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Article

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Article

Predicting Innovation Capability through Knowledge Management in the Banking Sector

Friday Ogbu Edeh ¹, Nurul Mohammad Zayed ² , Vitalii Nitsenko ^{3,4,*} , Olha Brezhnieva-Yermolenko ⁵ ,
Julia Negovska ⁶ and Maryna Shtan ⁷

- ¹ Department of Business Administration, Alex Ekwueme Federal University, Abakaliki 1010, Nigeria; edeh.ogbu@funai.edu.ng
- ² Department of Business Administration, Faculty of Business & Entrepreneurship, Daffodil International University, Dhaka 1341, Bangladesh; zayed.bba@daffodilvarsity.edu.bd
- ³ Department of Entrepreneurship and Marketing, Institute of Economics and Management, Ivano-Frankivsk National Technical Oil and Gas University, 76019 Ivano-Frankivsk, Ukraine
- ⁴ SCIRE Foundation, 00867 Warsaw, Poland
- ⁵ Department of Finance and Accounting, Dniprovsky State Technical University, 51900 Kamyanske, Ukraine; ovbreol@ukr.net
- ⁶ Department of Marketing, Economics, Management and Administration, National Academy of Management, 03151 Kyiv, Ukraine; july-negovski@ukr.net
- ⁷ Department of International Economic Relations, National Academy of Management, 03151 Kyiv, Ukraine; mvsh2307@gmail.com
- * Correspondence: vitaliinitenko@onu.edu.ua; Tel.: +380-939983073



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Abstract: Purpose: The purpose of this study was to investigate the effects of knowledge management on innovation capability in the banking sector. Research methodology: Cross-sectional research design was employed in this study as it supports the use of questionnaire for data collection. Fifteen deposit money banks constitute the accessible population. Questionnaire was used as an instrument for data collection. A sample size of 272 was drawn from the overall population of 920. Overall, 259 staff participated in the study. Demographic characteristics of participants were analysed with frequency distribution while linear regression was used to analyse formulated hypotheses with the aid SPSS. Findings: This study found that knowledge management has significant positive effects on innovation capability. Research limitations: The research limitation is associated with cross-sectional survey and geographical scope. Future studies should employ longitudinal survey that support data collection for a year. Secondly, future studies should be carried out in other countries other than Africa. Practical implications: The implication of the finding is that managers and directors of banks should encourage knowledge management practices in their workplaces as this has proven by this study to improve innovation capability in terms of marketing innovation capability, product innovation capability and process innovation capability. Originality/Value: There is no research that has investigated the effects of knowledge management on innovation capability. Thus, this study provides new insight on promoting innovation capability through knowledge management.

Keywords: knowledge management; bank; innovation capability; intangible resources

1. Introduction

Innovation capability is a lubricant through which organisations develop, adjust and promote their product and services for the purpose of meeting customers' needs. It has been shown that firms that possess innovation capability are likely to overcome external turbulences that would have affected their performances negatively (Mendoza-Silva 2020; Sudolska and Łapińska 2020; Danyliuk et al. 2020); it against this premise that Purwati et al. (2021) opined that organisation that is aiming to stay ahead of its competitors can only achieve that when its formulated strategy is in sync with innovation capability due to dynamism in the global environment. Innovation capability has contributed to increasing

enterprise resilience, customer loyalty, responsiveness and sustainability (Mahmod et al. 2010). Iddris (2011) opined that an organisation's strategic advantage is dependent on its innovation capability targeted at new product development, rebranding the existing ones, quite apart from the processes and marketing strategies involved. In line with the above, innovation capability has been affirmed to be an instrument of strategic surveillance and competitiveness which comprises marketing innovation capability, product innovation capability and process innovation capability surrounding the major functional areas of management (Iddris 2011; Koffi et al. 2021; Goel and Nelson 2018; Nitsenko et al. 2018).

