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Effect of Technological Innovation on Personnel Skill of Selected Manufacturing Firms in Nigeria

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Abstract

Technology in any organization that has a significant influence on the quality and quantity of production of its goods or services. But despite this, technology is prone to constant change which organizations have to monitor, manage and cope with. Manufacturing firm that will like to be competitive and profitable should ensure that employees are trained and involved in the management of technological innovation for organizational survival. But most organization tends to undermine the contribution of employee in managing technological innovation, the outcome of which are low profitability and performance. This study examines how technological innovation influence personnel skill of manufacturing firms in Nigeria It also seeks to determine effective method of using technological innovation for improved performance in the Nigerian manufacturing firm. Two hypotheses were formulated to determine the relationship between technological innovation and personnel skill; and between technological innovation and performance. Question based on the hypotheses were formulated and 300 questionnaires were distributed to select 10 manufacturing firms in foods and beverages firms in Nigeria. Findings reveal that personnel skill do not have significant relationship with technological innovation. The study recommends that personnel skill should be considered in the management technological innovation for profitability, competitiveness and survival of the Nigerian Manufacturing firm.

Keywords: Technological Innovation; Personnel Skill; Manufacturing Firm; Organisation.

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1. Introduction

Often when the word "technology" is mentioned, what readily comes to mind are machines and other equipment used in production, but technology is much more than this as it refers to the sum total of knowledge or ways of doing things. The author in [22] noted that Technology includes inventions, techniques and the vast store of organized knowledge about everything from aerodynamics to zoology. Technology in most organization provided the required forces through various forms by which goods and services were produced. The author in [1] may be in forms of machine equipment information and communication made up of knowledge, tools, method and system directed to work in specific manner. Technology is made up of the hardware, the software and the brain ware. The hardware is the physical structure and logical of equipment, the software is knowledge and method used for production or output from the hardware and the brain ware is the reason for using the technology in a particular way. All these depend on a particular way. The author in [20] sees technology to be the result of man's learned and acquired knowledge or his technical skills regarding how to do things well. The state of technology determines the quality and quantity of goods and services produced. Organizational and national conditional performance and development are determined by the state and types of technologies. Technology also influences living conditions of individual and groups in organizations and nations and the relationship between them. To some people technology use a lot of labour and some use more of other equipment or capital. Investors and manage based their selection or the quantity of both to their price and prefer or choose the one with lesser price to maximize their profit. The choice is explicit but rapid and radical change and regulatory control may create problem that make it sometimes difficult to make a rational choice. The choice and the preference place on capital at the expense of labour may reduce labour co-operation, lowered their morale, productivity, create conflict that may reduce organizational profit. On the other hand choice of labour may reduce the quality and quantity of goods produced and lowered organizational profit, competitiveness and profitability. Investors constantly face the dilemma of making rational choice and to balance the needs for each of them so as to make sustainable profit. However, the author in [5] explained that a firm's strategy is expressed in the products and services it brings to the market which depended on the technology, once technology is mentioned, the means of production is assumed. The author in [2] sees technology as consisting of factors that are related to knowledge applied and machine used in the production of goods and services which have an impact on the business of the organization. The state of technology in any organization has a significant influence on the quality and quantity of production of its goods or services. This implies that organizations have to continually monitor, manage and cope with technological changes and advancement with a view towards innovation. This study examines how technological innovation influence personnel skill of manufacturing firms in Nigeria It also seeks to determine effective method of using technological innovation for improved performance in the Nigerian manufacturing firm. It uses both the descriptive and Regression analysis to examine technological innovation influence on personnel skill of manufacturing firms in Nigeria. Two (2) null hypotheses were postulated: They are to test whether: There is no significant relationship between technological innovation and personnel skill; and to examine if there is no significant relationship between technological innovation and performance.

2. Literature Review

2.1 Classification of performance proxies

Classes of performance proxies are:

1. Financial ratios: it is further classified into classical and modern financial ratios. They include return on assets, return on equity, return on investment, dividend yield, earning per share, Tobin's Q and others.
2. Non-financial ratios: Examples are quality of management, customers' satisfaction, quality of employees, human resource capabilities and others.

