

The Impact of Knowledge Management on Product Innovation of Manufacturing Firms in Nigeria

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ABSTRACT

This study investigated the impact of knowledge Management on Product Innovation of Manufacturing firms in Nigeria. A sample size of 95 was determined from a population of 125 employees selected from 5 manufacturing firms in Port Harcourt. 70 copies of the questionnaire were appropriately filled and data was analyzed using Standard Multiple Regression with the aid of SPSS version 21. The findings showed that all the dimensions of Knowledge Management influenced Product Innovation of the firms. However, it was revealed that knowledge acquisition has the most impact on product innovation. It was therefore recommended that management of these firms should take practical steps to acquire the right blend of knowledge workers so as to enhance efficiency of their production through innovativeness. Likewise, the recruitment process of potential employees should be based on competence and credibility of the candidates.

Keywords: Knowledge Management, Product Innovation, Knowledge Acquisition, Knowledge Conversion, Knowledge Application.

1. INTRODUCTION

Manufacturing is an important economic contributor and a pointer that a country has a robust economy. It enhances the success and competitiveness of a country's economy (Ojo & Ololade, 2013; Amakom, 2012). In some countries, revenue generated from the manufacturing sector constitutes a major source of foreign exchange e.g. Brazil, China, Japan and Hong Kong (Ogbu, 2012). However, this seems not to be the case in Nigeria as submitted by Sola, et al (2013). In separate studies by Onuoha (2013), and Ojo and Ololade (2013) it was revealed that the major problems accosting the manufacturing sector in Nigeria comprises technical and technological dependence on other countries and lack of innovation. Others include "high production costs; poor infrastructure; poor financing; competition from fake and sub-standard imported goods; limited scope of operation, among a myriad of other obstacles". These problems hamper the development of this sector and has, in most cases, lead to the winding up of several manufacturing firms.

The annual report of the Nigerian Association of Chambers of Commerce, Industry, Mines and Agriculture (NACCIMA, 2012) showed that more than eight hundred (800) manufacturing firms in Nigeria wind up within the period of 2009-2011. The report indicated that the main reason for the closure of these firms was the dynamism of the business environment. Meanwhile, Onuoha (2012) submits that the winding up of several manufacturing firms in the country was as a consequence of inefficient patronage of their products locally and internationally, this may have been as a result of lack of product innovation. NACCIMA (2012) further noted that the sustainability of the Nigerian manufacturing firms could not be ensured, since more than half of the surviving firms were rated as "ailing" as at 2012. The report also showed that knowledge utilization in the sector fluctuates between 30-45% within the period under review. This lack of utilization of available knowledge in the sector has hindered the competitiveness of these firms' products and services, while further reducing the contribution of the industry to the country's GDP (NBS, 2015; Olusanya, 2013; Onuoha, 2012).

According to The National Bureau of Statistics (2014) fourth quarter report, growth in Nigeria's manufacturing sector shrank to 19.2 percent in the ending quarter of the year. The Bureau presented the sector's nominal GDP growth for the quarter of at 19.12 percent (year-on-year), this was 13.28 percent lower than the corresponding period of the previous year which was reported at 32.40 percent. The sector also had a decline in growth of a 2.46 percent less than that of the preceding quarter of the year. In a related report by the Central Bank of Nigeria (2015), industrial production in Nigeria declined as much as 6.60 percent during the middle of 2015 as measured against the previous year. The average of industrial production in the country between 2007 and 2015 was put at

1.81, while the peak was at 20.10 percent which was obtained during the early 2011. The country recorded its lowest industrial production at -6.60 percent during the second quarter of 2015. The low performances of the manufacturing firms in the country may be attributed to the problem of lack of proper management of tacit knowledge which has led to low product quality on the part of the manufacturers in the country.

