimum relationship between people and machines (Wilmot, 2000). Cooke (2000) has another definition "TPM seeks to engender a company-wide approach towards achieving a standard of performance in manufacturing, in terms of the overall effectiveness of equipment, machines and processes, which is truly world-class"

Japanese Institute of Plant Maintenance's (JIPM) defined TPM to include the following five key elements (Pomorski,2004):

- i. TPM aims to maximize equipment effectiveness.
- ii. TPM establishes a comprehensive preventive maintenance (PM) system.
- iii. TPM can be implemented by all departments that use and maintain equipment's.
- iv. TPM involves every employee from top level to the workers on the shop floor.

TPM is based on the promotion of preventive maintenance through the motivation of management and autonomous Small Group Activity

#### **Employee commitment**

According to Meyer & Allen [20] commitment "is a psychological state that characterizes the employees' relationship with the organization and has implication for the decision to continue membership in the organization." (Meyer and Allen , 997)

### **Total Productive Maintenance and Employee Commitment**

In order to achieve world-class performance, more and more companies are replacing their reactive, fire-fighting strategies for maintenance with proactive strategies like preventive and predictive maintenance and aggressive strategies like TPM to improve productivity and quality (Swansion 2001). Another factor in achieving world-class manufacturing can be said to be its approach to health and safety issues. As TPM improves machine performance, reduces machine breakdown, improves working condition and procedures, encourages total participation of management and workers, requires continuous improvement and commitments to training and resources, TPM is believed to improve safety as well,

Manufacturing systems (Blanchard 1997) often operate at less than full capacity, productivity is low, and the costs of producing products are high. In dealing with the aspect of cost, experience has indicated that a large percentage of the total cost of doing business is due to maintenance-related activities in the factory, that is, the cost as associated with maintenance labor and materials

#### International Journal of Academic Management Science Research (IJAMSR) ISSN: 2643-900X Vol. 5 Issue 10 October - 2021 Pages: 69-77

## Vol. 5 Issue 10, October - 2021, Pages: 69-77

and the cost due to production losses. TPM aims to increase productivity through maximizing equipment effectiveness and minimizing losses in production (Schmidt 1997). This is a good incentive for management to implement TPM, which will promote safety together (JIPM 1996). TPM maximizes equipment effectiveness through reducing machine utilization losses caused by reduced processing speed, minor machine stoppages and process defects. In addition, TPM reduces the occurrences of equipment failure and the associated costs of repeated machine and process set up

TPM minimizes losses in production by eliminating major losses in production activities (Riis, Luxh & Thorsteinsson 1997). Naguib (1993) also said, "TP Menables operating equipment profitably by reducing equipment related losses. The "six major losses" as described by Swanson (2001), that TPM aims to remove are equipment failure, set-up and adjustment time, idling and minor stoppages, reduced speed, defects in process and reduced yield, Besides maximizing productivity and minimizing losses, TPM is cost effective. It provides cost effective acquisition of equipment by selecting the correct machine forthe job, with comprehensive documentation, training and spare parts availability (Naguib 1993, p.90). By decentralizing maintenance activities, such as planning and supervision, to the operators, the costs and performance of maintenance can sometimes be improved.

McKone et al. (2001), TPM helps to improve the organization's capabilities by enhancing the problem-solving skills of individuals and enabling learning across various functional areas. Successful change in technology depends on the deployment of organizational structures (see Figure 1) that enable individuals to work across functional boundaries to identify problems, develop solutions, and execute plans. Companies need to build the skills of their workforce and develop worker participation in order to compete through World Class Manufacturing. TPM changes the structure of the organization to break down traditional barriers between maintenance and production, fosters improvement by looking at multiple perspectives for equipment operation and maintenance, increases technical skills of production personnel, includes maintenance in daily production tasks as well as long-term maintenance plans, and allows for information sharing among different functional areas.

