

Process Improvement and Performance of Manufacturing Firms in Nigeria

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Abstract

This paper focusses on process improvement and the performance of manufacturing firms in Nigeria. The problem which forms the motivation for the study borders on the inability of manufacturing firms to leverage on the availability of cheap and abundant locally sourced raw materials to increase patronage for their product. The study used survey research design. The population of the study comprises employees of the selected manufacturing firms in Nigeria. The sample size for the study is 275 and was determined using Taro Yamane sampling determination formula. The convenience sampling technique was used for selecting the participants that took part in the survey. Cronbach's alpha and construct validity were used to assess the reliability and validity of the study respectively. The partial least square structural equation model (SEM) was used for data analysis. The study found that process improvement has significant effect on the firms' performance. The study concludes that ensuring consistent positive performance trajectory in an organization demands that there is deliberate drive to consistently improve the process and operational activities of the organization. The study recommends that manufacturing firms need to ensure there is increased learning system in the organisation that allows for knowledge sharing of new ideas, greater attention to communication flow and strong internal management system control that ensures consistent evaluation and monitoring of the generality of their activities.

Keywords: Process Improvement, Performance, Manufacturing Firms, Nigeria

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I. Introduction

The formal manufacturing sector has been in the main avenue through which the production of goods required in both household and business operation are achieved. The manufacturing of these goods in turn, has been a major source of income for businesses and household in form of income and tax for government, with attendant benefit of economic growth and development for the country (Akinmulegun&Oluwole, 2014). The rising technology level has further segregated the production activities engaged into by large firms, thereby creating room for smaller firms and reducing task structure, and further creating seamless process in task execution (Gbande, 2018).

However, this reality has created an increasing competition that has led to the displacements of some manufacturing concerns, as modern technological advancement has led to the outgrowing of their value and thus being replaced by value-driven, service-rendering organisations. This has created challenges for the sector and has led to some manufacturing concerns to re-evaluate their approach to their continued existence from a completely different perspective (Ahmad, 2012).

The sector in most developed economies have recorded impressive performance (Kalu et al., 2019), however, in most developing economies it has not fared any better. In Nigeria, the manufacturing sector experienced its highest contribution to GDP (10%) in 2012, after which there has been consistent drop and even closure of a number of the firms (Akinmulegun&Oluwole, 2014). Further, the Nigerian manufacturing sectors products in the country are faced with weak demand for locally produced goods coupled with low market for export despite the expansionary benefit of export to its economic of scale. As such, the sector is bedeviled with a high preference for foreign goods to locally produced goods.

An analysis of the performance of manufacturing firms in Nigeria by Söderbom and Teal (2002) reveals a very grim picture and calls for serious actions by researchers and policy makers. At the end of the 1990s, Nigerian per capita value-added in manufacturing was very low at approximately \$13, which corresponds to about 10 per cent of the level of Botswana and less than 50 per cent of that of Ghana and Kenya. Over the period from 1975 to 1999, Nigerian per capita exports halved, while those of Botswana and Mauritius doubled. In 1999, the Nigerian per capita value of manufacturing exports was less than \$1, by far the lowest number in the sample of countries reviewed. This raises a fundamental policy issue facing the Nigerian government, which is to understand and address the factors that will enable the efficiency of firms – their competitiveness – to increase. In other words, potential variables that could impact of firm's efficiency should be subject of interest for researchers. This is one of the reasons why this research work become germane.

Considering manufacturing firms' role in providing opportunities for export of finished goods and securing foreign exchange to the country, while providing employment opportunities for her citizenry, it is not out of place then to be concerned with the performance of manufacturing firms in Nigeria, the most populous black nation in the world. Studies have confirmed that manufacturing firms' performance increases when they have access to cheap factors of production (Peteraf, 1993; Priem & Butler, 2001; Bendixen & Dreyer, 2003). Nigeria manufacturing firms largely have access to cheap sources of labour by virtue of the demography of the country and to some extent access to relatively cheap raw materials for the products they produce based on the abundant natural endowments, but their performances have been abysmal when compared to those of other developing and developed nations. Why is this so? Clearly then, the problem of poor performance may not be connected to limited or lack of access to cheap factors of production. Perhaps, the problem may be related to potentially poor or low level of business process improvements.

Further, scholars have opined that ensuring increased and consistent performance in any business venture demands that the organisations are consistently driven with the push to review their processes to accommodate changes in both their external and internal environment, given that today's business environment remains highly unpredictable and volatile (Smith & Fingar, 2003; Prodan, Prodan & Purcarea, 2015), and most critical is the changing consumer's preference, thus, demanding that organisation engages in process improvement or a radical innovation to remain competitive. Business process improvements has been receiving tremendous attention as part of this re-evaluation exercise (Ranganathan & Dhaliwal, 2001; Hammer, 2002; Seethamraju & Marjanović, 2009; Davenport, 1993).