Currently, the search for new, genuine, competitive and quality products have attracted global attention. Multiple scholarly works have been carried out to ascertain if knowledge management can enhance product innovation (Kör & Maden, 2013; Ismail & Omar, 2012). Despite the immense impact knowledge management has been said to have on product innovation, there are studies with contrasting views (Mageswari, et al, 2015; Ferraresi, et al, 2012). This disagreement among scholars and the inability of the country's manufacturing firms to creatively develop new products that can compete with their peers from other countries is a major concern for government at all levels and industry captains. This current situation calls for urgent attention and action towards redressing the ravaging effects this is having on the country's economy. Therefore, this study is set to investigate if the proper knowledge management by manufacturing firms in the country can enhance product innovation and position the manufacturing industry for greater performance. The study is therefore set to examine the following specific objectives:

1. Impact of knowledge acquisition on product innovation among the manufacturing firms.
2. Impact of knowledge conversion on product innovation among the manufacturing firms.
3. Impact of knowledge application on product innovation among the manufacturing firms.

2. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

2.1 Knowledge Management

The effective use of human knowledge in an organization is not only a strategic organizational tool, but an important competitive strategy for businesses (Alavi & Leidner, 2001; Carneiro, 2000). Similarly, Drucker (1995) submits that knowledge is a major organizational resource and the preponderant source of comparative advantage. While numerous scholars have concluded that organizations can enhance the development and creation of new and innovative ideas through the proper management of knowledge, and by effectively managing available intellectual capitals, this can be done by constantly acquiring, sharing, and applying knowledge within the firm (Huang & Li, 2009; Plessis, 2007; Lin & Lee, 2005; Carneiro, 2000; Alavi & Leidner, 2001; Beijerse, 1999; Nonaka & Takeuchi, 1995).

According to Hall and Adriani (2002), Knowledge management could be defined as a managerial function that locates important data and process it into needed information which is essential to the formulation and implementation of decisions. Knowledge management has also been said to comprise organizational strategies and actions to "identify, capture, share and leverage the knowledge required to survive and to compete successfully" (Pena, 2002; Hall & Adriani, 2002; Lepak & Snell, 1999; Lim, 1999). Similarly, Frost (2014) opines that Knowledge management is essentially the identification of the right employees at the appropriate time. Proper knowledge management in an organization may not be difficult, but without the proper policies and strategies, it may become a daunting task that may end up consuming the whole organization.

Gold, et al., (2001) states that, knowledge management can be considered as "a structured coordination for managing knowledge effectively and efficiently". While Alavi and Leidner (2001) submit that it includes processes such as "knowledge creation, sharing, storage, and usage". Knowledge management is about harnessing available knowledge by encouraging innovative ideas which leads to enhance organizational performance. Several scholars have stated the dimensions of knowledge management to include "identification, acquisition, codification, storage, retrieval, sharing, dissemination, and creation, application" (Liao & Wu, 2009; Wang & Ahmed, 2004, etc). Wang and Ahmed (2004), in their study on development of a measure for knowledge management, conceptualized it as comprising "knowledge system, organizational memory, knowledge sharing, a learning culture and knowledge benchmarking". Zahra and George (2002) earlier dimensionalized it as "skills acquisition, assimilation and transformation of knowledge, and ability to use and exploit knowledge". However in this study acquisition, conversion and application of knowledge (Liao & Wu, 2009) were deemed appropriate, and so were adopted as dimensions of knowledge management.

Knowledge acquisition is the procedure through which knowledge can be secured. Huber (1991) defined it "the process by which knowledge is obtained". Similarly, Kraaijenbrink, et al. (2006) described knowledge acquisition as the process through which "knowledge is transferred from a source to a company through sub processes: written form, physical objects, people, cooperation between source and recipient, courses, and outsourcing". Knowledge conversion involves the transforming of "generated knowledge into accessible and applicable formats" (Davenport and Prusak, 1998). Also, Nevo, et al (2007) defined it as the capturing, expression and storing of knowledge. Knowledge application are those processes geared towards a positive uage of the knowledge acquired (Gold, et al, 2001), it was also defined as "the ability to learn by most people in organization" (Saisuthanawit, Wayuparb & Buranajarukorn, 2013).

