A Study of Technological Capability in Selected Rice Processing Firms in Nigeria

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Abstract
In the advent of processing indigenous rice production, there is need to encourage local technology. This study simply provides an insight into the intertwining capabilities. Mainly, a snowballing primary data technique was used to gather data across the thirty-five licensed rice processing firms in the four geopolitical zones of country using structured questionnaire. Data gathered was then analysed using the descriptive statistics- mean. The results showed that on a Likert rating scale of 5, acquisition capability and production capability were rated above average while creative, supportive and adaptive capabilities were rated low. This indicates that the firms have sufficient capability in the area of acquisition of resources and conversion of technologies while the capability to provide training and improvement of technologies is low. The study concluded that rice processing operations in Nigeria could be enhanced if all technological capabilities are adequately developed.
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1.0 Introduction

Rice is an essential commodity and a major contributor to agricultural production in Nigeria. As such, it is imperative that, its production process, through to the end-user, must be guided with high technological standards (National Cereals Research Institute, NCRI, 2006; Floros, Newsome and Fisher 2014). In the past, and still on-going, the government has deployed series of policies in this direction. Among such policies are the support mandatorily provided by its agencies and parastatals such as: the Bank of Industries (BOI) and Federal Ministry of Agriculture and Rural Development (FMARD), for rice reservation, technological/technical assistance and financial support (Longtau, 2003; Bamidele, Abayomi, and Esther, 2010; Ibitoye, Idoko, and Shaibu, 2014). In spite of these interventions, demand still outweighs supply.

Essentially, locally produced rice often fails to compete with imported rice because of out-dated processing technologies and ill-equipped infrastructure (Seck et al., 2010; *Seck* et al., 2013; Styker, 2013; West Africa Rice Development Association, WARDA, 2003). Thus, studies such as Tilman et al. (2002); Maertens and Barrett (2013); Kehinde and Adeyemo (2017); Fiamohe, Diagne and Flifli (2014); Feifei and Li (2007); Demont (2013) have advocated for means to synergise rice production and local technology capability. Manual/poor harvesting, threshing, drying and milling, leading to impurity and mixed colour are some of the highlighted challenges posed in this regard.

To resolve the aforementioned, Panda and Ramanathan (1996); Ogbimi (2007); Dike (2009); Danish Ministry of Science, Technology and Innovation (2005); Ojiako, Greenwood and Johansen (2005) advocated the adoption of the international best practices in rice production. In PMBOK (2013), organizations that uses international best practices as production benchmark do better than others (Biggs, Shah and Srivastava, 1999; Figueiredo, 2009; Oluwale, Ilori and Oyebisi, 2013). It means with capacity, better rice production is possible likewise, better return.

Kim (1997) says that, technological capability is the ability of an organisation to develop, use technological knowledge such as the ability to assimilate, use, adopt and change existing technologies. This is however not the case among developing countries like Nigeria, where technologies are imported.

The concept of technological capability has been well researched in the literature. However, there is barely any on rice production. On this ground, the study leverage on this gap in providing one by answering questions such as: what is the present state of technological capability of rice processing industry in Nigeria? Do rice production firms have the technological capability to adapt local technology to production?

2.0 Literature review

The concept of technology has been defined in different ways (Akintelu, 2018; George, 1823; Bain, 1937). On one hand, it is referred to as the study of useful arts. On another, it is described to include all tools, machines, utensils, weapons, instruments, housing, and clothing, communicating and transporting devices (George, 1823; Bain, 1937). MacKenzie and Wajcman (1999) defines technology as applied science. Likewise, it is seen as the know-how, physical things and procedures used to produce products and services.

Rhodes (2000); Akpomi (2003); UNESCO (2015) says, it is the collection of techniques. Thus, the current state of humanity's knowledge of how to combine resources to produce desired products, to solve problems, fulfil needs, or satisfy wants. Borgmann (2006) viewed technology as an activity that forms or changes culture. The state of modern communication is ascribed to this in terms of technology advancement. As a cultural activity, technology predates both science and engineering, each of which formalizes some aspects of technological endeavour.

Likewise, technology capability refers to a continuous process of absorbing and creating technological knowledge from interaction with the environment and the accumulation of skills and knowledge mastered by a firm (Lall, 1992; Bell and Pavitt, 1995; Archibugi and Pianta, 1996; Panda and Ramanathan (1996); Kim 1997).