The author in [3] noted that for a long time, performance of firm has been perceived through its ability to obtain profit alone i.e. financial indicators. But this has changed over time, as non-financial indicators like; investments in intangible assets may be better predictors of future financial performance than historical measures and subsequently that these predictors should be reported by firms author in [13]. As the concept of performance is been defined differently, various measures have emerged, classified and are been used differently in as much the information provided satisfy the interest of all stakeholders. Author in [14] noted that financial measurement is one of the tools which indicate financial strength, weakness, opportunities and threats. Also, company's management use financial indicators (such as Return on Asset, Return on Equity, Return on Investment and Dividend Yield) to measure, report and improve its performance status. More so, it could be assumed that in order to obtain a global situation of an economic entity at a specific time, it is important that evaluation of performance is based on a balanced multidimensional system that includes both financial and non-financial measures. Financial ratios are the oldest, simple and practical financial planning analysis tools, author in [6]. They are used by both internal and external financial data users for economic decisions. Improvement and increase in firm performance will be reflected by such factors as increased profitability, efficiency improvements and increased output, author in [19]. These classifications and factors are thus measured through the use of either financial or non-financial ratios as well as variables. Financial performance variables include widely used measures embracing levels, growth and variability in profit which relate to assets, investment and owner's equity, author in [24]. Examples of these ratios include; market value, assets, cash flow, equity, sales and others. These financial ratios are further classified as classical and modern ratios. While the non-financial ratios, are considered and measured as environmental, strategic, formal and informal factors. Examples include; human resource capabilities, human resource management effectiveness. Although, financial accounting indicators (classical ratios) are seen to be subject to numerous bias (negative opinions) not present in market – based measures (modern ratios), considered to be generally accurate to reflect firm's financial health. However, accounting measures help to provide information not found in the market based measures. Author in [21] also criticized accounting ratios that it is not a good proxies and measures for a firm's operating performance, since it does not consider the replacement cost of assets rather their historical value. Finally, Author in [10] came up with the conclusion that despite their criticisms, they are useful measures to approximate for firms profitability and are used by firms for internal decision making.

2.2 Technology Innovation and Human Resource Performance

Man in seeking for his survival and recognition tends to achieve them by providing for his needs and interest and that of others. Author in [18] succinctly combined the two positions. Man to them is a social animal that has natural tendency to seek out for others. In doing so, he finds and fulfills himself through his interaction with others. Social network provide the settings in which individuals struggle to find significance for themselves by relating with others. Man's sense of self and of his own value therefore depends on the presence of others and of his interaction with others throughout his life, author in [11]. Biological, social and psychological necessities, which are mainly due to his interaction with others and with his environments, provide inspiration or motivate individuals to innovate. Author in [17]. However, author in [16] placed emphasis on individual distinctness in their relationship to organisation. An individual sees himself as distinct and acts as if he is distinct. Author in [7] sees individual groups in similar way. He argued that group identity is maintained primarily by inter group comparison, and groups seek positive interest between themselves and other reference groups to enhance their self-esteem. Organisation in this regard subsumes a multiplicity of identities in individual group, each of which is appropriate for a given context. Author in [11] see individuals and groups as separate from organisation, and interact with other organisations by a process of inter organisations comparison. Dutton and his colleagues (1994) is of the view that individual members' sense of identification is created by organisational identity which depends on the attractiveness of their perceived organisational identity, the consistency between individual self-context and distinctiveness of organisational identity. In these contexts, individual, groups and teams are symbiotically connected and they interact and depend on each other to achieve their interests. These explain why organisations should lay emphasize on the promotion and protection of individuals and group interests for managing technology innovation. It is human effort or its cumulative knowledge that further promotes technology innovation to enable organization and nation cope with change. The explosion of knowledge that is taking place today is the innovation of the human resource in the past. Since the present condition is not static, it is dangerous for an organisation and nation to rely on the present achievement, hence, the need to innovate whether they are succeeding or failing. Organisations and nations should not wait for technology limit before innovation; hence, human resources require constant nurturing and training to enable them to recognise or capture the limit and attack, rather than to allow change to overwhelm them. The "attacker" constantly analyses the present, and peeps into the future, to understand and determine environmental threat and limitation and launch attack. Defending the present condition may provide false security that cannot stand the test of time. Defender may be deceived by security of economic performance that may make it difficult for it to reposition itself or to move along with the changing conditions. Managers in this situation may find it "too late" to respond and doomed by doing "too little" author in [15]. Human resource performance is intimately linked to technological change and technological innovation. Technological change could be effectively managed through human resource joint approach. Individuals can innovate and achieve great technological breakthrough but the complexities of modern technology require effective combination of different innovations based on different aspects of technology. Hence human resources need to work as an individual and as a team and combine their innovation for production of new technology, goods and services. Individual innovation is meaningful and workable when combined with that of others. The collective innovation is also impossible without individual innovation, hence the two are separate, but could only work in the production process when they are combined and effectively managed to produce result, author in [12] noted that managers need to provide enabling work environment that enhances collaboration and team-networking to encourage employee initiative to innovate for