#### **Empirical Review**

Hope, Obianuju and Augustine (2016) did a study on total Productivity Maintenance and Performance of Selected Aluminum Manufacturing Companies in Anambra State. The objective of the study was to determine the relationship between Total Productivity Maintenance and the Performance of selected Aluminum Firms in Anambra State. Specifically, this study explored the typeof relationship between Maintenance Autonomy and Employee Commitment. The study employed a correlation research design. It was anchored on the Theory of Structural Empowerment. Pearson's Product Moment Correlation Co-efficient was used in analyzing the data. The findings revealed that Maintenance Autonomy has a significant positive relationship with Employee Commitment. It is therefore advocated that management should empower the operatives by giving them necessary working resources to succeed in the maintenance activity. Effort should be geared towards avoiding stock out syndrome. In addition, state of the art equipment should be provided in order to ensure optimum level of coordination among the various departments in the organizations.

#### Theoretical Review

#### Lean Production Theory

Lean production theory states that managing the flow of production through all the steps that add value to the final product should be the focus of organizations. In contrast, mass production focuses on maximizing the return from the initial investment in machinery and the initial overhead of setup. As a result, mass production is characterized by the processing of products in large batches. In practice, mass production produces mass waste, including over-production of unneeded or defective parts, excessive inventories at each stage of production, and excessive movement of parts between production facilities and/or storage facilities at each stage of production (Stiglitz 2005). Mass transit shares many characteristics with mass production. Patrons are gathered into large lot sizes. Massive investments are made in machinery/vehicles and warehouses/stations. This results in mass waste: time wasted waiting for scheduled service, trips and time wasted in traveling to a transit corridor, time wasted transferring between lines and modes, station and vehicle capacity wasted during non-peak travel periods, and energy wasted by accelerating and braking heavy vehicles over short distances(Womack et al. 1990).

Critics of production Theory (PRT) say that no model of production economics demonstrates the superiority of PRT to mass transit service in either the return on investment or the overall quality of service. The authors contend that there is such a model in the lean production systems implemented by manufacturers in many different industries throughout the world. This paper maps the key principles of lean production to the key principles of PRT. We will trace the flow of patronage through the PRT production system, noting how it relates to lean production theory and citing similar examples in other industries The growing world economy imposes new pressures upon communities to improve their transit infrastructure in order to remain economically competitive and protect their business tax bases from migration to other, more favorable, business environments. A "lean" transit technology will provide a key competitive advantage for some communities as an important piece of the total production system. We are projecting major economic benefits in a widespread adoption of "lean" transit systems (PRT), based on the demonstrated benefits of lean production over mass production (Robert, 2003).

#### International Journal of Academic Management Science Research (IJAMSR) ISSN: 2643-900X Vol. 5 Issue 10, October - 2021, Pages: 69-77

Kathleen, Roger and Kristy (2001) did a study on the impact of total productive maintenance practices on manufacturing performance in USA. The study investigated the relationship between Total Productive Maintenance (TPM) and manufacturing performance (MP) through Structural Equation Modeling (SEM). They find that TPM has a positive and significant relationship with low cost (as measured by higher inventory turns), high levels of quality (as measured by higher levels of conformance to specifications), and strong delivery performance (as measured by higher percentage of on-time deliveries and by faster speeds of delivery). Also find that the relationship between TPM and MP can be explained by both direct and indirect relationships. In particular, there is a significant and positive indirect relationship between TPM and MP through Just-In-Time (JIT) practices.

Mohammad and Masoud (2015) examined impact of implementing total productive maintenance system on organizational excellence based on EFQM model New York. This study examined the influence of implementing a comprehensive total productive maintenance (TPM) system on the EFQM excellence model. Data collection involved a questionnaire consisting of 30 items. After data collection and extraction, all research hypotheses were analyzed using descriptive and inferential statistics. Findings suggest a significant positive relationship between implementing a TPM system and achieving excellence goals of organization.