Technological capability has received considerable attention of many researchers worldwide. Specifically, during the 1990s, different studies focused on firm technological capability (Lall, 1992; Bell and Pavitt, 1995; Archibugi and Pianta, 1996; Panda and Ramanathan, 1996). For instance, Lall (1992) referred to technological capability as a continuous process of absorbing and creating technological knowledge from interaction with the environment and the accumulation of skills and knowledge mastered by a firm. Bell and Pavitt (1995) opined that, technological capability is the resource needed to generate and manage technological change, including skills, knowledge and experience, institutional structure and networks.

At the micro-level, Malerba (1992) describes technological capability as the knowledge and skills that a firm needs to acquire, use, adapt, improve and create technology. That is, knowledge built through interactions within the firm and with external actors. In Eric (2006), technological capability is described as a specific collection of equipment, skills, knowledge, aptitudes and attitudes that confer the ability of a firm to operate, understand, change and create production processes and product. Universally, the notion of technological capability cuts across the formation of new knowledge and learning (Ogbimi, 2007). Technological capability is also referred to as the firm's ability, based on its accumulated knowledge, to perform a set of activities, which results in new knowledge development to achieve positive economic results (Fernanda et al., 2014; Hall and Bagchi-Sen, 2002).

Accumulation of resources and competencies can help firms to develop technological capability than their competitors (Garcia-Muina and Navas-López, 2007; Jin and Von-Zedtwitz, 2008; Zawislak et al., 2012; Fernanda et al., 2014). In this sense, absorption and transformation of a technology, as a way of reaching higher levels of technical-economic efficiency, remains as an alternative goal (Zawislak et al., 2012; Ruffoni et al., 2012). Many authors linked technological capability to firm knowledge (Panda and Ramanathan (1996); Fernanda et al., 2014; Garcia-Muina and Navas-López, 2007; Jin and Von-Zedtwitz, 2008). In order words, firms that develop their technological capability in an incremental way are made to be limited to a routine activity. Ogbimi (2007) as well as Calantone, Cavusgil and Zhao (2002) articulated that learning leads to innovation and performance. Accordingly, they argue that firms need to focus on learning process to obtain competitive advantage in the market (Sirmon, Hitt and Ireland, 2007). As such, firms' ability to leverage on technological learning will result in its ability to create more value for its ultimate reward.

Reversely, Westphall et al., (1990); Romijnh (1999); Wignaraja (2002) sees technology capabilities as input and outcome. This distinction comes mainly from the difference between competences and capabilities (Von-Tunzelmann and Wang, 2007). Simply, the former enhances inputs to produce goods and services. The latter, involves learning, accumulation of new knowledge, and, the integration of behavioural, social and economic factors, as adapted to specific contexts. Also, capabilities are the outputs of adaptive learning processes that are sustained through variety of external sources for innovation, partially embedded in the regional environment of the firm (Akintelu, 2018; Von-Tunzelmann and Wang, 2007; Von-Tunzelmann and Wang, 2003; Iammarino and McCann, 2012; Abramovitz, 1986; Piva and Vivarell, 2009; Sobanke, Ilori, and Adegbite, 2012; Iammarino et al., 2009). Also, the concept of capabilities has been used variously across different levels of systems to describe a large variety of processes and a variety of functions (Akintelu et al., 2018; Abramovitz, 1986).

Lall (1992), as well as Bell and Pavitt (1995), describes technological capabilities as the knowledge and skills that firms need to acquire, use, adapt, improve and create technology, interacting with the external environment. One may think of firm's endowment of adequate skills as the necessary internal competences to obtain value from R&D and innovation investments (Piva and Vivarell, 2009).

Capabilities involve acquisition of new knowledge about firms and integrating behavioural, social and economic factors into a specific set of outcomes (Akintelu, 2018). Capabilities are to be taken as the results of adaptive learning processes that can be highly localised in their collective dimension giving rise to system capabilities (Akintelu, 2018); Iammarino and McCann, 2012; Iammarino et al., 2009). Variables related to human resources, or cooperative linkages for innovation with external actors, are to be considered as determinants of a firm's technological capabilities, rather than as the capabilities themselves (Von-Tunzelmann and Wang, 2003; Iammarino and McCann, 2012).