organisational survival and competitiveness. Only the human element can check the abuse of technology, which poses portent dangers to the survival of organisations, nations and humanity in general. Technology can be used to make and to destroy. “Peoples forgetfulness, confusion, anger, despair can make them to use technology in ways that it could endanger their very existence and even destroy them” The author in [9] had earlier succinctly put it that man had used technology to create his own monster. Weapons of mass destruction are produced with energy, time and money that are enough to solve the problems of poverty in all parts of the world.

2.3 Technology Innovation and Organisational Performance

The starting point of technological development, changes and innovations is always people. It is the people who create, initiate, use and manage ideas that are the bases and directions of technology. Identity theory provides a way of assessing individual relations to organizational objectives and national goals and enables us to understand human resource inspiration and readiness for technology innovation. The motivation the individual receives determines the extent of its identity and his readiness to innovate for organisational and national development. This theory to author in [11] provides strategies intended to change beliefs, attitudes, values and structure of an organisation so that they can better adapt to new technologies, market challenges and changes. It can also be used to plan intervention in organisation process to increase organisation effectiveness and health. The author in [17] demonstrated the relationship between organisational development and managerial effectiveness. Organisational efficiency requires that somebody in the strategic position should feel the need for innovation and change. These include the need to:

- Change managerial strategy;
- Make organisations more consistent with both individual needs and the changing needs of the environment;
- Change structure and roles;
- Change the motivation of the workforce;
- Make better planning;
- Improve inter-groups collaborations; and
- Adaptation to new environment.

Organisations in the competitive global economy require managers that can combine neatly organization and individual interests for the common good. Today’s workers want to participate in drawing up of management plans, in decision making and want to be recognized and appreciated for their contributions. Continuous organizational improvement require managers and team leaders that are capable of bringing out new ideas and techniques from their subordinates and can create environment in which new thinking is encouraged and welcomed. Drucker (1985) argues that innovation comprises of both hard work and inspiration. Managers