However, there are limited studies that have accounted for the link between business processes improvement and performance of manufacturing firms, most especially in developing economies, such as Nigeria. This has become necessary in light of the fact that process improvement is key to manufacturing firm's performance (Danica & Ante, 2017). Given that the customers' preference are dynamic and not specific and that firms consistently strive to be competitive on the market, it still remains unclear what role process improvement would play in achieving these organisations objectives, as scholars have failed to account for process improvements links to increased performance. It is on this basis that this study sought to assess process improvement effect on the performance of manufacturing firms in Nigeria.

II. Theoretical and Hypotheses Development

The study is underpinned with the resource based view theory. The core assumption of the theory is that organisations resources are the link to gaining competitive advantage and improving performance. The theory has been linked to the study of Barney (1991), which sought to show the process that can be adopted towards gaining competitive advantage. The theory holds the organisation's resources are the secret for improving performance, as improving performance in any organization must start from the ability to effectively and efficiently manage and ensure optimal utilization of organizations resources (Hansson, 2015; Collis & Montgomery, 2008).

The theory held that resources are mainly assets including human and material that an organization possesses and can rely on in the designing and implementing of its strategy, as such, an organization is only as strong to the extent of the resources that are available for their operational and functional existence (Hansson, 2015). Similarly, Wernerfelt (1984) stated that the RBV indicates that an organization can only gain increased performance when it has the requisite resources that allow for creating superior value when compared to a competitor in its operating market. Peteraf and Barney, (2003) held that superior value is simply in terms of the difference or actual benefit derived from the buying a product when compared to the economic cost.

However, the theory holds that before the resources can lead to competitive advantage, it vital that the resources have certain features such as been rare, valuable, inimitable and it cannot be substituted because it is what differentiates an organization from the other competitors (Barney, 1991; Helfat & Peteraf, 2003). Das and Teng (2000) stated that these organizations specific resources are the essential resources that should drive increased performance in the organization, whether mobile or immobile.

Further, the RBV attributed organizational resources as tangible and intangible, while the tangibles are the physical assets, market share, while the intangibles are the culture, process changes, knowledge capabilities etc. (Mahoney & Pandian, 1992). Helfat and Peteraf, (2003) stated that the strength of any organization lies in its ability to strategically coordinate the organization's resources (tangible & intangible) towards improved performance. The application of the theory is based on the assumption that process changes of the organizations using the inherent resources in the organization would improve performance of the organization and give them a competitive advantage, which is the foundational premise of this study.

Performance

Performance as a concept has attracted diverse researches (Bititci et al., 2012; March & Sutton, 1997; Cook & Bala, 2007), and this is because the essence of every individual action is directed towards an expected outcome. The outcome is a function of a defined benchmark or objective that were set at the start of the given activity (Brush, Bromiley & Hendrickx, 2000), as such it is necessary to determine whether the expectations were realised or not (Bititci et al., 2012).

Performance is the actual outcome or result that reflects that entirety of the activities that organisation have undertaken over a period (Kyrgidou & Spyropoulou, 2013; Cook & Bala, 2007). It is the basis for comparison between the resources and the outcome. It indicates the true position of the organisation and provides the basis for assessing the entirety of the organisations directed towards identifying the areas of strength and weakness that demand greater attention.

In management literature, the concept performance has been operationalised in two variant ways – the objective and subjective (Dess & Robinson, 1984; Cook & Bala, 2007), and this is because of the difficulty in determining what truly is the reflective performance of an organisation (Kyrgidou & Spyropoulou, 2013). While some have argued that performance must be viewed from the overall set of activities that are undertaken in the organisation (Darwish & Singh, 2013; Hubbard, 2009), some have argued that it is a function of the result that is measurable in terms of the tangible outcomes that reflect the true position of performance (Kyrgidou & Spyropoulou, 2013; Brush et al., 2000). These measures are what Singh, Darwish and Potocnik (2016) referred to as the objective and subjective parameters of performance.

The objective parameters of performance assessment take into cognizance the ratio of the outcomes in terms of physical relatable outcomes that shows the true position of the organisation. It is the accounting and financial outcomes from the set of activities at the end of a financial year (Hawawini, Subramanian & Verdin, 2003). Examples of the objective measures are profit, return on assets, cash ratio etc. The subjective measure of performance captures the outcomes from a perception based angle (Singh et al., 2016). Since this study relies on the perceptions of the population of study with respect to such objective parameters as profit, employee's turnover, as well as subjective variables such as customer's satisfaction among others, as against exact figures, the performance in this study utilizes the subjective.

