

EFFECTS OF TECHNOLOGICAL CHANGE AND EMPLOYEE WELLBEING ON THE PERFORMANCE OF EMPLOYEES OF MANUFACTURING COMPANIES IN KADUNA STATE

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Abstract

Very few studies in the literature have examined the effects of technological change and employee wellbeing on the performance of employees of manufacturing firms especially in developing economies like Nigeria. Thus, amounting to a gap of knowledge in the literature. To fill this knowledge gap, this study examined the effect of technological change and employee wellbeing on the performance of employees of manufacturing firms in Kaduna State, Nigeria. To this effect, two hypotheses were developed in alternate form for testing after a review of literature. Data were collected from respondents with the aid of questionnaires, adapted from different authors. Cross sectional research design was used for the study. The population of this study comprised 1,452 employees of 25 selected manufacturing firms in Kaduna state, Nigeria, out of which a sample size of 392 employees was reached. Copies of Questionnaire were distributed using proportionate stratified sampling and simple random sampling to the respondents of the study. A total of 332 copies of questionnaire were used for analysis using structural equation modelling on Smart PLS2. The study found out that both technological change and employee wellbeing have positive and significant effects on the performance of employees of manufacturing firms in the state. The study therefore concludes that technological change and employee wellbeing both exerts positive influence on the performance of employees in manufacturing firms in Kaduna state. Therefore, the study recommends that the management and owners of manufacturing firms should constantly ensure the machineries they use for their production processes are not obsolete. That is to say, they should ensure they use complex technologies that eases production processes of employees. More so it is recommended that the wellbeing of their employees be taken very seriously as it exerts significant effect on their performance of their employees.

Keywords: Technological change, employee wellbeing, employee performance, manufacturing firms

INTRODUCTION

Manufacturing has always been the engine of economic growth, structural change, and development (Naudé & Szirmai, 2012). Manufacturing is a cornerstone of many national economies (Warren, 2013) as a vital industry that creates productive jobs and long-term economic prosperity. According to a report by the World Economic Forum (WEF, 2012), manufacturing is critical to a country's economy with disparities in manufactured product export data accounting for almost 70% of the income discrepancies among 128 countries. As a result of its strong ties to other sectors of the economy, the manufacturing sector has multiplier effects. These connections might be “backwards” (as in mining or building) or “forwards,” (such as with transportation, wholesale and retail trade and business services) according to Veugelers (2013).

Given the manufacturing industry's reported importance in the development of international economies, particularly Nigeria's, it is critical that the manufacturing sector performs optimally. However, the manufacturing industry in Nigeria is thought to be operating poorly which prompted the observation of Edo (2012) that Nigeria's manufacturing sector has seen a remarkable drop in the last three decades and slowing economic growth and development. Similarly, despite initiatives by the Nigerian federal government, particularly in the areas of ease of doing business in the country, Adekoya (2020) averred that local manufacturing remains challenged and overwhelmed by a weak and brittle performance outlook. In addition, Adekoya (2020) posited that while manufacturing sector growth improved to 0.77 percent in 2019 from -1.46 percent in 2015, current realities show that the industry failed to improve during from 2015 till present due to a slew of problems.

Furthermore, when compared to other countries, the contribution of Nigeria's manufacturing sector to the GDP has been low. For example, the sector contributed only 13% of GDP in the second quarter of 2020 (Varrella, 2021) while it contributed much more to the GDP in other African countries. World Bank (2012) reported that the manufacturing sector contributed to the GDP of some other African countries as follows: Algeria - 24%, Central African Republic -

18%, Democratic Republic of Congo - 21%, Egypt - 16%, Equatorial Guinea - 21%, Gabon - 33%, Lesotho - 16% and Morocco - 15%. This report is alarming because nations in Africa that are significantly smaller than Nigeria are performing better in the industrial sector. In addition to the sector's low contribution to the country's GDP in Nigeria, it does not appear to be generating much employment (Banjoko & Bagshaw, 2012). This clearly demonstrates that Nigeria's manufacturing sector has been underperforming.

