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Effect of Maintenance Culture on Firm Performance of Rice Mill in Anambra State

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Abstract: *The study examined the effect of maintenance culture on firm performance of rice mill in Anambra state. The problem of poor maintenance and neglects of equipment was the motivating factor for the research. The objectives of this study were basically to assess the effect of maintenance culture on firm performance. This study is anchored on structural empowerment theory. The population of the study comprised of all the bottled water companies in Nnewi. A sample size of 552 employees was drawn from the population using purposive sampling of which 530 copies of questionnaires were duly completed and returned showing 95% response rate. Research hypotheses were tested using Analysis of variance (ANOVA) which was carried out with the aid of Statistical Package for Social Science (SPSS) version 23. Findings from the study revealed that maintenance culture has positive significant effect on firm performance of rice mill in Anambra state. Finance has positive significant effect on firm performance of rice mill in Anambra state. In view of the findings, the study therefore, recommends that Autonomous maintenance teams consisting of operators, engineers and managers should be set up with the aims of improving personnel competence and equipment performance. Firms should continuously adopt preventive and corrective measures of maintenance to reduce cost of repairs and intermittent top page of production processes.*

Keywords: *maintenance culture, finance, ANOVA, Rice Mill, firm performance*

1.Introduction

Maintenance culture in this study suggests the habit of regularly and consistently keeping a building, machine, facilities, equipment, infrastructures etc in good and working condition. In support of this assertion, Suwaibatul-Islamiah, Abdul-Hakim, Syazwina, & Eizzatul (2012) posited that maintenance culture is the values, way of thinking, behaviour, perception and the underlying assumptions of any person or group or society that considers maintenance as a matter that is important and practices it in their life. The basic role of maintenance has traditionally been shallowly perceived as to fix broken items.

Taking such a narrow view, maintenance activities have been confined to the reactive tasks of repair actions or item replacement. Thus, this approach is identified as reactive maintenance, breakdown maintenance, or corrective maintenance. (Fallahian-Najafabadi,Mahbod, and Karimi,(2014). In as much as there is every necessity to progress from this narrow perception, it is equally important to acknowledge that the maintenance function has experienced noticeable changes in the last three decades. A more evolved view of maintenance as seen from the perspective of Gits, (2018) is defined as all activities aimed at keeping an item in, or restoring it to the physical state considered necessary for the fulfilment of its production function. In other words, maintenance is the combination of all technical engineering, financial and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. This conception of maintenance by Gift, (2018) encompasses the proactive tasks such as the regular servicing and periodic inspection, preventive replacement, and condition monitoring.

Also, for optimum performance of equipment, it is incumbent in maintenance department to carry out further tasks such as planning of work, purchasing and control of materials, personnel management, and quality control, otherwise referred to as terotechnology. Thus terotechnology encompasses of design of production machinery, replacement of faulty part at the right time, and proper repairs. With such complexity of responsibilities and activities geared towards ensuring equipment availability by enhancing overall equipment effectiveness, maintenance is no longer just a simple function to manage. Ensuring equipment availability is vital as this will enable production of products at the compulsory quantity and quality levels. According to Murray et al. (2016), the scope of maintenance management includes every phase in the life cycle of technical systems (plant, machinery, equipment, and facilities), specification, acquisition, planning, operation, performance evaluation, improvement, and disposal.

Lantz, (2017) is of the view that maintenance problem-solving is primarily concerned with four areas: maintaining critical systems, fixing the problem quickly and faster than the last time, determining what is causing the breakdown to happen so frequently, and identifying the 20 percent of breakdowns that are consuming 80 percent of the company's resources. To diagnose these problems require great care through conducting periodic evaluation and timely maintenance to keep equipment operating under acceptable level of service. When the problems are identified, information has to be transmitted to Management. Management needs information on maintenance performance for planning, organising, co-ordinating, financing and controlling the maintenance process. The information needs to focus on the effectiveness and efficiency of the maintenance process, its activities, organization, cooperation and coordination with other units of the organization.

This studied while agreeing with the above mentioned has adopted the definition of Enofe and Aimienrovbiye, (2018) which consider maintenance generally as activities which include fixing any kind of equipment or component in a working order to prevent fault or error from arising, so as to perform its intended function, ensuring safety, as well as protecting the environment considering the fact that environmental management has turn out to be one of the principal issues companies are facing as a result of it's effect on all other aspect of the company's operations. Adopting this definition will give us the latitude to discuss some pertinent issues surrounding maintenance which most studies have often ignored. For instance the study will dwell on safety and the maintenance of the buildings housing the production plant, on maintenance of customers and staff, product quality and how employees capacity development are handled in any manufacturing firms.