should not be rigid in managing their employees but allow them to use their initiatives. Severe and inflexible rules can be easily circumvented. High labour turnover in the Nigerian Telecommunications industry in vital positions and sections, most especially the engineers by the time this research was conducted was not because of poor salary but to the mismanagement of their skills and lack of recognition for their innovation. (Dauda, 1997). Top management should establish the right roles and processes, set clear goals and relevant measures and review progress at every stage. Innovation experience and opportunities may occur through unexpected occurrence, ingenuities, process needs, industry and market changes, demographic changes, changes in perception and new knowledge. All these when properly understood and managed promote technology innovation. In spite of the changing conditions that characterised the work place of the 21st century, man's domination in the society and organisational settings remain the same. Many aspects of management may have changed, but the changes have not altered or removed the dominating position of human resources. Technology, most especially information technology have only expanded man's minds and intellect but have not replaced him. Human resource capability to manage other resources and to adapt to the changing conditions makes his position dominant. Human resource management theories and practices could therefore be useful to provide effective methods of managing all other aspects of the organisation for the achievements of its objectives. Managers, supervisors and employees have to practice and operationalise management theories to promote technology innovation for organisational competitiveness. It is the realizations of these that have made many organisations to consistently promote the relevance of human resource management to technological innovation. In spite of the dynamic technological changes, human resource still needs to apply his skills and intellect in practical ways for improved technological innovations. Whenever management styles of top managers deviate from human resource management theories, concepts, models and practices, they are often off-target in their efforts to improve employee performance for technology innovation and for the overall organization improved performance. Human resource management provides managers with adequate tools for improving technology innovation (Boyd, 1984). It is imperative for managers to employ human resource management theories, concepts and practices for the progress and development of their organizations and nations. They should plan, staff, organize, control and lead their human resources in the most appropriate manner. They should also acquire, train, appraise, reward and compensate them to get the best from them. These to Dessler (2008) will enable organization to hire the right employee, placed them on the right job, experience low turnover and motivate their employee to work efficiently and effectively and to motivate their employees to innovate. Many industries embark on improving customer satisfaction by getting the latest machines to improve their organisations performance. They believe that acquisition of latest technology will improve operating practices and the quality and quantity of their goods and services. This is often complemented by other opportunistic customer responsive practices such as aggressive marketing strategies, sales promotion, public relations and others. But in spite of these, many organisations still fail to reap the benefits of their strategic innovations because these innovations are not supported by effective human resource strategies for their implementation. All emphasis were often placed on what can be easily measured and calculated, and innovation processes were often dominated by finance, marketing and operational staff inputs, and human resource managers were often considered as an appendage rather than active participant in the management effort to improve technology innovation. Barrow (1997) argued that business and industrial growth could only be enhanced if effective human resource management strategies are properly implemented in all units of the organization such as

marketing, production, finance and others. Most developing nations of Africa, Asia and Latin America could not harness their natural, material and human resources for socio-economic development as a result of their inability to utilise science and technology. This is not unconnected with the failure of their governments to encourage technology innovation and/or lack of commitment of their people to innovate. But the advanced countries of Europe, America, Russia and few emerging countries such as China have succeeded through the efficient application of science and technology in transforming their material and human resources into goods and services and dominate the world market. In the developed countries, government and organizations provided enabling environments and rewards to motivate their scientists, engineers, technologists, technicians and artisans/craftsmen to innovate. In most developing countries, apart from lack of these indices, human resource management factor was not considered. Human resource were not encouraged and rewarded to inspire and promote technology innovation. Nigeria was considered appropriate for this study because it is the most populous and one of the most endowed in natural and material resources and one of the most poverty-stricken nations of the world. In most of her technology-driven organisations most especially the Nigerian telecommunications industry, technology innovation is only considered in terms of purchase of latest equipment designed and manufactured in the advanced countries of Europe, America, Japan and China and some Asian countries. Most of these companies invested heavily on equipment, but not really on the human resource. Engineers, scientists, technologists and technicians were employed in different departments and in Research and Development (R&D) departments/units and organisations, but were not well managed to improve technology innovation. Government and managers in nations and organisations should manage the people and their employees not only to make them comply with their directives and company policies and national law, but also to learn, accommodate and benefit from them. They have to study their personality, motivate and provide conducive environment for them to perform effectively. Commensurate reward should be given to employees for the performance of their roles and other extra rewards for their individual and team creativity and innovation. Group norms that promote individual interaction and improved performance should be encouraged.

2.4 The Concept of Technological Innovation

Innovation is not a new phenomenon, but in spite of its importance it has not received enough attention of scholars. However, research on innovation and economic and social change has proliferated in recent years, particularly in social sciences. Especially, researches on the relationship between innovation and productivity or performance of firms has been synthesized by Mairesse and Mohnen (2010), Hall (2011) and Mohnen and Hall (2013) particularly. Mairesse and Mohnen (2010) analyzed innovation surveys' characteristics and econometric problems raised by such data collected. While Hall (2011) study concerned the synthesis of researches about the relationship between innovation and productivity at the firm level, author in [18] updated the literature review in both previous studies. With the main target of determining the relationship between innovation and productivity of European firms, Hall (2011) reviewed the ways in which economists have analyzed the relationship between productivity and innovation. He concluded that there are substantial positive impacts of product innovation on revenue productivity, but that the impact of process innovation is more ambiguous. Also, he observed that at the individual firm level, process innovation can increase real output while leaving revenue mostly unchanged. Further, one of consequences of innovation is likely to be the entry of new innovating firms and the exit of some inefficient firms. Thus, he suggested to direct attention to the extent to which entry and exit regulation impacts