There are arguments on the superiority of the measures (Cook & Bala, 2007; Henri, 2004; Hillman & Keim, 2001), however, recent studies (Singh et al., 2016; Darwish & Singh, 2013) have shown that either measure comes with their advantage and disadvantages, as such, the choice of a measure should be based on the research in focus, access to data and relative period of the study (Singh et al., 2016; Hawawini et al., 2003). In this study, the subjective measure was used and this because of limited access to most manufacturing firms published financial reports and the need to cover a broader aspect of performance beyond their financial standing.

Process Improvement

James Harrington (1991) first coined the concept process improvement. Process improvement is simply a deliberate management approach that is aimed at adopting specific sets of methods that are aimed at improving the general outlook and operational and functional system of the organisation (Harrington 1991). It connotes deliberate systemic methods that top management adopts to ensure that organisation advances or take a turn around in their operations (Harrison, 1995). The concept of process improvement has been linked to business process reengineering (BPR) (Seliverstova, 2014; Bateman & David, 2002). However, the two concepts significantly differ in terms of the approach to organisations problem and technique of solution (Ayad, 2010).

Process improvement is a deliberate management action that is gradual, without the focus of changing the existing patterns of operation but rather to reorganise same towards achieving increased performance, though the performance increase is usually marginal increments (Baines & Adesola, 2000). However, business process reengineering is conscious organisations radical change process that focuses to change the performance of the organisation through outright rejection of the operational process in the organisation and creating a new approach of operation in the organisation, which is aimed at transforming the performance of the organisation (Seliverstova, 2014). It is, however, worthy to state that both concepts share a similarity in the focus on customers and ensuring quality goods and services to the consumers (Siha & Saad, 2008).

Slack, Chambers and Johnston (2007) stated that to better understand process improvement, there is a need to provide a clear understanding of process in an organisational context. Organisations process is a procedural set of activity that is engaged to achieve a set goal and objective. It is usually purposeful and focused on achieving a definite set of result. Organisations process activities have a start point and do have a finish line given the procedural required in the set activity, though may involve several sub-activities in between that directed towards the attainment of the production goals and objectives (Bateman & David, 2002). The process could be directed at transforming resources (manpower, technology & materials) with some extent of control and value-added actions (operation, control & evaluation) so as to attain the set goals and objectives from the start of the production process (Slack et al., 2007).

Similarly, Andersen (2007) held that organisations process is also referred to as business process and this is aimed at differentiating an organisations process from every other process and given that its outcomes for the sequence of tasks or set of actions and decisions that are taken in the organisation. The organisation's process is usually connected to several interrelated sub-structures or task that links up to form the entirety of the organisation's processes that defines the operation of the organisation with a level of control aimed at attaining predefined objectives (Harrington 1991). Davenport (1993) defined organisations process as a set of given specific arrangement of organisations activities across a given time and place that has a start-up point and end period, which allows for identifying the inputs and outputs.

Process improvement is aimed at improving the performance of an organisation or rebranding the image of the organisation to better appeal to its customers (Moghdeb, Green & Indulska, 2009). It involves advancing the activities an organisation engages into through adding value to customer's demand and ensuring their benefit after sales. Mentor (2010) held that process improvement allows for deliberate reinventing and redesigning of the organisation's approach to technology and information in such a manner that it will increased value addition.

Moghdeb et al.(2009) held that process improvement involves a deliberate, sequential and logical set of activities that allows for the combination of the varying input that helps adds value and ensure renewal of the existing product or services. Business process improvement consists of two or more interconnected or independent business activity that ought to be carried out leading to an input/start and an output/end, which adds value to a customer and contributes significantly to the performance of the organisation (Shtub & Karni, 2010; Radnor & Bucci, 2008). However, it is worthy to state that the result may not be any better where there is a missing link in information available for operation; as such employees at all levels and in all areas must be engaged towards implementing the improvement strategies, though gradually it will significantly add value to the overall performance of the organisation(Ntaliani et al., 2010).

The lack of consensus on the measures and definition of process improvement have led to varying perspective, as authorities have indicated that what constitute an improvement could differ from the industry type (Merchant & Van der Stede, 2007; Lee, Fin & Widener, 2013; Kariyawasam & Kevin, 2014). Hence, this study relied on Slack, Chambers and Johnston (2007) identified components of process improvement, which are learning, communication and management control system.

Organisational learning

Critical to process improvement is the development of learning capabilities, as they are critical to attaining competence in technology and innovation in business process (Ni & Sun, 2009; Yang, Watkins & Marsick, 2004). Organisation leaning is the development and sharing of knowledge on essential activities within the organisation (Granerud & Rocha, 2011). However, learning is only useful when it is reflective in the task in the organisation and when it is applied to bring about integration in the organisation (Murray & Chapman, 2003).