These are issues which should not be ignored if one must discuss maintenance in the real sense of it. We cannot equally ignore the index of maintenance effectiveness which was developed based on the market share growth in this direction. Parida and Kumar (2016) are of the opinion that the growth signifies the increase of the product demands in the industry. The importance of stakeholder satisfaction as external factors that drive performance towards effective maintenance will also be highlighted. According to Kennerly and Neely (2017), for large companies, stakeholders' opinion and satisfaction are really

important for business because they hold the key for a company's mission and vision. Accordingly, it will be of utmost importance if maintenance system is planned and conducted based on stakeholder satisfaction.

Apart from production companies, in-depth study shall be undertaken in some selected service companies. These companies may not be operating on heavy machinery, but most of them operate computers and accessories, photocopiers and accessories, and above all, are housed in buildings which themselves must be maintained.

i. Theoretical Framework

This theory known as Structural Empowerment theory was propounded by Kanter (1977). Kanter maintained that the behavior of employees and their performance in the organization depend on how empowered and equip they are. Empowerment in this theory means the level of opportunity given to the employees for growth and mobility, the amount of power possessed by employees to access resources and information to carry out their duties as well as the kind of equipment available to them to carry out their function in an organization. This theory states that when employees are provided with access to information, resources, support and the opportunity to learn and develop, then it can be said that such an organization promotes empowerment (Larkin, Ciepial, Stack, Morrison & Griffith 2008).The rationale for anchoring this study on the theory of Structural Empowerment is because part of the problem that contributed to frequent machine breakdown is probably lack of empowerment and support from the management. The operatives seemed not empowered to carry out simple maintenance activities and to exercise maintenance autonomy.

Empirical Studies

Chukwuemeka, and Nsobundu,. (2013). aimed at integrating the efficiency and effectiveness of the production function into equipment and plant maintenance in Cutix Cable Manufacturing Plc. Nnewi, Nigeria, through the review of their maintenance input for the year 2011. The objectives were to identify the lapses in their maintenance culture using the maintenance performance productivity model. To identify the effectiveness and efficiency of their production system using the overall equipment effectiveness/efficiency model (OEE) and as well establish the correlation between their performance and the productivity of their system using the statistical analysis technique. Findings revealed 98.8 hours of breakdown resulting to ₦990000($1.55B) being cost of breakdown repair. Equipment effectiveness/efficiency varies throughout the year 2011 with values between 81% and 86%. It is therefore recommended by the investigation that Cutix Cable Plc should adopt and implement the total productive maintenance strategy to improve the Equipment Availability (EA) and its utilization, as well as the Production Rate (PR), and the Quality Rate (QR). This research will help CUTIX Cable manufacturing Plc to adopt the most effective maintenance strategy.

Prasanth, Poduval, Jagathy Raj, & Pramod (2015). Total Productive Maintenance Role of Interpretive Structural Modeling and Structural Equation Modelling in analyzing Barriers in its Implementation –A Literature Review on Total Productive Maintenance and the barriers in implementation of Total Productive Maintenance (TPM) were carried out.The study begins with a brief description of TPM and the barriers in implementation of TPM. Interpretive Structural Modeling (ISM) and its role in analyzing the barriers in TPM implementation was examined and explained in brief. Applications of ISM in analyzing issues in various fields are highlighted with special emphasis on TPM. The studied moves on to introduce the Structural Equation Modelling (SEM) and its role in validating ISM in analyzing barriers in implementation of TPM. The studied concludes with a gap analysis from the current literature, research which can be further carried out and expected its outcomes from the proposed research.

Oliveira, Lopes, and Figueiredo (2014), studied the maintenance management practices of companies of the industrial pole of Manaus Brazil. A questionnaire was developed and sent to the company of the industrial pole and the returned questionnaire data was analyzed using descriptive statistics. The study found that the effectiveness of the maintenance function in an industrial unit depends on the equipment involved, the training of personnel, and mainly on the adopted strategy for maintenance management. In addition to modern equipment ownership, it is necessary to understand the concern about flaws, in its details, in order to attack not the consequences but the causes using the most appropriate tools and techniques.