Melesse and Ajit (2012) did a study on total productive maintenance: A case study in manufacturing Industry. The purpose of this paper is to evaluate the contributions of total productive maintenance (TPM) initiatives towards improving manufacturing performance in Ethiopian malt manufacturing industry. The correlations between various TPM implementation dimensions and manufacturing performance improvements have been evaluated and validated by employing overall equipment effectiveness (OEE) in boiler plant. The research focused upon the significant contributions of TPM implementation initiatives, towards affecting improvements in manufacturing performance in the Ethiopian industry. The study established that focused TPM implementation over a reasonable time period can strategically contribute towards realization of significant manufacturing performance enhancements. The study highlights the strong potential of TPM implementation initiatives in affecting organizational performance improvements of Ethiopian manufacturing organizations through proactive TPM initiatives have been evaluated and critical TPM success factors identified for enhancing the effectiveness of TPM implementation programs in the Ethiopian context.

Halim, Mohamed, Chandrakantan and Siti (2013) conducted a study on Total Productive Maintenance and Manufacturing Performance: Does Technical Complexity in the Production Process Matter. This study discussed some findings from a study of TPM practices in manufacturing organizations in Malaysia. Total productive maintenance (TPM), a resource-emphasized approach moves the paradigm of maintenance by putting emphasis on total employee involvement in the maintenance activities. They studied the relationship between TPM practices and manufacturing performance. They investigated the moderating effect of the level of technical complexity in the production process in the TPM practices and manufacturing performance relationships as well. Significant relationships were found between TPM practices and cost. They also found the moderating effect of technical complexity in the production process on the relationship between TPM practices and manufacturing performance.

Chukwutoo, and Paschal, (2018) Conducted a study on optimization of production system: An Application of Total Productive Maintenance (TPM) in USA. In this work, research has been conducted to study the impact of equipment effectiveness, availability and performance through the use of total productive maintenance in Apex Automated Manufacturing Industry, with the objectives of producing goods without reducing product quality, increasing product cost and to produce a low batch quantity of products at the earliest possible time with non-defective products. The equipment parameters, such as the availability rate, the performance and the quality rates of the goods produced are consider while optimizing the Equipment Effectiveness (EE) of a production system. Pareto principle and statistical models of downtimes were used to depict the most downtime factors. This study reported OEE of 22.4% and 23.5% for 2012 and 2013 years respectively as regards to the world class recommended OEE is 85%. Pareto analysis showed that planned In this work, research has been conducted to study the impact of equipment effectiveness, availability and performance through the use of total productive maintenance in Apex Automated Manufacturing Industry, with the objectives of producing goods without reducing product quality, increasing product cost and to produce a low batch quantity of products at the earliest possible time with non defective products. The equipment parameters, such as the availability rate, the performance and the quality rates of the goods produced are consider while optimizing the Equipment Effectiveness (EE) of a production system. Pareto principle and statistical models of downtimes were used to depict the most downtime factors. This study reported OEE of 22.4% and 23.5% for 2012 and 2013 years respectively as regards to the world class recommended OEE is 85%. Pareto analysis showed that planned.

Gurvinder (2017) did a study on the implement the total productive maintenance (TPM) in the Milk Industry in Padrana. The paper aimed to develop a methodology to increase production rate by minimizing the downtime of machines and chances of bread own and increasing the availability that will enhance Overall Equipment Efficiency. Design/Methodology/Approach-The methodology based on analyzing the reliability of data of a milk plant. Where the steps could be traced to implement the TPM through Autonomous Maintenance that will further improve the maintenance policies of the mechanical equipment. Also the continuous and thorough inspection of production process is achieved though management of overall equipment efficiency. Finding -The goal of development methodology is to bring competitive advantages, such as increasing the productivity; improving the quality of the product; and reducing the cost of production line and wastage due to breakdowns in machines. Practical Implementations -TPM in milk industry will as increase in productivity, improve the quality of the product, reducing the cost of production line and wastage due to breakdowns in machines and providing a healthier and safe work environment. It can help to improve the design and operation of the production line