Sobanke, Ilori, and Adegbite (2012) classified technological capability as basic skills required by firms operating in a given country. These are the skills and knowledge required by firms to start a new business or upgrade an existing one. This type of technological capability is needed by firms to choose, install and operate a set of modern machinery and equipment that are widely used in a given industry. Basic technological capability is readily available to all competitors and it is the minimum requirement for standard production (Iammarino and McCann, 2012; Iammarino et al., 2009). It is expected that technological capability is required for the management of the effect of a technological change in a particular industry or system. It is the required skill to navigate the inevitable. It gives the firm a competitive edge over other competitors and also allows the firm to compete favourably at the international market (Pierre, Staut and Bernard, 1992).

Measures of Technological Capability (TC)

Egbetokun (2009); Khalil (2000); Abereijo (2006); Armbruster et al. (2008); Becheikh, Landry and Amara (2006); Schmidt and Rammer (2007); Olomu, Akinwale and Adepoju (2015) describe the following as measures of TC:

a. Investment capability
b. Production capability
c. Innovation capability
d. Linkages capability

For instance, Egbetokun (2009); Armbruster et al. (2008) says that investment in research and development provides great reward on investment if channelled appropriately. In order words, with adequate knowledge in research and development, as a result of appropriate investment, firms have greater chances of improved services and increased income. The essence of this, as Khalil (2000); Becheikh, Landry and Amara (2006); Schmidt and Rammer (2007) puts it, is that, it provides superior production capability. This will bring about reduced production cost and optimal revenue. Invariably, the constantly introduction of new technology is innovation or, simply, firms innovation capability. This is driven by factors which may be technological or non-technological (Olomu, Akinwale and Adepoju, 2015; Jiaji et al., 2000).

Further, linkage capability is a system used for transmitting and receiving supportive information at three different levels. These levels include business to business, research and development (Sobanke, Ilori, and Adegbite, 2012). Akintelu (2018); Olamade (2001); Massa and Testa (2008) referred to this capability as those skills that are required for transmitting information, skills and technology, and receive them from component/raw material suppliers, customers, subcontractors, consultants, service firms and technology institutions.

3.0 Research Methodology

A primary survey of the relationship between technological capability and rice processing is set-up as the study methodology. Basically, this is split into the snowballing approach, interview and questionnaire distribution. The former is to acknowledge, the face-to-face evidence of the level of technology capabilities used. Thereafter, the instrument of interview is deployed to elicit informed conversion. After that, questionnaire was distributed to elicit documented responses for conclusion purposes. Items used to proxy technological capabilities are as opined in Reichel and Ramey (1987) Bell and Pavitt (1993) Fasola, Aliyu and Wakatsuki (2001); Federal Ministry of Agriculture and Rural Development, FMARD, (2015); Wudiri (1990) and, is technology capability index which measures: acquisition, production, adaptive, creativeness and supportive capabilities. This is measured against volume (bags) processed over time. Here, based on the Likert-scale 5 rating, the frequency, mean and percentage statistics were deployed as the instrument of analysis. Firms used are registered firms across four-geopolitical zones of the country

Study Area

The study was carried out in the rice processing firms that engage in parboiling and processing operations in all the rice producing states across four of the six geopolitical zones in Nigeria. The zones were selected because they have good cluster of rice processing firms that can contribute to national rice production in Nigeria. Eight (8) states were purposively selected from the four geo-political zones in Nigeria. The states consist of Lagos (South west), Edo and cross-river (South South), Benue, Kwara and Nasarawa (North Central) and Ebonyi and Enugu (South East). These states were chosen because the states formed about 75 percent of the share of the national rice producing areas in Nigeria. It covered existing but registered firms in the rice processing industry within the country.

Population, sample, sampling technique and data analysis

The population of the study consists of all registered rice processing firms in four (South West, South-South, North Central and South East) of the six geo-political zones in Nigeria. There are forty-five (45) existing firms in the rice processing subsector in these zones in Nigeria. The industry cut across fourteen (14) integrated and thirty-one (31) medium and small-scale mills; totalling forty-five (45) firms for the study. However, thirty-five (35) firms is found functional and was selected for the study using snow balling sampling technique.

The variables (Technological capability index) used is graded and coded using a 5-piont Likert rating scale ranging of not at all (1), low (2), medium (3), high (4) and very high (5). Descriptive statistics (frequency and percentage) is used to analyse the variables with the aid of Statistical Package for Social Sciences (SPSS), Version

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4.0 Results and Discussion

The states of technological capability in the firms

Table 1 presents the results of the analyses of five (5) technology capability indicators namely acquisition, creative, and production, supportive and adaptive capability. The Table shows that, 2 out of the 5 identified technology capabilities, acquisition (mean = 3.22) and production (3.90**)** capabilities were rated high in terms of mean rank on a 5-point Likert scale. While three capabilities, creative (mean = 2.85), supportive (mean = 2.80) and adaptive (mean = 2.86) were rated low. The result corroborates West Africa Rice Development Association, WARDA (2003) that rice processing sector in Nigeria witnessed a fairly basic processing technology on the aspect of parboiling and milling operations. The results suggest that a lot still needs to be done to effectively adopt technology capability indicators in the rice processing sector of the economy because the state of technological capability of the firm determines the quality of the end product.