A number of issues have been identified in the literature as contributing to the poor performance of manufacturing enterprises in Nigeria. According to Adekoya (2020), some of the factors include a general economic slowdown, a lack of coordinated fiscal and monetary policies, poor performance of key macroeconomic fundamentals, the ever-increasing cost of production caused by an unfavorable operating environment, and severe disruptions in the global value chain. Other problems cited in the literature that impede performance of manufacturing firms in the country include poor road networks, inefficient train systems, weak port infrastructures, and erratic power supply, all of which put major financial demands on enterprises and corporations. However, one crucial aspect of research that has been missed is how employee performance has contributed to the low performance of Nigerian manufacturing businesses. Employee performance may be a strong predictor of organizational performance, according to Vosloban, (2012); Tarmidi and Arsjah, (2019). It is safe to assume that if the employees of an organization perform well, the organization will as well function well, hence the need for this study is to identify factors that have a substantial impact on employee performance.

One of prominent factors highlighted in the literature that may significantly influence employee performance is technological change (Dauda & Akingbade, 2018) and employee wellbeing (Haddon, 2018). Consequently, a change in the use of technology in manufacturing firms could lead to positive or negative significant influence on the performance of employees. On the other hand, employee wellbeing refers to the status of an employee's mental and physical health as a result of workplace dynamics (Haddon 2018).

A number of studies have been carried out in relation to this study, however, most of the previous studies focused largely on technology and performance. For example, Abbas, Muzaffar,

Mahmood and Ramzan (2014), Sait, Muharam, Chin, Sulaiman, Zakuan & Choon, (2018) and Gagnon & Dragon (2019) examined the relationship between technology and firm or employee performance. Other studies including Imran, Maqbool, Shafique. (2014) and Kim, Park &, Juh (2019) examined relatively the relationship between technology advancement and the performance of organisations. This shows that despite the reported importance of technological change on performance, studies on the relationship in the literature have rarely been conducted. Durowoju (2017) and Dauda & Akingbade (2018) have examined the relationship between technological change and organizational performance, neglecting the effect of technological change on the performance of individual employees in an organisation. More so, very few studies have been conducted on the effect of technological change and employee wellbeing using a single model despite their reported importance in the literature (Dauda & Akingbade, 2018; Haddon, 2018). This has led to a dearth of knowledge in the literature as very little is known regarding the effect of technological change and employee wellbeing on the performance of employees of manufacturing firms in Kaduna State. To fill these identified knowledge gap in the literature, the study assessed the effect of technological change and employee wellbeing on employee performance of manufacturing firms in Kaduna State, Nigeria.

LITERATURE REVIEW

The purpose of the study is to examine whether there exists a significant relationship between technological change, employee wellbeing and the performance of employees of manufacturing firms in Kaduna State. Consequently, the following hypotheses were formulated and tested by the study:

- i. technological change has significant effect on the performance of employees of manufacturing firms in Kaduna state.
- ii. Employee wellbeing has significant effect on the performance of employees of manufacturing firms in Kaduna state.

CONCEPTUAL FRAMEWORK

Employee Performance

The job performance of employees is highly relevant for both the employees and organizations and it results in several positive organization outcomes (Sonnentag, Volmer, & Spsychala 2008). Despite the critical role of job performance of employees, the definition and clarification of job performance has received little attention (Sonnentag & Frese, 2002). Motowildo & Kell (2012) coming from the value perspective, defined job performance as the expected organizational value of what people do.

In addition, Jones (2019) defined job performance as a means to reach a goal but not the actual result of the acts performed within a job. Motowildo & Kell (2012) stated that results are the route through which an employee's behaviour supports an organization to achieve its goals. Motowildo & Kell (2012) further emphasized that the performance domain encompasses behaviours that might have either positive effects or negative effects on organizational goals. As explained by Sonnentag & Frese (2002), only behaviours that are relevant for the organizational goals constitute performance. Therefore, the emphasis on performance behaviour or action is still not well clarified. In other words, performance refers to what the employer hires an employee to do and do well (Campbell, McCloy, Oppler & Sager 1993). As explained by Sonnentag & Frese (2002), the outcome aspect of performance refers to the result of the employee's behaviour.