## Methodology

The study adopted research survey design. The populations of the study consist of the employee of Breweries Plant in south Nigeria (1528). A Sample size was determine using *Cochran Formula* releasing a sample of 431. Out of 431 copies questionnaire distributed, 401 copies of questionnaire were returned while 30 copies not returned. The instrument was validated using face to face content validity by giving the tool to academicians to make necessary corrections so that the device can measure what it ought to measure. The tools used for test of hypotheses was Product Moment Correlation Co-Efficient. The reliability of the instrument was obtained using Spearman Reliability and Validity of Instrument. Ranking Order Correlation Co-Efficient which amount to a coefficient of 0.871 indicating a High Internal Consistency of the Instrument.

Table 4.1 Descriptive Statistics:	Total productive maintena	nce and employee	commitment of	the Brewing	Firms in South
East, Nigeria					

s/no	Questionnaire	Strongly	Agree	Undecided	Disagree	Strongly	Mean	Remarks
	items	Agree				Disagree		
35	Total Productive Maintenance In my organization we clean and lubricate our equipment everyday	270 (67.33%)	112 (27.93%)	9 (2.24%)	8 (2.00%)	2 (0.50%)	4.60	Agreed
36	We are made to realize that the quality of goods this organizations rendered by our machine	223 (55.61%)	150 (37.40%)	20 (4.99%)	5 (1.25%)	3 (0.75%)	4.46	Agreed
37	Weadoptaproactiveandpreventiveapproachtomaintenance	170 (42.39%)	220 (54.86%)	3 (0.75%)	5 (1.25%)	3 (0.75%)	4,37	Agreed
38	Everyone in this organization is involved in the process of keeping our machines in perfect working condition all times	230 (57.36%)	160 (39.90)	4 (1.00)	5 (1.25)	2 (0.50)	4.52	Agreed
	Mean	4.49						
	Cronbach Alpha	0.904						
39	Employee commitment This organisation makes workers feel	200 (54.61%)	180 (40.40%)	9 (2.24%)	8 (2.00%)	4 (0.75%)	4.41	Agreed
	it connection with it							

#### International Journal of Academic Management Science Research (IJAMSR) ISSN: 2643-900X Vol. 5 Issue 10, October - 2021, Pages: 69-77

40	All workers fit in	250	131	7	8	5	4.53	Agreed
	and understand the	(.62.34%)	(32.67%)	(1.24%)	(2.00%)	(1.25%)		
	organization							
41	The workers here	165	221	7	6	2	4.35	Agreed
	are loyal to the	(41.14%)	(55.11%)	(1.75%)	(1.50%)	(0.50%)		_
	organization and							
	less likely to leave							
42	Most of the	200	181	8	9	3	4.41	Agreed
	employees act as	(49.88%)	(45.13%)	(2.00%)	(2.24%)	(0.75%)		
	ambassadors for							
	this organization							
	Mean	4.42						
	Cronbach Alpha	0.922						
	Valid N (Listwise)	401						
	Overall Mean	4.46						

### Source: Fieldwork, 2020 Decision Rule

#### If mean < (Less than) 3.5 the respondents Disagree

#### If mean > (greater than) 3.5 the respondents Agree

Table above shows the responses to the likert scale statement and this sample mean (x) respect of the total productive maintenance and employee commitment in the Brewing Firms of South East, Nigeria. For the statement on whether in their organization they clean and lubricate their equipment every day, 270 (67.33%) of the respondents strongly agreed that in their organization they clean and lubricate their equipment every day, 112(27.93%) of the respondents agreed, 9(2.24%) of the respondents were undecided, 8 (2.00%) and 2(0.50%) of the respondents disagreed and strongly disagreed respectively that in their organization they clean and lubricate their equipment every day, giving the mean of 4.60, this shows that in their organization they clean and lubricate their equipment every day, since the mean is> 3.5