Process improvement is seemingly impossible when there is an absence of an effective approach towards ensuring increased organisational learning. In other words, organizational learning is a prerequisite to process improvement. The increased learning can be achieved when there is the existence of informal structures or teams within the organisation, improved communication and cooperation and a host of other internal factors that are in the interest of the organisation. The study of Oh (2018) also found that organizational learning affects performance. Also, Rondeau and Wagar (2002) study on organizational learning and quality improvement found that learning is fundamental to quality improvement.

Wang and Ahmed (2003) stated that a major feature of organisational learning is that it is obtained through the creation of enabling environment that allows for shared perceptions, mutual understanding, knowledge and mental models and their inherent institutional mechanisms designed by the top management that supports idea and knowledge retention. Organisational learning supports making personal knowledge available so that others can partake and reshape the knowledge to suit organisations interest. The ability to tap into the tacit and insight, intuitions and emotions of individual employees and using the same for the operational management of the organisation is what translates into increased performance.

The study of Argyris (1977) made a distinction between learning. He stated that learning can be single-loop and double-loop learning. The single-loop or adaptive learning is a situation where steps are taken to improve the process of operation without necessarily changing the existing objectives but rather adjusting them to suit the current need of the organisation. The double-loop learning involves a systemic approach at confronting the already existing policies and objectives inherent in the organisation (Argyris, 1999). Organisational learning is fundamental in the organisation and a precondition for ensuring competitive advantage and growth.

Garvin, (1993) stress that organisation that is learning is one that not only seeks to acquire new knowledge but is also willing and has the capacity to adopt such knowledge in its operational processes, i.e. application of knowledge. Learning organisations make effort to ensure knowledge is acquired on a regular basis, as this enables them to develop core competencies and capabilities that in the long run lead to incremental or transformational change (Nevis, DiBella & Gould, 1995). Khandekar and Sharma (2015) study found that organizational learning affects performance. Similarly, Li, Jian, Li, and Yeung (2018) researched the effects of organisational learning on service innovation performance. The relationship was mediated with supply chain collaboration. The study found that organizational learning has significant effect on performance. Hence, we propose that:

H₀₁: Organisational learning has no significant effect on the profitability of manufacturing firms.

Communication

The survival of modern organisation has been hinged on the availability and consistent flow of communication amongst the varying units in the organisation (Allen, 1992). The flow of the communication should be such that it is understood and without any noise that distorts the information shared through that communication medium else communication would not have been said to have occurred (Nelissen & van Selm, 2008). Organisation communication encompasses a deliberate approach that leads to teamwork, leadership and conflict in an organisation (Lindlof & Taylor, 2011).

Communication can also be said to be a flow of requisite information that are required for the smooth process and operation of any organization (Giri & Kumar, 2010), towards ensuring the organisations set goals and objectives are achieved (Goldhaber, 1993). The primary goal of communication is dissemination for goal attainment (Nelissen & van Selm, 2008). Inebo, Nwankwo and Okonkwo (2015) study on the role of communication on organizational performance found communication affects organizational performance. Similarly, Kibe (2014) study was on communication strategies and organisations performance and found the relationship to be positive.

Kitchen and Daly (2002) stated that organisations communication can be internal and external. The external communication deals with interactions with its external environment, such as suppliers, customers, regulatory agencies, etc. (Goldhaber, 1993). The internal communication is interactions with their internal variables, such as the employees, shareholder's managers and board members (Kitchen & Daly, 2002). Giri and Kumar, (2010) stated that none of the component units (internal & external) is more important to the other, rather the organisation must as a matter of expediency ensure that both are satisfied and the interaction links are well sustained in order to ensure the attainment of strategic goals and objectives.

Further, Nelissen and van Selm, (2008) indicated that though both are relatively important but for process improvement, there is need for the organisation to rather focus more on the internal communication flow, as it involves the internal member's changes in actions and attitudes to drive the proposed improvement. This is because internal communication in the organisation supports of requisite information to members in the organisation. Kitchen and Daly (2002) stated that in ensuring smooth flow of organisations strategy and for ease in interpretation there is a need for an effective flow of information among employees within an organization. Also, Keyton (2011) stated that effective flow can only be achieved when there is an inherent vivacious internal communication system in the organisation.

Besides, Invernizzi, RomentiandFumagalli, (2012) state that the organisation is at liberty to determine the flow of information that best suit their operation when he stated that the internal communication systems can take the form of vertical (upward & downward) or horizontal flow. Invernizzi et al. (2012) stated that the vertical upward flow is a communication flow that flows from the top management downwards to the employees in the organisation, while the vertical downward starts first from the employees to the top management. The horizontal internal communication is a flow of communication among individuals that are within the same class or peers in the organisation. However, Greenberg and Baron, (2008) held that they are all based on the command structure in the organization. Temitayo, Adedayo and Linus (2018) study on communication and employee's performance showed that communication is sufficient to ensure that there is increased employee's performance in an organization. The study of Udegbe et al. (2012) found that business communication directly links with performance of an organisation. Hence, we propose that:

H₀₂: Organisational communication has no significant effect on the profitability of manufacturing firms

Management Control System

Management control systems are approaches that an organization adopts towards providing a solution to specific inherent challenges in their operating environment. The challenge is misfits that are systemic to the existence and operational efficiency of the organization (Janke, Mahlendorf & Weber, 2014). Simons (1995) stated that the management control system is aimed at identifying and providing gradual solutions to misfits in an organisation's internal processes. The internal misfit arises when employees in the organization are rather focusing more on their personal goals at the expense of that of the organization (Straub & Zecher, 2013).