Nevertheless, Purwati et al. (2021) affirmed that innovation capability can be attained if directors, managers, supervisors and financial intermediary practitioners are able to implement knowledge management practices successfully; this is the reason why Iddris (2011) asserts that to build innovation capability requires accurate, timely and comprehensive knowledge about every area of management such as marketing, production, human resource and finance. Regarding the significance of this study, knowledge management if effectively deployed, would enhance the performance, resilience capacity and innovation capability of service organisations (Alias et al. 2018); including innovativeness and entrepreneurial orientations of money deposit banks (Valmohammadi et al. 2019). Another significance of this study is that knowledge management provides employees with opportunity for growth when they share knowledge that is relevant in solving pressing problems in the workplace (Chen et al. 2018). Knowledge management is a process of creating, acquiring, and storing, distributing and utilizing knowledge to enhance organisational performance (Chen et al. 2018).

However, prior trends of studies such as Niqresh (2021); Edeh et al. (2020a); Li et al. (2020); and Alolayyan et al. (2020) investigated the influence, relationship, effects and impact of knowledge management on various organisational criterion variables in different countries and industries. The above mentioned studies did not in any way examine the effect of knowledge management on innovation capability which has created a research lacuna that need to be filled; this is what motivated the researchers to embark on this study by investigating the predictive role of knowledge management on innovation capability with specific focus on banking industry in Nigeria. The choice of banking industry was informed as a result of their economic contributions such as community development, provision of loans for business growth, job creation and foreign exchange supply (Almahadin et al. 2021; Igbiosa and Ogbeide 2016). The banking industry contributed NGN 34.6 trillion (USD 83.2 million) to Nigeria's GDP in 2017, NGN 37.8 trillion (USD 90.9 million) in 2018, NGN 42.7 trillion (USD 102.7 million) in 2019 and NGN 53.3 trillion (USD 128.2 million) in 2020 (Chiejina 2022; Komolafe 2022).

2. Literature Review

2.1. Knowledge Management (KM)

Knowledge management has been a major discourse amongst scholars and business practitioners' across the globe (Li et al. 2020; Mustafa et al. 2021; Ingram and Nitsenko 2021; Shashkova et al. 2021); this growing interest is as a result of KM contributions to organisational competitiveness and survival (Opeke and Adelowo 2020; Niqresh 2021). Knowledge management is the process of creating, acquiring, sharing, and utilizing useful knowledge that would improve the performance of the organisation (Armstrong 2009). In addition, Armstrong (2009) expanded the definition of knowledge management as how organisation retains and distributes accumulated wisdom concerning its operations, processes and techniques. In another perspective, KM is the utilization of relevant knowledge by members of the organisation to tackle problems that bedeviled the organisation (Edeh and Ukpe 2019). For Edeh et al. (2020a), knowledge management is concerned with how top-level leaders of the organisation are able to utilize tacit knowledge in the minds of the subordinates to achieve the goals of the organisation; what this implies is that the duty of managers is to draw useful knowledge from their subordinate so as to solve organisational needs. Also, there are certain time that managers lack prerequisite knowledge to handle

some situations but due to their ego, the problem would persist. Thus, knowledge created not shared for organisations' interest is a waste thereby making it impossible for learning to occur (Valmohammadi and Ahmadi 2015; Opeke and Adelowo 2020). Again, shared knowledge helps organisation to save money that would have been wasted to acquire it from different sources of knowledge (Edeh et al. 2020a). Knowledge management is human resource department responsibility which is directed at individuals that possess certain tacit knowledge that need to be expressed for the benefit of others. Edeh and Ukpe (2019) asserts that tacit knowledge sometimes outweighs explicit knowledge because of the originality of the former. KM is seen as a process of developing and utilizing knowledge to attain organisational goals (Darroch 2005; Mills and Smith 2011; Chen et al. 2018; Kholiavko et al. 2020). Ever since workplace economy has metamorphosed into knowledge economy, managers, human resource professionals have equally adjusted their strategy to embrace KM as a practice of recognising people with core competencies. Therefore, KM encompasses all processes associated with generating, distributing, storing and utilizing knowledge for the good of the organisation. Employees generate knowledge that is relevant for organisational prosperity during meetings and work hours, but it behooves management to utilise that knowledge rather than discarding it just because it came from an employee (Opeke and Adelowo 2020).