For the statement on whether they are made to realize that the quality of goods the organizations rendered by their machine, 223 (55.61%) of the respondents strongly agreed that they are made to realize that the quality of goods this organizations rendered by their machine, 150 (37.40%) of the respondents agreed, 20 (4.99%) of the respondents were undecided, 5(1.25%) and 3(0.75%) of the respondents disagreed and strongly disagreed respectively that they are made to realize that the quality of goods the organizations rendered by their machine, giving the mean of 4.46. this shows that they are made to realize that the quality of goods the organizations rendered by their machine, since the mean is> 3.5

For the statement on whether they adopt a proactive and preventive approach to maintenance, 170 (42.39%) of the respondents strongly agreed that they adopt a proactive and preventive approach to maintenance, 220 (54.86%) of the respondents agreed, 3(0.75%) of the respondents were undecided, 5(1.25%) and 3(0.75%) of the respondents disagreed and strongly disagreed that they adopt a proactive approach to maintenance, giving the mean 4.37. This shows that they adopt a proactive and preventive approach to maintenance, 3.5

For the statement on whether everyone in the organization is involved in the process of keeping their machines in perfect working condition at all times, 230 (57.36%) of the respondents strongly agreed that everyone in the organization is involved in the process of keeping their machines in perfect working condition at all times, 160 (39.90%) of the respondents agreed, 4 (1.00%) of the respondents were undecided, 5 (1.25%) and 2 (0.50) of the respondents disagreed and strongly disagreed that everyone in the organization is involved in the process of keeping their machines in perfect working condition at all times, 160 (39.90%) of the respondents agreed, 4 (1.00%) of the respondents were undecided, 5 (1.25%) and 2 (0.50) of the respondents disagreed and strongly disagreed that everyone in the organization is involved in the process of keeping their machines in perfect working condition at all times, giving the mean 4.52, This show that everyone in the organization is involved in the process of keeping their machines in perfect working condition at all times, since the mean is> 3.5

For the statement on whether the organisation make workers feel the connection with them, 200(54.61%) of the respondents strongly agreed that the organisation make workers feel the connection with them, 180(40.40%) of the respondents agreed, 9(2.24%) of the respondents were undecided, 8(2.00%) and 4(0.75%) of the respondents disagreed and strongly disagreed respectively that this

organisation make workers feel the connection with them, , giving the mean of 4.41. this shows that the organisation make workers feel the connection with them, since the mean is > 3.5

For the statement on whether all workers fit in and understand the goals of the organization, 250 (.62.34%) of the respondents strongly agreed thatall workers fit in and understand the goals of the organization, 131(32.67%) of the respondents agreed, 7 (1.24%) of the respondents were undecided, 8 (2.00%) and 5 (1.25%) of the respondents disagreed and strongly disagreed respectively that all workers fit in and understand the goals of the organization, giving the mean of 4.53. This shows that all workers fit in and understand the goals of the organization, since the mean is> 3.5

For the statement on whether the workers are loyal to the organization and less likely to leave, 165(41.14%) of the respondents strongly agreed that the workers are loyal to the organization and less likely to leave, 221(55.11%) of the respondents agreed, 7 (1.75%) of the respondents were undecided, 6 (1.50%) and 2 (0.50%) of the respondents disagreed and strongly disagreed respectively that the workers are loyal to the organization and less likely to leave, giving the mean of 4.35. This shows that the workers are loyal to the organization and less likely to leave, since the mean is > 3.5

For the statement on whether most of the employees act as ambassadors for the organization, 200(49.88%) of the respondents strongly agreed that most of the employees act as ambassadors for the organization, 181 (45.13%) of the respondents agreed, 8 (2.00%) of the respondents were undecided, 9 (2.24%) and 3 (0.75%) of the respondents disagreed and strongly disagreed respectively that most of the employees act as ambassadors for the organization, giving the mean of 4.41. this shows that most of the employees act as ambassadors for the mean is> 3.5