Technological Change

Technology has revolutionized the way companies conduct business by enabling small businesses to level the playing field with larger organizations. Small businesses use an array of technology - from servers to mobile devices, to develop competitive advantages in the economic marketplace (Vitez, 2019). Small business owners should consider implementing technology in their planning process for streamlined integration and to make room for future expansion. This allows owners to create operations using the most effective technology available. Changes in technology affect businesses and business activity in a major way. Many businesses have adapted to new

technologies and use these to shape and influence their future. Technologies have made elements of business such as manufacturing, communication, purchasing, sales and advertising easier and more effective for businesses.

Employee Wellbeing

Fisher (2014) posited that organizations' owners and managers realized that satisfied and healthy employees contribute to organizational productivity than others. This reflects that employee wellbeing has considerable impact on performance and endurance of organizations in different ways. Judge, Thoresen, Bono and Patton (2001) stated that employee wellbeing causes high job performance, organizational citizenship behaviour, reduces employee low turnover and absenteeism.

Grant, Christianson and Price (2007) define work-related well-being as the overall quality of an employee's experience and functioning at work. Therefore, employee well-being refers to employees' overall experience or affect towards both the job and the organisation. They further distinguish psychological well-being (that is, happiness) which focuses on the subjective experiences of individuals, physical well-being (that is, health) which refers to objective physiological measures and subjective experiences of bodily health, and social well-being (that is, relationships) which refers to the quality of one's relationships with other people and communities.

THEORETICAL FRAMEWORK

Resource Based View (RBV) of the Firm

The resource-based view of the firm propounded by Wernerfelt, (1984) is regarded as one of the theories of strategic management that is widely referenced particularly because of its practical relevance to contemporary management practices. The RBV has two major assumptions: (i) the RBV assumes that firms within an industry may be heterogeneous with respect to the bundle of resources that they control (Bridoux, n.d). (ii) the RBV assumes that resource heterogeneity may persist over time because the resources used to implement firms' strategies are not perfectly

mobile across firms (Bridoux, n.d). Resources in the RBV can be a firms' assets, capabilities, change in organisational processes, firm attributes, information and knowledge (Barney, 1991). These firm specific resources and capabilities affect the performance of a firm (Madhani, 2010). RBV draws upon the resources and capabilities that reside within the organization in order to develop sustainable competitive advantages, which may lead to high performance (Madhani, 2010).

The independent variables of this study (that is, technical complexity, systemic shift and process innovation) can therefore be termed as being resources to any firm, as Barney (1991) asserted that firms' resources could either be a firm's assets, capabilities, changes in organisational processes, firm attributes, information and knowledge. Technical complexity, systemic shift and process innovation are all related to changes in organisational processes, since they alter old organisational processes. Consequently, based on the propositions of the RBV, there exist a theoretical relationship between technical complexity, systemic shift, process innovation and performance.

Empirical Studies

Imran, Maqbool & Shafique (2014) carried out a study assessing the impact of technological advancement on employee performance in the banking sector. Primary data was used in this paper to check the impact of technological advancement on employee performance. The study found out that technological advancement has significant impact on motivation and training of employees. Motivation has significant impact on employee performance but training has no significant impact on employee performance. The study also found out that technological advancement is a significant predictor of employee performance.

Thomas (2014) assessed the effect of change management on the performance of firms in the Nigerian telecommunication industry. In conducting this study, a total of 300 staff of Airtel were randomly selected from a staff population of 1000. Three hypotheses were advanced to guide the study and data collected for the study were analyzed using One-way Analysis of Variance.