the rationalization of industry structure in response to innovative activity. As Hall (2011), author in [18] analyzed the effects of technological and non-technological innovations on the productivity of firms by reviewing the existing evidence from literature. They updated the survey by Hall (2011) and complemented the Mairesse and Mohnen (2010) survey on the use of innovation surveys to better understand innovation. From this survey of empirical literature, they concluded that innovation leads to a better productivity performance. Also, they observed that all types of innovation influence the productivity, but isolating individual effect remains difficult because of simultaneity of different types of innovation. Further, they observed that the effect of innovation is divided into two parts; one going to the real output, and another pertaining to the price at which the output is sold. However, they concluded that it is very difficult to dissociate them because of measurement issues. Individual studies give further insights about the relationship between innovation and performance and raise detailed econometric problems according to specificities of each other. Also, they give various understandings about the probability of firms to engage in innovative activities. Crepon (1998), using an econometric method which corrects for selectivity³ found that in France, some factors affect positively the probability for a firm to engage in innovation activities.

They are number of employees, sales share and distribution, market demand and the technology. However, they observed that a small proportion of firms engage in research activities and/or apply for patents. About the effects of innovation on performance, taking into account both simultaneity and selectivity bias, they concluded that innovation output rises with innovation effort (investment in Research and Development) and firms productivity correlates with innovation output, represented by patents number or innovative sales. Considering different types of innovation, Mairesse and Robin (2009) found that product innovation appears to be the main driver of labour productivity in the French manufacturing and service industries. The impact of process innovation was either not significant or close to zero. Also, Legros and Galia (2012), analyzing the sources of knowledge and their effects on productivity in French manufacturing, found that the market share and firm size have a positive impact on innovation decision and intensity of R and D. Also, they concluded that size and worker's involvement matters to ISO 9000 certification. However, this main result is amplified by existence of competing products and patents. So that, they suggest that firms must invest not only in R and D, but also in different sources of internal and external knowledge such as workers' training and ISO 9000 certification previous results confirm conclusions of Griffith (2006) who studied the role that innovation plays in productivity of firms in four European countries using a structural multistage model (Crepon 1998). These countries are France, Germany, Spain and UK. They used data from the third wave of the internationally harmonized community innovation surveys. They found that firms that operate mainly in international markets and larger firms are more engaged in formal innovative activities (here R and D). Also, they found that the process innovation is more positively influenced by suppliers' information, while the product innovation is more influenced by the demand information. Further, conclusions of Griffith (2006) state that the process innovation is associated with productivity only in France, while product innovation is associated with productivity in three countries, namely France, Spain and UK. Also, previous findings are supported by the conclusion of Zemplerova and Hramadkova (2012) in Czechoslovakia.

These authors found that probability to engage in innovation for a firm is positively influenced by its size. Also, analyzing the relationship between innovation and productivity in the Mexican manufacturing industry, Brown

and Guzman (2014) concluded that firms that have more propensity to innovate are the largest, with high technological intensity and market share. Also, other outcomes of their study are that advertising; knowledge appropriability, foreign direct investment, information technologies and access to credit have a positive effect on innovation efforts. In Greece, Beneki (2012) attempted to investigate the relationship between innovativeness and firm performance and concluded on the unwillingness of the private sector to invest in R and D and the low productivity of innovation. Thus, they suggest leveraging private investment in innovation through public investment. Bronwyn (2009), using the structural multistage model which incorporates information on innovation success, analyses impacts of innovation on productivity of SMEs in Italy. They found that the international competition fosters R and D intensity, especially within high-tech firms. Determinants of engagement in both product and process innovations were firm size, investment in R and D and in equipment. Also, they found that both product and process innovation influenced the productivity of SMEs firms; especially process innovation. However, they observed that productivity of larger and older firm among SMEs was less influenced by their innovativeness. In Belgium, Van Beveren and Vandebussche (2009), using data from the Community Innovation Survey for Belgium attempt to explore the relationship between firm-level innovation activities and the propensity to start exporting.