Typically, one of the problems faced by the sector is lack of improved technology. As shown in Table 1, the acquisition capabilities include capability to identify, assess, negotiate and finalize the terms of the technology to be acquired (mean = 2.94), degree of dependence in performing contractual activities (mean = 2.83), degree of dependence for the procurement of raw materials, supporting facilities and spare parts (mean = 3.11), capability to identify, assess, negotiate and finalize the terms of the finance to be acquired without any external support (mean = 4.31), capability to identify, assess, negotiate and finalize the terms of human resource acquisition (mean = 3.20) and capability for planning, monitoring and coordinating resource acquisition processes and vendor development (mean = 3.09).

Also, creative capability includes the capability to carry-out improvements on the existing rice processing (mean = 2.97), capability to carry out development on rice processing (mean = 2.86), degree of dependence on outside consultants for undertaking changes in the organizational structure of the company during the last five years (mean = 2.69) and capability to plan, monitor and control research and development (mean = 2.86) respectively.

As shown in Table 1, production capability includes capability to effectively utilize and control the conversion technologies of the main and auxiliary processes (mean = 2.91), capability for carrying out quality assurance, inspection and inventory control (mean = 3.29), capability for carrying out preventive, corrective, improving and predictive maintenance (mean 3.34) and capability to perform production planning, equipment and maintenance scheduling (mean = 3.31). Furthermore, supportive capabilities include capability to provide training on rice processing technology (mean = 3.03), capability to undertake strategic planning (mean = 2.97) and degree of computerisation in the firm (mean = 2.40).

Lastly, engineering design and adaptive capabilities include capability to evaluate rice processing projects in terms of technical, financial environmental and social factors (mean = 3.09), degree of dependence on external agencies for carrying out feasibility studies (mean = 2.74), capability to do routine design and detail engineering of product or process (mean = 2.66), capability to adapt purchased or generated rice milling technology (mean = 2.86), capability to duplicate purchased rice processing technology (mean = 2.69), and capability to plan, monitor and control design and engineering activities (mean = 3.09).

Rate of technological capability development in the rice processing industry

Table 2 presents the results for the rate of technological capability development analysis in the industry. Five indicators which include acquisition, creative, production, supportive and adaptive capabilities were used in measuring the level of technological capability development of rice processing industry. Results of the analysis showed that the selected firms possessed the highest level of development in the area of production capability (3.23), and this was followed by acquisition capability (3.00). Also, the least level of development as witnessed by firms in the industry was in the area of supportive capability (1.97). On the aggregate, the result shows that technological capability index in the industry is 2.86, which is moderately high. This result submits that in the last five years, majority of the firms in the industry had effectively gained mastery of the act of carrying out quality assurance and inventory control; making preventive, corrective and predictive maintenance as well as performing production planning on equipment scheduling. This made the production capability index to have the highest mean score among other indicators. Equally, the result suggests a robust development of firms' ability in identifying and finalizing investment without external support, negotiating for manpower as well as planning and coordinating resources acquisition and development.

On the contrary, the industry generally witnessed a poor attitude of firms in computerising their operations as well as engaging in long-term planning of operations. Also, majority of firms in the industry depended more on external agencies for conducting feasibility studies. At the same time, the capability to do routine design and engineering of rice processing and duplication of purchased equipment was relatively low. This indicates that Nigerian rice processing firms lack accumulated resources to develop the state of their technological capability.

Panda and Ramanathan (1996) linked technological capability to firms who developed technological capability as those who will limit routine activity.