2.2 Product Innovation

Scholars and practitioners alike have come to the conclusion that organizational innovativeness is a strategic component of a firm's ability to succeed and be able compete favourably in the dynamic business environment (Wang & Ahmed, 2004). Product innovation is a strategic resource for modern businesses (Hultink, et al., 1998; Auh & Menguc, 2005; Vorhies & Morgan, 2005, Jelenic, 2011). Several scholars conclude that the success and survival or failure of modern organizations rely on how innovative they are (Quinn, 2000; Nonaka & Takeuchi, 1995). As opined by Ahmed (1998), many businesses emphasize the importance of improving their innovative ability, so many try to achieve it, but only a few could actually achieve it.

Product innovation has been noted to facilitate the achievement of organization's objectives as it help in the transformation of ideas into new, better quality products, and services through enhanced processes (Baregheh, et al., 2009). Product innovativeness helps in distinguishing a firm's product from that of its contemporaries. Notable scholars have pointed out that fact that for a firm that cannot control the market price of products in its sector, the succumb lies in the making of innovative products (Palas, Böckermann, Goetz & Tecklenburg, 2013; Baregheh, et al., 2009).

Product innovativeness has been of great interest to both managers and scholars, as it is a critical factor in predicting product success (Calantone, Chan & Cui, 2006; Sethi, et al, 2001; Zirger, 1997). In a related study by Henard and Szymanski (2001) it was showed to be influential in sustaining organizational success. Danneels and Kleinschmidt (2001), opine that innovative products brings about great openings for expansion and growth for businesses, as it allows them venture into new and untapped horizons and gaining leading position among its peers.

Henard and Szymanski (2001) submitted that product innovativeness is most times called "perceived newness, novelty, originality, or uniqueness of products", while Atuahene-Gima (1995) suggested that, it is made up of consumers and firm's perspectives. That is, a firm that continuously strive to innovate it products must consider the preference of the consumers in designing it products so as to retain the loyalty from them. Andrews and Smith (1996) concluded that the propensity to which a product is beneficial to the end user is determinant of product innovativeness, and that products should be rated based on its usefulness to the consumer.

Wang and Ahmed (2004) define product innovation as "the novelty and meaningfulness of new products introduced to the market at a timely fashion". In this study, product innovation was defined as the injection of new and enhanced goods or services that can significantly satisfy the final user. These improvements may include: better packages, specifications, easy to get components.

2.3 The Relationship between Knowledge Management and Product Innovation

The relationships between these two variables have been studied by several scholars (e.g, Palas, et al 2013; Bidmeshgipour, Ismail & Omar, 2012; Kör & Maden, 2013; etc). The anticipated impact of knowledge on innovation has been well documented (Darroch & McNaughton, 2002), and "how it is generated, disseminated, managed and applied will continue to be a distinguishing factor among the strongest economies" (OECD, 1996; DETYA, 1999). Knowledge management was also said to enhanced innovation through acquisition, conversion and application of new ideas and harnessing organization's knowledge power for newer and more quality products (Huang & Li, 2009; Plessis, 2007; Lin & Lee, 2005; Argote, et al., 2003; Darroch & McNaughton, 2002).