Chenhall (2007) stated that this misfit is one of the most explanatory cause for poor performance in most organisations given that employees ought to be the medium through which the organisation's goal and objectives are attained. Bisbe and Malagueno, (2012) opined that discovering this variance in the organisation is the precept for the adoption of a set of tools that are directed towards changing the inherent processes in the organization to align organisations interest to that of the employees.

Management control system is a process improvement dimension that is aimed at changing the way things are done in the organization, most especially when there is a misfit in the organization. The aggregate tools that top management adopts to handle misfits in the operational process in an organisation are what is known as management control system (Merchant & Van der Stede, 2007).

There have been varying views on what constitutes management control system (Lee, Fin & Widener, 2013; Kariyawasam & Kevin, 2014). In the views of Simons (1995) MCS are management approach towards changing the process of operation in the organization to align the various resources in the organization. Similarly, Libby, Libby and Short. (2003) stated that MCS is a deliberate attempt towards gathering information for managers that are directed towards the expansion and change in the operation of the business. The information covers human resources activities, new investment, advertising and as much as required towards improving the performance of the business.

Further, Simons (1995) argues there are two varying forms that management control can take in the organization, which are the diagnostic and interactive control system. The diagnostic seeks to identify the misfits in the organisation's process through careful selection of relevant information and using the same to make a decision that will improve the organization. The interactive is different given that the technical features seek to allow inputs and share ideas on how to provide a solution to the imminent challenges in the organization. However, the most important thing is identifying how the control systems are used in the organization (Thoren & Brown, 2004). The way that MCS is used remains the ultimate factor to ensure an increase in overall performance.

Verburg et al. (2018) found that there is a direct link between management control system and performance of the organization, similarly, the study of Ilias, Abdulatiff and Mohamed, (2016) found that management control system has significant effect on performance. In addition, Jamil and Mohamed (2013) found that management control system significantly affects performance of small scale hotels in Malaysia. The study mediated performance management system to management control and performance, however, the current study is not interested in the mediating variable. Also, Nurwati, (2013) study found that management control significantly influence performance. Thus, we propose that:

H₀₃: Management system control has no significant effect on the profitability of manufacturing firms in Nigeria.

III. Methodology

The study used survey design for the study. The survey design is especially appropriate here because of the nature of the problem statement that requires that data is gathered across a given existing population of interest. The study population are 884 employees of the manufacturing firms selected for the study. Two manufacturing firms were selected for each geopolitical zones of the country, as such, twelve firms participated in the survey. The criteria for selection of the firms was based on their registration with the corporate affairs commission. The study relied on report from the human resources on the population of the study. The study sample is 275. The study used Taro Yamane formula to determine the sample size of the study. The choice of the formula is because it is the most commonly used formula in behavioural researches. The study used a convenient sampling technique in selecting the participants for the study. The choice of the technique was to allow the researcher to have participants that are willing and are free to take part in the survey given an average employee of a manufacturing firm are always engaged with work. Primary data source was adopted. The study used a self-designed questionnaire for data collection. The questionnaire was designed in a likert scale format ranging strongly agreed (5) to strongly disagreed (1). The study adopted construct validity and Cronbach alpha for reliability of the instrument. The study used partial least square PLS (SEM) for data analysis. The choice of the technique is because of its suitability for data gotten through ordinal scale instrument.

Measures

The study used questionnaire for the collection of data and the instrument was designed using the likert scale format. The response ranges from strongly agree (5) to strongly disagree (1). The instrument had twenty items that measured the study dimensions. Rondeau and Wagar, (2002), Yang et al., (2014) and Siha and Saad, (2008) study were relied on in designing the items used in measuring organisational learning as measure of process improvement. The instrument questions were structured to capture perspective of the employees on organisational learning, taking into cognizance past and present events. The scale for communication was self-designed, however, the study adapted items from the study of Udegbe, et al., (2012) and Kibe (2014). The instrument has five items that make up the scale. The scale for management control system as a dimension of process improvement was self-designed having five items that makes up the scale. The study of Jamil and Mohamed, (2013) and Nurwati, (2013) were adapted in designing the instrument. Performance was measured using a subjective approach and the instrument was self-designed. We conducted exploratory factor analysis given that the items were self-designed using a pilot data of 50 respondents. The Bartlett test of sphericity shows the sample is sufficient and all items loaded sufficiently on their factors with coefficient values within and above .70. The EFA confirmed the variables are independent. The pilot confirmed the internal consistency test with values above .70 before the instrument was distributed.