On the average, the respondents agreed that there is significant relationship Brewing total productive maintenance and employee commitment in the Brewing Firms of South East, Nigeria; since overall mean (4.46) is > 3.5

## **Test of Hypothesis**

H<sub>4</sub>: There is no significant relationship between total productive maintenance and employee commitment of the Brewing Firms in the South East Nigeria

#### Table -4.2a Descriptive Statistics

	Mean	Std. Deviation	Ν
Total Productive Maintenance	1.4090	.69808	401
Employee Commitment	1.5411	.71689	401

#### Table 4.2b Correlations

		Total	Employee
		Productive	Commitment
		Maintenance	
Total Draduative	Pearson Correlation	1	.895**
Naintenance	Sig. (2-tailed)		.000
Maintenance	Ν	401	401
	Pearson Correlation	.895**	1
Employee Commitment	Sig. (2-tailed)	.000	
	Ν	401	401

\*\*. Correlation is significant at the 0.01 level (2-tailed).

The descriptive statistics of total productive maintenance and employee commitment, shown in Table 4.2a. The table shows a mean response of 1.4090 and standard deviation of .69808 for total productive maintenance and a mean response of 1.5411 and standard deviation of .71689for employee commitment and number of respondents 401. A close examination of the standard deviation values reveals a significant difference in the scores of the two variables. This implies that the variability of data points between the dependent and independent variables is about the same.

Table 4.2b displays the Pearson correlation coefficient for total productive maintenance and employee commitment. The correlation coefficient shows a value of 0.895. This value indicates that correlation is significant at 0.05 level (2tailed) and implies that there is a strong positive relationship between total productive maintenance and employee commitment(r = .895). The computed correlation coefficient is greater than the table value of r = 0.196 with 399 degrees of freedom (df. = n-2) at alpha level for a two-tailed test (r

= .895, p< .05). As a result, since the computed r = .895, is greater than the table value of 0.196. We reject the null hypothesis and concluded that there was a strong positive relationship between total productive maintenance and employee commitment of the Brewing Firms in the South East, Nigeria (r = .895, P<.05).

#### **Discussion of Result**

## What is the relationship between total productive maintenance and employee commitment of the Brewing Firms in South East, Nigeria?

The study reveals that there is a significant relationship between total productive maintenance and employee commitment in the Brewing Firms in South East, Nigeria. Hope, Obianuju and Augustine (2016) Assert that maintenance autonomy has a significant positive relationship with employee commitment. Kathleen, Roger and Kristy (2001) total productive maintenance has a positive and significant relationship with low cost, high level quality and strong delivery performance. Mohammad and Masoud (2015) suggest a significant positive relationship between implementing a total productive maintenance system and achieving excellence goal of organization. Halim, Mohamed, Chandrakantan and Siti (2013) found the moderating effect of technical complexity in the production process on the relationship between total productive maintenance practices and manufacturing performance, Gurvinder (2017) Total productive maintenance milk industry will as increase in productivity, improve the quality of the product, reducing the cost of production line and waste due to breakdowns in machine and providing a healthier and safe work environment. Therefore, TPM optimizes equipment effectiveness, eliminate breakdowns and promotes autonomous maintenance by operators through day to day activities involving total workforce which ensures their commitments

#### Summary of Finding, Conclusion and Recommendation

#### Summary of Finding

There is a significant positive relationship between total productive maintenance and employee commitment of Brewing Firms in South East, Nigeria. (r = 0.895).

#### Conclusion

The study concluded that TPM is a comprehensive, resource-based maintenance management system that strongly focuses on improving equipment effectiveness, productivity and eliminating production losses. Total participation from all employees including top management and operators are vital in TPM. More importantly, the role of top management stimulates the contribution of operators to achieve zero breakdowns, zero stoppages and safer working environment

#### Recommendation

Brewing plant in South East Nigeria should always carry out total productive maintenance, because lack of equipment maintenance widely affects the speed of production and ultimately slows down the process of production. If production process gets slow down due to lack of appropriate maintenance of equipment it may cause the prevent quality defects and minor stoppages. Since the equipment keeps operating, these kinds of losses are not recorded and they remain hidden.