Mutloane (2009), did a study on maintenance management for effective operations management at Matimba Power Station in South Africa. The study found that experience has shown that progress of implementing change is slow if there was no proactive involvement of all participants and stakeholders, especially employees at lower levels involved in operations. A work management process, which is one of the pillars of total productive maintenance, was recently implemented at Matimba and is currently experiencing teething problems which are being attended to.

Fredriksson (2012), did an analysis of maintenance strategies and development of a model for strategy formulation in Sweden. The study found that More frequent and maintenance focused education opportunities for the maintenance craftsmen concerning new technology in assets will contribute to a higher level of efficiency and effectiveness for the maintenance work. The management should encourage the craftsmen's ideas and utilize the competence they possess. This will also engage and motivate them to improve the organization which will facilitate reaching the desired state –a proactive environment. It is also essential that education concerning the ongoing changes within the organization is provided so that the customers gain knowledge about what is changing, why it is changing and what the objective of the change is. Otherwise, the resistance to change will most certainly be high.

Mwangi (2014), investigate the maintenance management practices and operational performance in electricity producing stations in Kenya. The study found that there was no one particular practice which was largely applied in relation to the others. However broadly, preventive maintenance practices were largely applied than reactive maintenance. The study found out that the level of top management support for maintenance management was low. This was causing a decline effect on operational performance.

Choka (2012), did a study on the impact of maintenance management systems on maintenance condition of built facilities of public universities in Kenya. A survey of maintenance condition of the buildings in the two public universities studied revealed that their condition is in need of repair especially the older building stock. In Kenyatta University most of the buildings were relatively new and so majorities have not been subjected to a lot of disrepair.

Kariuki (2013), studied the maintenance practices and performance of power sector in Kenya. The case study was done with a target population of all the three operational areas with different generation technology of hydro, thermal and geothermal. The study used primary data which was gathered by means of a self-administered questionnaire issued to respondents and secondary data which was extracted from internal operational reports in Eastern hydro power stations. The study established that KenGen has in place good maintenance practices. When they were benchmarked with world best practice, it was apparent that breakdown maintenances works were extremely high but surprisingly the plants availability recording very good results. There was a weak relationship between O&M cost, number of breakdowns and the plant availabilities.

Hamimah & Fauzi, (2012) investigates current implementation in maintenance management and to make recommendations to improve infrastructure maintenance management in Malaysian local authorities Through the interviews and questionnaires that are directly being conducted with the maintenance personnel give a clearer picture on the problems arise by the maintenance personnel in local authorities

during carrying out their infrastructure maintenance work. Approach used by most of the local authorities in taking action on the maintenance of infrastructure works are almost the same except their different ways of selecting or appointing the contractors are a bit different. Views from the maintenance personnel regarding the obstacles arise in carrying the maintenance works has to be address correctly, so that the maintenance works for the infrastructure facilities are to be carried out effectivel

Adedokun (2011) Analyzed Education for maintenance culture in Nigeria: Implications for community development. Two null hypotheses were formulated and tested at 0.05 level of significance. The survey design used for the study are sample of 120 men and women at various governmental levels which were randomly selected from Oyo State Ministry of Agriculture, Department of Works and Services Ibadan North Local Government and the Ministry of Commerce and Industry. A 12-item questionnaire called Maintenance Culture for Development scale was constructed on a four-point Likert-type scale and used for data collection. The data was analyzed using chi-square statistical tool. The result indicated that there was a significant relationship between maintenance of facility and development and that education has a significant impact on maintenance culture. Based on the result, it was recommended that people should be educated and encouraged to adequately and properly maintain facilities in their care so as to facilitate rapid process of develop

Eke, Musa Fashubaa & Owolabi, (2017). examined maintenance culture on public buildings in Nigeria with Osun State as a case study. The study further assesses the factors considered during design and construction stage and the extent of maintenance works on public buildings. These factors were identified and classified using a structured questionnaire that explains the relationship between factors and the elements. Findings were validated and supported by case study projects. This research equally pointed to ways of managing maintenance activities in the construction industry with a view of understanding the occurrence.

Iyamu Imasuen, and Osakue (2018) investigated the maintenance culture of public primary and secondary school in Edo State.. A research designed questionnaire titled, “Analysis of maintenance culture in public primary and secondary schools in Edo State” was used to collect relevant data from respondents. The Cronbach alpha was use to test for the internal consistency of the items in the questionnaire. It gave an acceptable reliability ofα=0.75.The data obtained were analyzed using descriptive statistics of mean and standard deviation. The result indicated that, poor funding by state government, the effect of the poor value system of the community members around the school environment, and poor school management were the causes of poor maintenance culture of public primary and secondary school building in Edo State. It was therefore concluded that, the government should expedites action on funding and also create public awareness on the importance of maintaining school building.