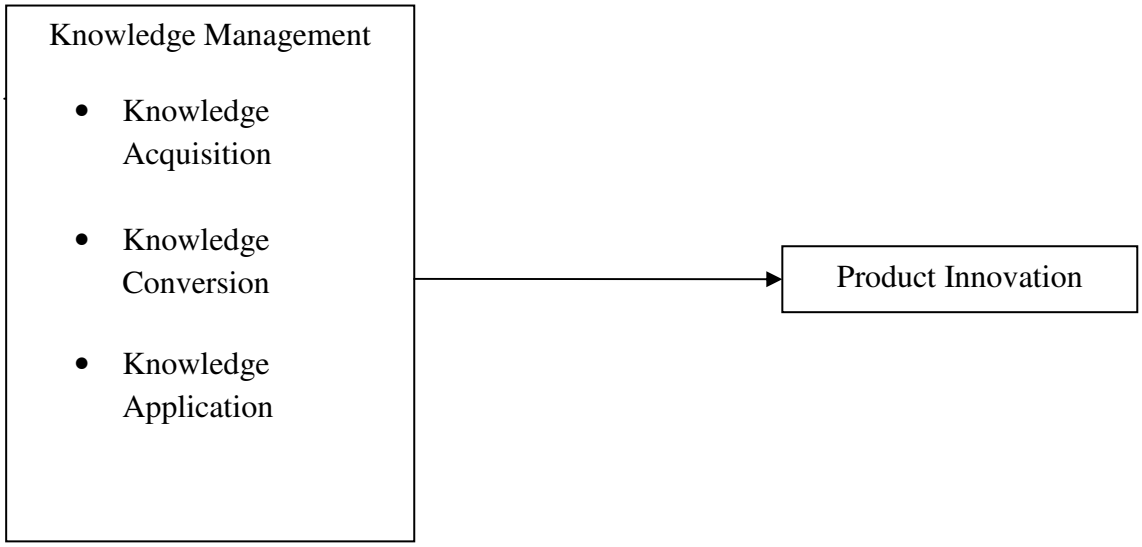
Knowledge management has been recognized as s strategic managerial tool that helps in the creation and dissemination of new and innovative ideas (Jelenic, 2011; Lepak & Snell, 1999). A manager that intends to lead

his subordinates to achieve success must find a way to harness the intangible assets imbibed in his employees. The effective utilization of available intellectual asset within a firm was said to enhance the decision making process in the firm, it also help improve the level of efficiency in operation, while encouraging employees involvement and ultimately commitment (Jelenic, 2011).
Not only have scholars discussed about the benefits organizations stand to derive from the proper management of knowledge available in their firms. Practitioners as well, are now showing serious concern on knowledge management as a critical factor of competitive products (Hall, 2006; Tippins & Sohi, 2003; Conner & Prahalad, 1996; Davenport & Prusak, 1998). A study of Service and High-Tech Firms conducted in Turkey by Kör and Maden (2013) revealed that knowledge management significantly aids the adoption and implementation of innovativeness ideas which lead to innovativeness in production.

In a knowledge-based economy, innovation has been noted to be a key factor enhancing competitive advantage and economic growth (Beesley & Cooper, 2008). But product innovativeness was said to be encouraged through the proper management of tacit knowledge (Nonaka & Takeuchi, 1995). In businesses, the prioritizing of knowledge management leads to successful product innovation (Darroch & McNaughton, 2002; Carneiro, 2000). From the arguments above, it is therefore hypothesis that:

H1: Dimensions of Knowledge Management have no impact on product innovation of themanufacturing firms.

Fig. 1 Conceptual Model



3. METHODOLOGY

3.1 Research Design

The correlational field survey design was adopted for this study. The correlational field survey was applied because the study involves the use of a questionnaire in the collection of data. It is also a correlational field study since it involves the measurement of the impact of a variable on another. It also involves the collection of data related to the research questions of interest at a single time. All these necessitated the application of a correlational field survey (Creswell, 2009; Tharenou, Donohue Cooper, 2007; Levin, 2006; Olsen & M. St. George, 2004).

3.2 Sampling and Data Collection Methods

A sample size of 95 employees was determined using the Krejcie and Morgan (1970) table. Having been drawn from a population of 125 employees from 5 manufacturing firms located around Trans Amadi industrial layout in Port Harcourt. A structured questionnaire consisting of three sections was sent to the respondents. Section one has items describing the demographical details of the respondents, section two contains statement items detailing

knowledge management in their firms, while, section three contains items on product innovation. The survey participants were told to place a value ranging from 1-5 on organization, with 5 representing strongly agree, while 1 represents strongly disagree. A total of 95 copies of the survey instrument were sent of which 82 were returned. On further screening 12 were dropped due to conflicting and incomplete information. The remaining 70 copies were used for analyses to determine the impact of knowledge management on product innovation.