The result revealed that change in technology has a significant effect on performance and that change in customer taste has a significant effect on customer's patronage. More so, Jane, Sma, & Bula (2016) examined the effect of technology on performance of mobile telephone industry in Kenya. The study employed descriptive and explanatory design. The target population consisted of 381 respondents and the sample size was 170 respondents from the four mobile phone companies in Kenya. The results were presented using tables. Technology was found to be significant in explaining the variation of performance of mobile phone companies. From the review of literature, it is seen that the independent variables of the study are technological change and employee wellbeing, while the dependent variable of the study is employee performance. Based on the review of literature, the apriori expectation of the study is for technological change and employee wellbeing to have positive and significant effect on the performance of employees of manufacturing firms in Kaduna state.

METHODOLOGY

The study utilized cross sectional research design which is considered as the most appropriate because longitudinal surveys need a longer time to be carried out when compared with cross sectional surveys (Kothari & Garg, 2014). The population of this study comprised employees of 25 selected manufacturing firms in Kaduna state, Nigeria. To this effect, the study selected only 25 manufacturing firms for the study, as only the management of these 25 manufacturing firms were reachable, accessible, cooperative and were willing to be part of the study. From the information from these 25 manufacturing firms, they have 1,452 employees combined. Therefore, these 1,452 employees formed the population of the study. The study utilized Krejcie & Morgan (1970) sample size formula to arrive at a minimum sample size of 302. However, the sample size was increased by 30% to 393 as advised by Israel (2013) to cater for any short fall, so that the number of filled and collected copies of questionnaires does not below the threshold of 302.

Data were collected using questionnaire. Proportionate sampling technique was used to reach the total copies of questionnaires to be given to each selected manufacturing firm. Copies of questionnaire were distributed by the researcher to the respondents of the study using simple random sampling technique.

Composite reliability was used to determine the internal reliability of the instrument. The variables were tested independently to check if the items on the questionnaire used for the study were reliable enough. Results showed that the items measuring each latent construct showed internal consistencies as their composite reliability coefficient is higher than 0.7 (Tabachnick & Fidell, 2013).

Items used in measuring variables of the study were adapted from their original developers. A total of 393 copies of questionnaire were retrieved from respondents, however, only 332 copies of questionnaire were qualified for further analysis, after replacing missing values by means of mean substitution (Tabachnick & Fidell, 2013) and the deletion of cases that constitutes outliers using Mahalanobis distance (D2) as advised by Hair, Black, Babin and Anderson (2014) since this study is concerned with multivariate analysis. The 332 copies of questionnaire retrieved from respondents constitutes 84% of the total sample size of this study, and is considered suitable for further analysis (Tabachnick & Fidell, 2013). The study utilized structural equation modelling (SEM) to analyse the effect of the exogenous variables of this study on the endogenous variable of the present study using Smart PLS2. Hypotheses of the study were either accepted or rejected using 5% significant level as advised by Hair et al. (2013).

RESULTS AND DISCUSSION

Table 1

Construct Reliability and Validity (Measurement Model) n=332

Construct	Items	Loadings	AVE	CR
Employee Performance	EP1	0.70	0.64	0.92
	EP2	0.79		

	EP3	0.79		
	EP4	0.84		
	EP5	0.83		
	EP6	0.86		
Technical Complexity	TC1	0.80	0.68	0.89
	TC2	0.86		
	TC3	0.81		
	TC4	0.83		
Systemic Shift	SS1	0.60	0.65	0.88
	SS2	0.81		
	SS3	0.89		
	SS4	0.89		
Process Innovation	PI1	0.72	0.61	0.89
	PI2	0.76		
	PI3	0.83		
	PI4	0.81		
	PI5	0.79		
Employee Wellbeing	EWB1	0.56	0.58	0.89
	EWB2	0.77		
	EWB3	0.80		
	EWB4	0.78		
	EWB5	0.82		
	EWB6	0.82		

Note: AVE represents Average Variance Extracted; CR represents Composite Reliability.