IV. Result and Discussions

The retrieved questionnaires were (270), which is 98% of the distributed instruments. Data cleaning processes led to the selection (255) instruments that were found usable for the study. However, this still accounts for 93% of the sample used for further analysis. Owing to the nature of the instrument used for collection of data and since one instrument was used for both the dependent and independent variable, we conducted common method variance analysis using factor analysis on SPSSv25. The result showed that none of the item accounted for more than fifty percent, as such the instrument was free from bias (Podsakoff, MacKenzie & Podsakoff, 2012). The demographic analysis of the instrument shows that the number of male respondents that took part in the survey are 148(58%) and the number of female respondents are 107(42%). The result showed the age bracket of the participants were 18-30years 25(3%), 31-40years are 155(17%), 41-50 years are 66(38%); 51-60years are 31(24%) while 61years and above are 18(18%).

Measurement Model

The first approach was to assess the reliability and validity of the scale (Roldan & Sanchez-franco, 2012). The convergence was after iteration 7 as specified in the process. Recommendation of Hair, Hult, Ringle and Sarstedt, (2017) was used to assess the reliability and validity of the measurement instrument. The result showed that all items in the scale had factor loading above .70 (See table 1 below). The Cronbach's alpha from the result are within the threshold of .70, as Henseler, Ringle and Sarstedt, (2015) and Scot, (2007) suggested. The suggestions of Hair, et al. (2010) on the coefficients of the composite reliability (> .70), Rho-A (> .70), and AVE (> .50) are satisfied from the result as indicated in table 1. The twenty items loaded significantly as the factors were above the threshold. The same applies with the composite reliability as all the items are above criteria expected. The result indicates that there is no collinearity problem, as they were less than five (Hair et al., 2010). The AVE and rho_A are further criterion test (convergent validity) to further validate the instrument, thus, justifying the instrument for the measurement of process improvement influence on performance of manufacturing firms. This is a contribution to knowledge, as a validated instrument that can be used to measure process improvement is provided in this study.

Table 1: Instrument Reliability and Validity on Process improvement and Performance

Indicators	Load	VIF	Cronbach's alpha	Composite reliability	AVE	rho_A
Organisational learning			0.736	0.818	0.674	0.734
OLN1	0.719	1.429				
OLN2	0.726	1.443				
OLN3	0.754	1.598				
OLN4	0.724	1.355				
OLN5	0.759	1.239				
Communication			0.723	0.865	0.569	0.831
COM1	0.726	1.535				
COM2	0.795	1.455				
COM3	0.711	1.232				
COM4	0.776	1.403				
COM5	0.727	1.387				
Management System Control						
MSC1	0.707	1.173	0.801	0.825	0.587	0.737
MSC2	0.804	2.327				

MSC3	0.859	2.705			
MSC4	0.712	1.503			
MSC5	0.835	1.959			
Performance			0.708	0.754	0.612
PEF1	0.878	1.412			
PEF2	0.849	1.519			
PEF3	0.737	1.522			
PEF4	0.710	1.198			
PEF5	0.706	1.600			

Source: Authors computation, 2019

Further, the table 2 is a result indicating the Fornell-Larcker Criterion result. The result indicates that the instrument is valid, as the AVE square root of the latent variables is greater than the correlations indicating that scales are valid, as Hair et al. (2017) recommended.

Table 2: Discriminant Validity using Fornell-Larcker Criterion

	Organisation learning	Communication	Management system	Control	Performance
Organisation learning	0.857				
Communication	0.771	0.912			
Management system	0.722	0.682	0.858		
Performance	0.626	0.558	0.500	0.882	

Source: Authors computation, 2019

Structural Model Assessment

The R-square result indicates that process improvement predicts about .0579 in the changes in performance. In line with the recommendation of Henseler and Chin, (2010) the result shows that process improvement measures moderately influences organisational performance. The fig 1 below shows the path result for each of the measures. The path coefficient for organisational learning (0.211), communication (0.271), and Management system control (0.668) are above the threshold of 0.2, as Chin (1998) recommended.