#### REFRENCES

Ahuja, I.P.S & Khamba, J.S. (2008) "Justification of TPM initiatives in Indian manufacturing industry for achieving core competitiveness," *Journal of Manufacturing Technology, Vol.19 (5), pp. 645-669*,

Andersson, R.; Manfredsson, P.; Lantz, B. (2015)Total productive maintenance in support processes: An enabler for operation excellence. *Total Qual. Manag. Bus. Excell*, 26, 1042–1055

Blanchard, B.S. (1997) 'Enhanced approach for implementing total productive maintenance in the manufacturing environment', *Journal of Quality in Maintenance Engineering, vol. 3, issue 2, pp.69-80.* 

Chukwutoo, C. I and Paschal, S. E (2018) Optimization of production system: An application of total productive maintenance (TPM) Archives of Current Research International13(1): 1-9

Eti, M.C.; Ogaji, S.O.T.; Probert, S.D.(2004)*Implementing total productive maintenance in Nigerian manufacturing industries.* Appl. Energy 2004, 79, 385–401. [CrossRef]

Gurvinder, S (2017) The implement the total productive maintenance (TPM) in the Milk Industry Proceedings of ISER 77<sup>th</sup>International Conference, Toronto, Canada, 28th-29th

Halim M, Mohamed N, Chandrakantan S and Siti N (2013) Total productive maintenance and manufacturing performance: Does technical complexity in the production process Matter. *International Journal of Trade, Economics and Finance, Vol. 4, No.* 

6,

# Hope N, Obianuju, M and Augustine, E (2016) Total productivity maintenance and performance of selected Aluminum Manufacturing companies in Anambra State, *Journal of Business and Management*. *Volume 18, Issue 1., PP 67-73*

Kathleen E, Roger G. and Kristy O. (2001) The impact of total productive maintenance practices on manufacturing performance, Journal of Operations Management 19 (2) 39–58

Leonard, D. (2010)"Quality management practices in the US homebuilding industry", The TQM Journal, 22 (1), 101-110.

McKone, K. E., Schroeder, R. G., and Cua, K. O. (2001). The Impact of total productive maintenance Practices on Manufacturing Performance. *Journal of Operations Management*, 19(1), 39–58

Melesse W.W and Ajit P. S (2012) Total Productive maintenance: A case study in manufacturing Industry. Global Journal of researches in engineering Industrial engineering Volume 12 Issue 1Version 1.

Meyer JP, Allen NJ.(1997) Commitment in the workplace: Theory, research, and application. Thousand Oaks, CA: Sage;

- Mohammad H and Masoud G (2015) Impact of implementing total productive maintenance system on organisational excellence based on EFQM model, *Int. J. Business Excellence, Vol. 8, No. 2, 197*
- Naguib, H. 1993, 'A roadmap for the implementation of total productive maintenance in a semiconductor manufacturing operations', *IEE/SEMI International*, pp.89-97

Pettersen, J. (2009) Defining lean production: Some conceptual and practical issues. TQM J. 21, 127–142.

Psomas, E.L. & Fotopoulos, C.V. (2009), "A Meta A nalysis of ISO 9001:2000 Research Findings and Future Research P roposals", International *Journal of Quality and Service Sciences*, 1(2), 128-144

- Riis, J.O., Luxh, J.T. and Thorsteinsson, U. 1997, 'A situational maintenance model', International *Journal of Quality and Reliability Management, vol.* 14, no. 4, pp.349-366
- Schmidt, S. 1997, 'Total Productive Maintenance and change over reduction engineering A way to increase quality and productivity', Portland International Conference on Management and Technology, p.702
- Swanson, L. (2001) 'Linking maintenance strategies to performance', *International Journal of Production Economics*, vol. 70, issue 3, pp.237-244.