Table 1 depicts the reliability and validity of constructs of the study. Construct reliability and convergent validity of constructs were tested using composite reliability and Average Variance Extracted (AVE) as suggested by Garson (2016). Composite reliability coefficient should be ≥ 0.7 also (Lee & Chen, 2013), while AVE coefficient should be ≥ 0.5 (Garson, 2016). Item loadings

should be above 0.5 (Hair *et al.*, 2014). On Table 1, it is seen that all of the items met the minimum bench mark for item loadings (i.e., 0.5), composite reliability (i.e., 0.7) and AVE (i.e., 0.5). Therefore, it is assumed that the items on Table 1 displayed reliability and convergent validity. The data were next subjected to discriminant validity test using fornell-larcker criterion. The result is presented in Table 2.

Table 2
Discriminant Validity using Fornell-larcker criterion (n=332)

		1	2	3	4	5
1	Employee Performance	0.80				
2	Employee Wellbeing	0.77	0.76			
3	Process Innovation	0.71	0.74	0.78		
4	Systemic Shift	0.72	0.68	0.71	0.81	
5	Technical Complexity	0.68	0.65	0.57	0.68	0.82

Note: The bolded diagonal numbers represent the square root of the AVE of each latent construct.

AVE was used by the study to establish discriminant validity using the Fornell–Larcker criterion. For discriminant validity to exist, the square root of the AVE should be higher than its correlation with other latent variables (Garson, 2016). On Table 2, the bolded numbers represent the square root of the AVE of each latent construct. The square roots of the AVE of each construct are higher than their correlations with other latent construct. Going by the fornell-larcker criterion, the data exhibited discriminant validity. The study hypotheses were tested by bootstrapping the samples 5,000 times. The result is presented on Table 3.

Table 3
Direct Path Coefficient

Hypotheses	Relationship	Beta Value	Standard Deviation	T Stat	P Value	Decision
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H ₁	TC->EP	0.50	0.08	6.09***	0.00	Supported
H ₂	EWB->EP	0.38	0.08	4.72***	0.00	Supported
R Square	0.49					

*** p< 0.01; **p< 0.05; *p <0.1

Technical Change (TC) has positive relationship with the performance of employees of manufacturing firms, significant at less than 1 percent ($\beta=0.50, p<0.01$). Thus, H₁ that states that technological change has significant effect on the performance of employees of manufacturing firms in Kaduna State is supported. In addition, employee well-being is positively and significantly related to the performance of employees at less than 1 percent ($\beta=0.38, p<0.01$). Thus, this study empirically supports H₂ that states that employee well-being has no significant effect on the performance of employees of manufacturing firms in Kaduna State. R square 49 percent. This means 49 percent variance in the performance of employees of manufacturing firms in Kaduna State is accounted for by technical complexity, systemic shift, process innovation and employee wellbeing.

CONCLUSIONS

Based on the findings of this study, the study concludes that both technological change and employee wellbeing are significant predictors of the performance of employees of manufacturing firms in Kaduna state. Based on the descriptive statistics of technological change, employees agreed that the technology use is very complex and has helped ease the process of manufacturing, and thus may be the reason why technical complexity has significant effect on the performance of employees. This finding is consistent with the findings of Lakshmi & Rajarathinam (2016) and Durowoju (2017). More so, employee wellbeing is positively and significantly related to employee performance, employee wellbeing as the overall quality of an employee's experience and functioning at work. This finding is consistent with the works of Warr & Nielsen (2018) and Zakaria, Abdulatiff & Ali (2014).

RECOMMENDATIONS

The study therefore recommends that the management and owners of manufacturing firms should constantly ensure the machineries they use for their production processes are not obsolete. That is to say, they should ensure they use complex technologies that eases production processes of employees. This will make certain production becomes very easy and efficient due to the use of sophisticated technologies. This will also ensure employees use less physical power in production as a result of the adoption of complex machineries by the manufacturing firms. Owners and managers of manufacturing companies who follow these suggestions will ensure that workers are happy with their job duties. Employees will obtain valuable experience at their workplace and have actual delight while working there.

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