Their study resulted in significant positive effects of combination of product and process innovation on probability to enter the export market. However, they pointed to endogeneity of innovation activities, and so, observed that firms that have good prospects of entering the export market in the next period are more likely to invest in innovation activities. However in developing countries, findings about the impact of each type of innovation are somehow different. Waheed (2011) when analyzing the influence of product and process innovations on firms' productivity in Bangladesh and Pakistan found that the process innovation affects more the productivity of firms rather than the product innovation. In Mexican, Brown and Guzman (2014) found that firms that have the higher propensity to innovate are those which are larger in terms of intensity in high technology and market share. Also, they found that Firms which innovate have a level of labor productivity 1.3 times higher than firms that do not innovate. However, their study doesn't distinguish between process and product innovations.

3. Methodology

The study were both primary and secondary data of financial performance of the selected foods and beverages firms, quoted on the floor of Nigerian Stock Exchange Market together with NSE facts books. The population of this study were consists of Ten (10) foods and beverages firms listed on the floor of Nigeria Stock Exchange Market as at December, 2017. The population of the study was three hundred (300) middle and top ranking officers. The purposive sampling techniques were used to select the respondents for the study. Purposive sampling method were chosen for the study to ensure that all categories of respondents in the Nigeria Stock Exchange fact books and annual reports that were obtained from the websites of concerned foods and beverages firms. The sample size is the foods and beverages firms were determined by the formula recommended by Mugenda and Mugenda, (2003).

4. Results

Table 4.1: Analysis of Questionnaire Response Rate

Total copies of questionnaire administered	300
Total retrieved	296
Percentage retrieved	98%

Source: Field Survey, 2019

4.1 Regression Analysis Showing the Influence of Technological Innovation On Personnel Skill of Firms In Nigeria

Findings based on the result obtained indicate that the predictive power of the independent variable as used to explain variation in the dependent variable (personnel skill) is about 72% given $R^2 = 0.7218$; and Adjusted $R^2 = 0.6117$. The fitness of the model is validated given the significance of $\text{prob} < f = 0.000$ and $F(3,292) = 62.16$. The general model of the equation is presented in equation 4.1.0 below.

$$PS = 3.727 + 0.066 \text{ PIT} + 0.819 \text{ MIT} - 0.109 \text{ AIT} \quad \dots\dots\dots\text{Eq.4.1.0}$$

All the three variables were significant and provided predictions for the model. However, while Production Technology (PIT) and Marketing Information Technology (MIT) had positive effect on personnel skill (PS). Age of information technology (AIT) exhibited a negative effect.

Table 4.2: Results of the Regression Analysis Showing the influence of Technological innovation on personnel skill of Firms in Nigeria

Dependent variables	Independent variables	Coefficient	Standard Error	T	p> t	[95% conf. interval]	
Personnel Skill	Production Information Technology	0.0655740	0.0584379	1.12	0.000*	.180587	.049439
	Marketing Information Technology	0.8189803	0.0515082	1.59	0.003*	.1319688	.0707799
	Age of Information Technology	-0.1087138	0.0503759	-2.16	0.002*	-.0095679	.2078597
	Constant	3.727758	0.3393012	10.99	0.000*	3.059972	4.395544

R-squared = 0.7218 , Adj. R-squared = 0.6117, $P \leq 0.000$ F (3, 292) = 62.16, Number of obs = 296, Root MSE = 1.2138

* = Significant at 1% level.

This implies that an improvement in PIT and MIT will lead to 6% ($\beta = 0.0655$) and 81% ($\beta = 0.8189$) improvement in personnel skill (PS) of the selected companies respectively. However, an increase in the AIT will contribute negatively (10%, ($\beta = -0.1087$)) to PS. The three variables were significant in predicting changes in Personnel Skill (PS). with t and p values of 1.12 (0.000); 1.59 (0.003) and -2.16 (0.002) respectively. Moreso,

with a calculated F-value of 62.16 as compared with a tabulated F-value of 2.74 (at 1% level of significance), the null hypothesis is rejected, while the alternative is accepted with the conclusion that Technological innovation have any significant influence personnel skill of manufacturing firms in Nigeria. The regression results in as shown in the table 4.2.