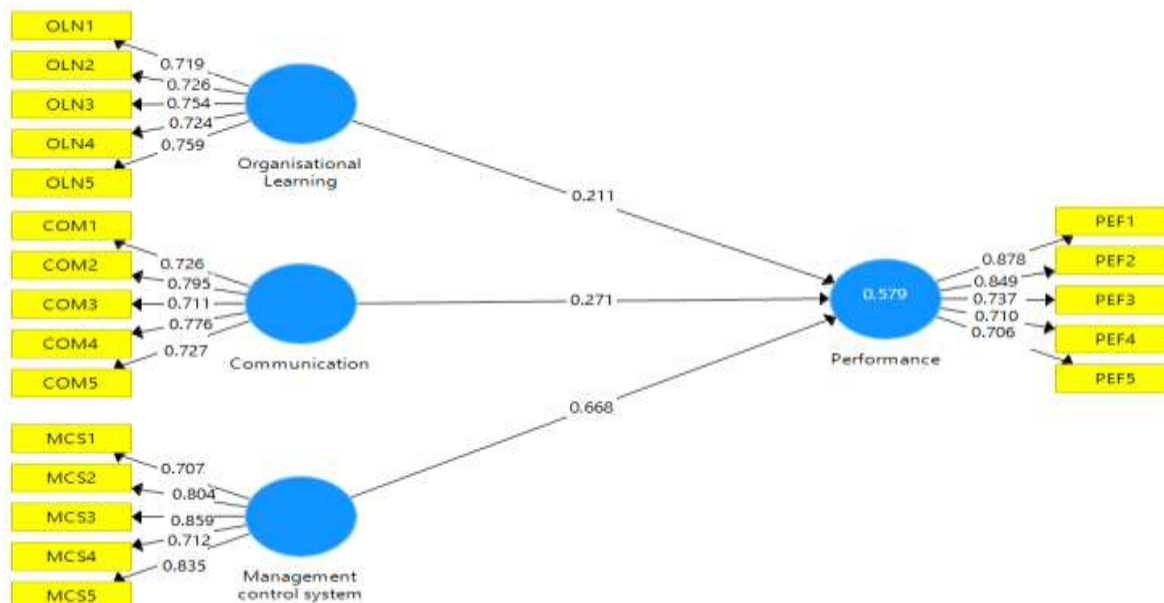


Fig. 1: Path Diagram indicating Process Improvement and Performance

Significance of the Model

Fig 2 shows the significance test of the structural model. The report shows that process improvement significantly influences performance in the manufacturing sector in Nigeria, as the relationship are positive. The study used the p-value for decision rule for accepting or rejecting the hypothesis.

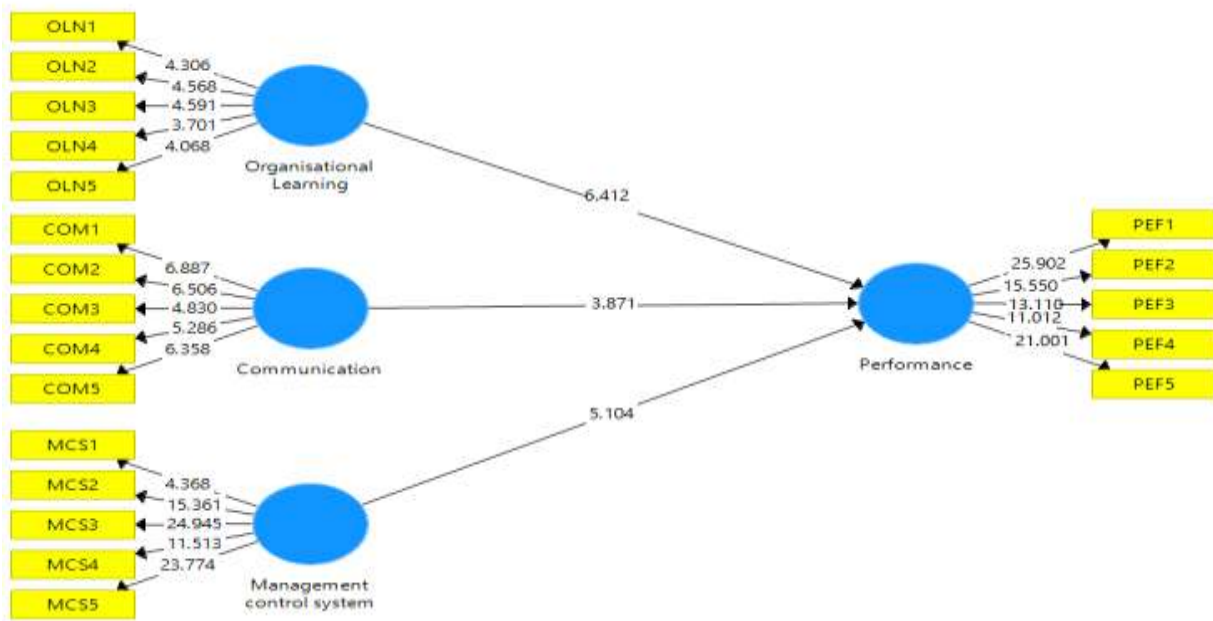


Table 3: Summary of result

Hypothesis	Model	T Statistics (O/STDEV)	P-values	Decision
H1	Organisational learning -> Performance	6.412	0.000	Reject Null
H2	Communication -> Performance	3.871	0.031	Reject Null
H3	Management control system -> Performance	5.104	0.010	Reject Null