3.3 Operational Measures of Variables

Knowledge management was dimensionalized using acquisition, conversion and application of knowledge. The dimensions were measured using twenty one observable indicators adopted and modified from the work of Liao and Wu (2009). Knowledge acquisition has eight items (eg. "My organization has processes for exchanging knowledge with our business partners"). Also, six statement items were used to describe Knowledge conversion (eg. "My organization has processes for absorbing knowledge from individuals into the organization"). Finally, knowledge application was observed through seven statement items (eg. "My organization has processes for using knowledge to solve new problems").

Four statement items adopted from the work of Wang and Ahmed (2004) were used to describe product innovation, with such items as "In comparison with our competitors", "our company has introduced more innovative products and services during the past five years". All items were placed on a five-point Likert scale, with 1 = strongly disagree, and 5 = strongly agree.

3.4 Validity and Reliability of Measuring Instrument

The adopted instrument, had reported good validity in the earlier studies of Wang and Ahmed (2004), and Liao and Wu (2009). However, in this study, the face - and content validity were ascertained by subjecting the instrument to the scrutiny of a panel comprising of scholars and experts from the manufacturing industry (Nunnally & Bernstein, 1994; Hayes, Richard & Kubany, 1995)

The reliability of the instrument was appraised using the Cronbach's alpha scores (Cronbach, 1951). Analyses showed Cronbach alpha values of .89, .78 and .84 for knowledge acquisition, conversion and application respectively. Likewise, product innovation returned a Cronbach alpha of .760. All the alpha values satisfied the 0.7 and .60 benchmarks set by Nunnaly (1978) and Price and Mueller (1986) respectively.

3.5 Data Analysis

Data were analyzed through standard multiple regression, using the Statistical Package for Social Sciences (SPSS) version 21. This parametric statistical tool was adapted after the prior tests of normality, linearity and homoscedasticity confirmed it to be appropriate and suitable for the analyses (Pallant, 2005; Tabachnick & Fidell, 1996).

4. FINDINGS OF THIS STUDY

In order to test the formulated hypotheses, the standard multiple regression analysis statistical technique was used to evaluate the impact of the dimensions of knowledge management (knowledge acquisition, conversion and application) on product innovation in the Nigerian manufacturing firms. Table 4.1 gives a summary of the results obtained.

Table 4.1: Summary of Standard multiple regression of the impact of KM dimensions on Product Innovation

Dependent Variable	R	R^2	Calculated f	Source	Df	Sig.	Ind. Variables	**B**	T	Sig.
Product Innovation	.793[a]	.629	.612	Regression	3		Knowledge Acquisition	.928	6.384	.000
				Residual	66	.000	Knowledge Conversion	.739	5.009	.000
				Total	69		Knowledge Application	.610	4.850	.000

a. Predictors: (Constant), Knowledge Acquisition, b. knowledge Conversion, c. Knowledge Application

b. Dependent Variable: Product Innovation

The results indicate that the acquisition, conversion and application of knowledge have significant positive impact on product innovation with all the dimensions having significant positive impact on product innovation. The Adjusted R^2 value of .612 showed that the model which includes (knowledge acquisition, knowledge conversion and knowledge application) explained 61.2% of the variance in product innovation. Similarly, looking at the level of significance of the independent variables, it shows that $p < .005$, which means that they all contribute significantly to the prediction of product innovation in the manufacturing firms. However, observing the individual contribution of knowledge management dimensions on product innovation of the manufacturing firms revealed that knowledge acquisition contributes the most ($\beta = .928$) to the model, all variables contributed significantly to the model with p-values < 0.05.The hypothesis that the dimensions of knowledge management have no significant impact on product innovation was rejected.

4.2 Discussion

The study focused on the impact knowledge management has on product innovation among manufacturing firms in Nigeria. Specifically, the impact of three dimensions of knowledge management (acquisition, conversion and application) was tested on product innovation. Therefore, it was hypothesized that, knowledge management dimensions have no significant impact on product innovation of the manufacturing firms. Our findings, revealed that knowledge acquisition, conversion and application have significant positive impact on product innovation with $r = .793$, $r^2 = .629$, while the adjusted $r^2 = .612$ and $p > .005$. Our result finds consistency with earlier empirical studies of (Alrubaiee, Alzubi, Hanandeh & Ali, 2015; Noruzy, et al., 2013; Akroush & Al-Mohammad, 2010).