HYPOTHESIS 2

Ho: There is no significant relationship between technological innovation and performance.

Hi: There is significant relationship between technological innovation and Performance.

Table 4.3: MODEL SUMMARY

Model	R	R²	Adjusted R²	Std. error of the estimate
1	0.932	0.869	0.868	0.159

Field Survey, 2019

Table 4.3 shows R, R square, adjusted R squared, and the standard error. R has a value of 0.932 represent the multiple correlation coefficient (the correlation between the observed and predict values of the dependent variable). This is a strong positive correlation. This means that a positive relationship exists between technological innovation and performance therefore accepting the hypothesis that there is significant relationship between technological innovation and performance. This can also be attested to as the R squared have a value of 0.869 showing a proportion of variation in the dependent variable explained by the regression model meaning that the model fits the data well (the population). Adjusted R squared also affirmed to it by closely reflecting the goodness of fit of the model in the population also with a larger value of 0.868.

Table 4.4: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	208.527	9	23.170	917.282	0.000
	Residual	31.473	1246	0.25		
	Total	239.999	1255			

Field Survey, 2019

Table 4.4 summarized the results of an analysis of variation in the dependent variable with large value of regression sum of squares (208.527) in comparison to the residual sum of squares with smaller value of 31.473 (this small value indicated that the model does not fail to explain a lot of the variation in the dependent variables. In conclusion, the independent variables also did a good job explaining the variation in the dependent variable in the smaller significance value of the F statistics of 0.000 which is smaller than the maximum criterion value of 0.05. Thus, also indicating a relationship between technological innovation and performance.

5. Summary

From the findings technological innovation have a significant relationship on personnel skill and performance. Significant improvements were noted in the selected manufacturing firm performance, which are related to performance and satisfaction, but were not sufficient to cope with global competitiveness. Hence many industries were forced to close down due to their inability to exploit technological innovation in the production of their product. In Nigeria, many factors have hindered the performance of manufacturing firm. For example, most of the selected manufacturing firms are using fairly used machine instead of new one which resulted in to outdated technology and this has drastically affect their productivity. This may be due to the fact that they lack enough capital to purchase new machine. Machines and equipment are arranged and installed without considering the safety of workers. Also, skilled labours that are necessary for managing technological change and human resource are lacking in most of these industries. In addition, newly invented sophisticated technologies from developed countries are not available for purchase by the Nigerian manufacturing industry as a result of the patent rights being enjoyed by the inventors, many of which are research and development section of manufacturing industry (Dauda, 2007). Irregular power supply also affects the manufacturing industry's ability to cope with technological change. Most manufacturing industry spend huge amount of money in the procurement of generating set and petroleum motor spirit (PMS) to supply power to their industry. In addition, most industries lack of access to other infrastructural facilities such as good roads and potable water. Foreign Direct Investment (FDI) in to the country is very low. This affects the purchase of new machines and equipment and growth of the manufacturing industry. There is also the problem of shortage of funds and grants for research and development in Nigeria Universities, Research Centres and industries. These have hindered or lowered the human resource response to technological change and innovation in Nigerian Manufacturing Industries. The interrelationship between technological innovation, organizational performance and employee performance in the Nigerian manufacturing firm is highlighted. Investors, workers management purchase new machines and equipment to increase their efficiency and competitiveness and to make more profit. Findings from the study reveal that the adoptions of new technologies in the recent years have improved the performance and profitability of Nigerian Manufacturing Firm. Workers performances have also increased due to the use of new technology, but workers skills have not improved sufficiently to cope with new technology.

6. Conclusion

The study concluded that technological innovation have significant influence on personnel skill of foods and beverages manufacturing firms in Nigeria. According to the findings, production technology, market technology and age of information technology all had relationship with personnel skill. In order to benefit from their investment strategic human resource management which considers improvement of workers skill through training, apprenticeship and development should be given to the employee before new technology is introduced. Workers, working conditions to be improved and their salary and allowance be made to move along with increasing productivity and profitability in the Nigeria manufacturing firms. Technology in the manufacturing firm should be monitored and they should anticipate rather than to react to technological innovation. Government should take interest in the workers living and protect them from complete substitution by machines and equipment.

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