Table 1: States of technological capability in the firms

s/n	Indicators	Not at All F(%)	Low F(%)	Medium F(%)	High F(%)	Very High F(%)	Mean
A	**Acquisition Capability (average mean = 3.90)**						
1	Capability to identify, assess, and finalize technology to be acquired	0(0.00)	14(40.0)	11(31.4)	8(22.9)	2(5.7)	2.94
2	Degree of dependence in performing contractual activities	1(2.9)	19(54.3)	3(8.6)	9(25.7)	3(8.6)	2.83
3	Degree of dependence for procuring raw materials and spare parts	1(2.9)	13(37.1)	5(14.3)	13(37.1)	3(8.6)	3.11
4	Capability to identify and finalize investment without external support	2(5.7)	9(25.7)	8(22.9)	12(34.3)	4(11.5)	4.31
5	Capability to identify, negotiate and finalize human resources required	1(2.9)	10(28.6)	9(25.7)	11(31.4)	4(11.4)	3.20
6	Capability to plan & coordinate resource acquisition & development	0(0.00)	14(40.0)	8(22.9)	9(25.7)	4(11.4)	3.09
B	**Creative Capability (average mean = 2.85)**						
7	improvements of existing technology	1(2.9)	12(34.3)	13(37.1)	5(14.3)	4(11.4)	2.97
8	Capability to carry out development of new rice processing method	2(5.7)	14(40.0)	8(22.9)	9(25.7)	2(5.7)	2.86
9	Degree of dependence on consultants for undertaking changes	5(14.3)	12(34.3)	7(20.0)	11(31.4)	0(0.00)	2.69
10	planning & controlling R&D Projects	2(5.7)	13(37.1)	10(28.6)	8(22.9)	2(5.7)	2.86
C	**Production Capability (average mean = 3.22)**						
11	Capability to effectively utilize and control the conversion technologies	0(0.0)	14(40.0)	10(28.6)	11(31.4)	0(0.00)	2.91
12	Capability for carrying out quality assurance and inventory control	0(0.0)	11(31.4)	4(11.4)	19(54.3)	1(2.9)	3.29
13	Capability for make preventive, corrective & predictive maintenance	1(2.9)	8(22.9)	5(14.3)	20(57.1)	1(2.9)	3.34
14	Capability to perform production planning on equipment scheduling	0(0.0)	8(22.9)	12(34.3)	11(31.4)	4(11.4)	3.31
D	**Supportive Capability (average mean = 2.8)**						
15	Capability to provide training	1(2.9)	10(28.6)	11(31.4)	13(37.1)	0(0.0)	3.03
16	Capability to undertake strategic Plan	0(0.0)	12(34.3)	13(37.1)	9(25.7)	1(2.9)	2.97
17	Degree of computerization	11(31.4)	11(31.4)	3(8.6)	8(22.9)	(5.7)	2.40
E	**Engineering Design and Adaptive Capability (average mean = 2.86)**						
18	Capability to evaluate project on technical & financial factors	1(2.9)	12(34.3)	6(17.1)	15(42.9)	1(2.9)	3.09
19	Degree of dependence on external Agencies on feasibility studies	6(17.1)	12(34.3)	6(17.1)	7(20.0)	4(11.4)	2.74
20	Capability to do routine design and engineering of processing method	4(11.4)	14(40.0)	7(20.0)	10(28.6)	0(0.0)	2.66
21	Capability to adapt purchased or generated rice processing technology	3(8.6)	12(34.3)	8(22.9)	11(31.4)	1(2.9)	2.86
22	Capability to duplicate purchase	5(14.3)	13(37.1)	5(14.3)	12(34.3)	0(0.0)	2.69
23	Capability to plan, monitor & control engineering and contract activities	2(5.7)	8(22.9)	11(31.4)	13(37.1)	1(2.9)	3.09

Legend: Not at all = 1, Low = 2, Medium = 3, High = 4, Very High = 5

Table 2: Rate of technological capability development in rice processing industry