Source: Authors computation, 2019

The study relied on the p-value for rejecting the hypothesis, if the p-value is less than 0.05 (two-tailed), the null hypothesis (H_0) is rejected and vice versa. Table 3 shows the summary of the result. Organisational learning relationship to performance is significant as the p-value is less than 0.05 (0.000) and t-value above 1.96 (6.412). Therefore, the null hypothesis (H_{01}) is rejected, which implies that organisational learning significantly influences performance. The result is consistent with the findings of Khandekar and Sharma (2015) and Oh (2018). That also found organisational learning to have positive significant influence on performance. However, when the descriptive statistics is considered, it was observed that though there is a direct relationship between organizational learning and performance, the axis of interactions among the firm under consideration is in the negative coordinates. In other words, organizational learning is low, hence performance is also low.

In addition, the result shows the effect of communication on performance is significant, given that the p-value is less than 0.05(0.031) and the t-value is above 1.96 (3.871). Therefore, the null hypothesis (H_{02}) was rejected. This implies that communication has significant influence on performance. The result agrees with the finding of Inebo et al. (2015) and Kibe (2014) that also found that communication, as a measure of process improvement, significantly influence organisations performance. When this is considered with the descriptive statistics of the representative firms under the study, it was observed that though there is a direct relationship between communication and performance improvement, the two variables were in the negative axis; which signifies that as the level of communication is low, so is the low performance among the firms.

Finally, the result on the effect of management control system on performance shows a significant relationship, given that the p-value is less than 0.05(0.010) and the t-value is above 1.96 (5.104). Therefore, the null hypothesis (H_{03}) was rejected, which implies that management control system, as a dimension of process improvement, significantly influence performance of the manufacturing firms. The study result is in line with the findings of Ilias et al. (2016) and Jamil and Mohamed (2013) that also found that management control system significantly influences performance. When this result is combined with the descriptive statistics, it was observed that though there is a direct relationship between management control system and performance, the axis of interactions among the firms under consideration is in the negative coordinates. In other words, management control system is weak, hence performance is low.

Hu and Bentler (1998) criteria for model fit assessment was used for this study. In view of the recommendation, the study used the SRMR to assess the model, and given the value is less than 0.08 (recommended threshold), it thus, indicates that the model is fit. Thus, indicating that process improvement in manufacturing firms in Nigeria can predict increased performance.

V. Implication for research and Practice

The study focusses on the effect of process improvement on performance of manufacturing firms in Nigeria. The empirical and theoretical underpinning of the research provided justification for the evaluation of the study, as gaps related to the constructs were identified and explored in this work. It was found that process improvement had significant effect on the performance of the manufacturing firms in Nigeria. In other words, the higher the process improvement level, the higher the level of performance. The research concludes that process improvement has a direct influence on performance of manufacturing firms in Nigeria, but both variables were observed to be low. Based on the findings of this research, there are a number of implications for managers.

In order to drive performance in the upward direction in the manufacturing sector, there is a need for managers of manufacturing firms to improve the learning system in the organisation and allow for knowledge sharing and dissemination of new ideas, which correspondingly would lead to innovative outcomes that will help increase the patronage of their products among the ever conscious consumers. Managers must pay greater attention to communication in the manufacturing firms. The flow of vital information would help employees better contribute and make meaningful inputs that will be essential to the growth of the sector. The communication level must be improved through the emplacement of effective communication strategies and implementation.

Managers must ensure that their internal management control system is effectively emplaced, as there is a need for consistent evaluation and monitoring to ensure product conformity to quality standards, customers satisfaction and feedback mechanism and increased relationship management to the benefit of the firms. As it stands, the manufacturing firms operate weak internal management control system which corresponds to the poor performance level. Therefore, necessary investment to improve the internal management control system is a decision that has the propensity to improve the firm's performance.

Finally, the study advances a new theoretical paradigm in explaining the challenges in the manufacturing firms in Nigeria and exposes the relevance of the RBV theory in providing a theoretical lens through which performance can be attained in the Nigerian manufacturing sector. The study provides an empirically validated instrument that other studies can adopt in measuring process improvement.

VI. Limitations of the study

The study was limited to the use of questionnaire, as such future studies can adopt a longitudinal approach to the study. The study was also limited to two manufacturing firms in each geopolitical zones of the country. Future studies could consider a broader sample that captures the entire firms and possibly conduct a comparative analysis. Despite the limitations, the researcher made effort to ensure the drawbacks does not affect the outcome of the research.

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