In a study on knowledge management capabilities and product innovation, Malkawi and Rumman (2016) concluded that KMC positively influence the product innovativeness of SMEs in Jordan. Similarly, Abdelqader, et.al (2013) argued that a firm's Knowledge capabilities if effectively concatenated into the organization will enhance innovation and accelerate the development and production of quality new products at a lower cost to the firm. The results also found conformity with that of Jenny and Maria (2013) who submitted that KMC positively correlate with product innovation of IT firms in Spain. In the same line of argument, Pinar and Kor (2010), and Tseng, et.al (2011) in separate studies found that product innovation is greatly dependent on knowledge management capabilities. Alrubaiee, et al (2015) while studying the moderating effect innovation has on the relationship between knowledge management and performance of Jordanian SMEs found that the knowledge management significantly leads to improvement in performance through innovation.

Liao and Barnes (2015) studied "knowledge acquisition and product innovation flexibility in SMEs" and concluded that knowledge acquisition enhances the relationship between suppliers which in turn help the firm to achieve product innovativeness through the production of standard quality products based on customers' requirement. This submission is in the direction as the first hypothesis, which was concluded that knowledge acquisition is positively correlated with product innovation of the manufacturing firms. However, Yang (2011) in his study on Chinese software vendors, submitted that though knowledge acquisition positively influence the product innovation among the firms, it is not significant enough to keep the organization at the peak of the market, they concluded that firms should inculcate all dimensions of knowledge management in order to achieve full results.

This study runs counter to the earlier study of Mageswari, Sivasubramanian and Dath (2015), Ferraresi, et al (2012). Mageswari, et al (2015) found that in small manufacturing firms, knowledge creation and storage does not have impact on their ability to innovate. This finding was in harmony with the prior study of Ferraresi, et al (2012) who submitted that knowledge management does not exact any impact on product innovation, except when moderating for strategic orientation.

5. CONCLUSION

Analyses showed that manufacturing firms in the country need to center their attention on knowledge management so as to enhance their product innovation. However, they need to focus more on knowledge acquisition as findings revealed that, knowledge acquisition impact more on product innovation than the other two dimensions. The findings that knowledge management has a substantial impact on product innovation, denotes that product innovation could be enhance through the adequate acquisition, conversion and application of knowledge in the manufacturing firms.

The acquisition of new knowledge could bring about fresh ideas being brought into the organization's via the newly acquired employee. These could lead to the production of innovative products through the conversion of the acquired knowledge. The successful application of this knowledge enhances effectiveness and efficiency in the firms' production processes. This study was in tandem with earlier studies of Alrubaiee, Alzubi, Hanandeh and Ali (2015), Liao and Barnes (2015), Noruzy, et al (2013), Akroush and Al-Mohammad (2010), etc, while it also refutes the studies of Mageswari, et al (2015), Ferraresi, et al (2012), etc. It was therefore concluded that proper knowledge management via acquisition, conversion and application of knowledge has a positive impact on product innovation of manufacturing firms in Nigeria.

5.2 Recommendations

The following recommendations are made based on our findings:

1. Management of these firms should take practical steps to acquire the right blend of intellectual so as to enhance efficiency of their production through innovativeness.
2. Recruitment of potential employees should be without nepotism or favouritism, rather on capability and credibility.
3. Employees should be allowed the freedom to make mistake and learn from it.
4. Innovative ideas should be encourage and rewarded publicly to encourage others to think out the box.
5. Management should make proper design in accordance with the latest technology obtainable internationally to enhance their knowledge conversion process.
6. Management should adopt processes to examine the level of application of new ideas frequently.
7. Employees should be encouraged to make their input in the production process.
8. There should be frequent evaluation of employees' skills on the application of new technologies.

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