Technological Capability	Decline F (%)	Stagnant F (%)	Slow F (%)	Growing F (%)	Fast F (%)	Mean Score
Acquisition Capability Index = 3.00						
Capability to identify, assess, and finalize technology to be acquired	-	14(40.0)	11(31.4)	8(22.9)	2(5.7)	2.83
Degree of dependence in performing contractual activities	1(2.9)	19(54.3)	3(8.6)	9(25.7)	3(8.6)	2.67
Degree of dependence for procuring raw materials and spare parts	1(2.9)	13(37.1)	5(14.3)	13(37.1)	3(8.6)	3.08
Capability to identify and finalize investment without external support	2(5.7)	9(25.7)	8(22.9)	13(37.1)	3(8.6)	3.17
Capability to identify, negotiate and finalize human resources required	1(2.9)	10(28.6)	9(25.7	11(31.4)	4(11.4)	3.21
Capability to plan & coordinate resource acquisition & development	-	14(40.0)	8(22.9)	9(25.7)	4(11.4)	3.04
Creative Capability Index = 2.69						
improvements of existing technology	1(2.9)	12(34.3)	13(37.1)	5(14.30)	4(11.4)	2.88
Capability to carry out development of new rice processing method	2(5.7)	14(40.0)	8(22.9)	9(25.7)	2(5.7)	2.71
Degree of dependence on consultants for undertaking changes	5(14.30)	12(34.3)	7(20.0)	11(31.4)	-	2.46
planning & controlling R&D Projects	2(5.7)	13(37.1)	10(28.6)	8(22.9)	2(5.7)	2.71
Production Capability Index = 3.23						
Capability to effectively utilize and control the conversion technologies	-	14(40.0)	10(28.6)	11(31.4)	-	2.79
Capability for carrying out quality assurance and inventory control	-	11(31.4	4(11.4)	19(54.3)	1(2.9)	3.33
Capability for make preventive, corrective & predictive maintenance	1(2.9)	8(22.9)	5(14.30)	20(57.2)	1(2.9)	3.42
Capability to perform production planning on equipment scheduling	-	8(22.9)	12(34.3)	11(31.4)	4(11.4)	3.38
Supportive Capability Index = 1.97						
Capability to provide training	1(2.9)	10(28.6)	11(31.4)	13(37.1)		2.96
Capability to undertake strategic Plan	-	12(34.3)	13(37.1)	9(25.7)	1(2.9)	2.88
Degree of computerization	11(31.4)	11(31.4)	3(8.6)	8(22.9)	2(5.7)	2.04
Adaptive Capability Index = 2.70						
Capability to evaluate project on technical & financial factors	1(2.9)	12(34.3)	6(17.1)	15(42.9)	1(2.9)	3.04
Degree of dependence on external Agencies on feasibility studies	6(17.1)	12(34.3)	6(17.1)	7(20.0)	4(11.4)	2.54
Capability to do routine design and engineering of processing method	4(11.4)	14(40.0)	7(20.0)	10(28.6)	-	2.42
Capability to adapt purchased or generated rice processing technology	3(8.6)	12(34.3)	8(22.9)	11(31.4)	1(2.9)	2.71
Capability to duplicate purchase	5(14.30)	13(37.1)	5(14.30)	12(34.3)	-	2.46
Capability to plan, monitor & control engineering and contract activities	2(5.7)	8(22.9)	11(31.4)	13(37.1)	1(2.9)	3.04
Technological Capability Index = 2.86						

Legend: Decline = 0, Stagnant = 1, Slow growing = 2, Growing = 3, Fast growing = 4

5. Conclusions

The study has revealed that two technological capabilities (acquisition and production) were strongly possessed by the selected rice processing firms in Nigeria. Acquisition capability includes capability to identify, assess, negotiate and finalize the terms of the technology to be acquired; degree of dependence in performing contractual activities; degree of dependence for the procurement of raw materials, supporting facilities, spare parts and consumables; capability to identify, assess, negotiate and finalize the terms of the finance to be acquired without any external support; capability to identify, assess, negotiate and finalize the terms of human resource to be acquired and capability for planning, monitoring and coordinating resource acquisition processes and vendor development. While production capability refers to the capability to effectively utilize and control the conversion technologies of the main and auxiliary processes; capability for carrying out quality assurance, inspection and inventory control; capability for carrying out preventive, corrective, improving and predictive maintenance and capability to perform production planning and equipment and maintenance scheduling. Hence, this paper concludes that the low level of adaptive, supportive and creative capabilities might be responsible for the unimpressive performance of the rice processing industry in Nigeria. Also, this might be responsible for the low patronage of local rice in the country.

5.1 Contributions to Knowledge

The study has provided information on the current status of rice processing technological capability in the rice processing firms and also, the rate of technological capability development in rice processing firms. Also, the areas of technological capabilities where improvement is required have been established.

5.2 Recommendations

Based on the findings from this study, the following recommendations are made:

i. Rice processing firms need to focus on the development of adaptive, supportive and creative capabilities.
ii. Nigerian rice processing firms need to accumulate resources to develop the state of their technological capability.
iii. Supportive capability which signifies the ability to train manpower, provision of information support and carrying out networking needs to be focused and improved upon in the Nigerian rice processing firms.

Conflict of Interest

Author declare no conflict of interest.

Author Contribution

Every aspect of this study were done by the author.

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