3 Methodology

This study was concerned with maintenance culture and firm performance: An analysis of rice mill firms in Anambra State, It therefore requires a specified methodology that will be used to obtain relevant data, present, analyze and interprets the result of the study. The study therefore descriptive survey design to assess the effect of strategic planning on employees performance in an organization. Survey research design was chosen because the sampled elements and the variables that are being studied are simply being observed as they are without making any attempt to control or manipulate them. Anambra state is the area of study. The primary source of data was used in this study because of the variables that were used. Questionnaire and semi-structured interview were used to collect data from manager-owners and other relevant officers in the selected firms. This describes characteristics of rice mills firms in the five, Anambra, which constitute the universe of this study. The population of interest therefore consist of all rice mill firms in Anambra state (between 2016 and 2021). Which is Coscharis rice mill with population of 1322, Anambra rice mill Amichi with a total population of 672, and Udemezu rice mill Omor with the

population of 876, this give the total population of two thousand eight hundred and seventy (2870). Thus the population of this study is 2870 respondents, while the sample size were 552 through the Borg & Gall (1973) formula. The researcher adopted the use of questionnaire as a method of data collection instrument to the identified set of respondents. The study will adopt ANOVA for analysis of the collected data.

4. Data Presentation and Analysis

Introduction

This chapter presents the data obtained from the respondents through the administered copies of questionnaire, five hundred and fifty-two (552) were administered. However, five hundred and thirty (530) copies of the questionnaire were retrieved. Therefore the analysis and interpretation of data is based on the returned questionnaire.

4.3 Test of Hypotheses

To further justify the results, ANOVA test was conducted to examine the relationship maintenance culture and firm performance. The results were shown in the ANOVA Table below;

Hypotheses one

Ho_1: Maintenance culture has no significant effect on firm performance in rice mill in Anambra state.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1863344666.602	2	53238419.046	67.0767	.008
Within Groups	397198.932	528	397198.932		
Total	1863741865.534	530			

Source: **SPSS Version 20, 2021**

The test table reveal that small significance value (F. sig<.05) indicate group differences. Since the F-value of 67.0767 which has a significance of .008 is less than .05 (i.e .001<.05), there exist significant difference among the variables. Therefore, null hypothesis is rejected and alternative hypothesis is accepted, which states that maintenance culture has significant effect on firm performance in rice mill in Anambra state.

Hypothesis Two

Ho_2: finance has no significant effect on firm performance in rice mill in Anambra state.

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	18816621102816.195	2	537617745794.748	11.6295	.000
Within Groups	64810152397.620	528	64810152397.620		
Total	18816621102816.195	530			

Source: SPSS, Version, 20 2021

The small significance value (F.sig<.05) indicates that there is a group difference. Since the F-value of 11.6295 which has a significance value of .000 is less than .05 (i.e 000<.05). This implies rejection of null hypothesis and acceptance of alternative hypothesis which state that finance has significant effect on firm performance in rice mill in Anambra state.

5. Conclusion and Recommendation

Maintenance functions in Nigeria are under increasing pressure to improve quality maintenance and reduce maintenance and operational costs. The top management industries in Nigeria have not recognized this, and have not responded to focus on reliability cultured maintenance and continuous improvement. This paper, focused on elements of corporate culture to continuous improvement in the following areas: corporate culture; national culture, leadership, the learning organization; core competition; benchmarking; continuous improvement; and management style. Nigerian barriers in proactive maintenance in industries can be identified as lack of corporate culture, which could be identified by the management style, and maintenance strategy. An objective of this paper has been to gain an understanding of the subtle areas of maintenance and culture. One complication when studying quality maintenance and culture is that, the cultural influence not only comes from national culture, but from corporate culture.

Recommendation

From the findings the study recommends that

- Autonomous maintenance teams consisting of operators, engineers and managers should be set up with the aims of improving personnel competence and equipment performance..
- Firms should continuously adopt preventive and corrective measures of maintenance to reduce cost of repairs and intermittent top page of production processes.
- Firms should embark on continuous training programmes for their maintenance personnel as pillar for proper maintenance culture development.

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