Nonetheless, results from previous studies on the investigation of knowledge management with different organisational criterion variables were enumerated in this section. Mustafa et al. (2021) examined the impact of KM on corporate performance; their finding revealed knowledge management predicted institutional performance. The result of the investigation carried out by Edeh et al. (2020a) investigations on the relationship between knowledge management and employee extra-role behaviour, and their result shows that knowledge management (knowledge acquisition, knowledge storage and knowledge sharing) has a significant association with discretionary behaviour of employees. Alolayyan et al. (2020) on KM showed that knowledge acquisition, knowledge sharing, and knowledge storage have a significant influence on organisational performance. Finding of Li et al. (2020) empirical investigation regarding KM, entrepreneurial and SMEs performance in Pakistan revealed that knowledge management dimensions have a significant positive influence on dynamic capabilities, entrepreneurial and corporate performance. Valmohammadi et al. (2019) examined the mediating influence of innovation practices on the relationship between KM and sustainable balanced performance and found KM to predict innovation practices and sustainable balanced performance. Rezaei et al. (2021) examined the influence of knowledge management on business performance in Afghanistan. Result of their research showed that KM has significant positive influence on organisational performance. Niqresh (2021) investigated the role of KM on attaining quality education in Jordan. Niqresh's result revealed that knowledge management has positive effects on improving quality higher education in Jordan.

From the foregoing, various scholars have measured knowledge management using different dimensions but majority agreed with the reliability and validity of knowledge acquisition, knowledge sharing, and knowledge storage (Valmohammadi et al. 2019; Alolayyan et al. 2020; Tadesse 2020; Mustafa et al. 2021). Knowledge acquisition covers all the processes of generating knowledge from its sources such as subordinate's ideas, suggestions and contributions during organisational meetings (Valmohammadi et al. 2019). Organisation can also acquire knowledge from their customers. Rezaei et al. (2021) assert that complaints from customers concerning how best the organisation should operate or reorganise their operations can serve as knowledge to management teams. In the banking sector, customer's complaints are regarded as very important assets that is capable of changing the way services are rendered. Alolayyan et al. (2020) opined that knowledge acquisition refers to any idea or suggestion that can solve the problem facing the organisation. Again, Alolayyan et al. (2020) is of the view that knowledge acquisitions do not only mean suggestions or contributions, it also refers to sponsoring employee to acquire additional educational qualification from a higher institution of learning which at the end

would be beneficial to the organisation. Supporting [Alolayyan et al. \(2020\)](#); [Niqresh \(2021\)](#) argued that acquiring new knowledge is necessary for any organisation because learning is continuum and hence management should enshrine it in their strategic intent. The second KM dimension is knowledge sharing. Sharing knowledge refers to activities of distributing knowledge amongst colleagues in the organisation for the purpose of achieving one goal ([Chen et al. 2018](#)). [Mustafa et al. \(2021\)](#) contended that knowledge sharing is the process of transferring acquired knowledge from one individual to another in the workplace for the benefits of using it to carryout organisational objectives. Knowledge dissemination is an indicator of cordial, loyalty and altruistic behaviour amongst employees working together to accomplish a common purpose ([Niqresh 2021](#)). [Tadesse \(2020\)](#) asserts that organisation that encourages knowledge sharing amongst their workers cannot be defeated by their competitor. It therefore implies that knowledge sharing is a strategic weapon against any competing organisations. Lastly, knowledge storage is concerned with the process of retaining acquired and shared knowledge for future use. [Nurdin and Yusuf \(2020\)](#) stressed that organisations store knowledge in books and databases which they can make reference to it whenever there is a problem that need to be resolved. Knowledge storage is a symbol of reputation for retaining employees that contributed for knowledge that was used to solve organisational problems ([Razi et al. 2019](#); [Syed et al. 2021](#)). It has been shown that knowledge storage is a culture of sustainable development which translate to positive organisational outcome ([Edeh et al. 2020a](#); [Osaulenko et al. 2020](#); [Kassaneh et al. 2021](#)).

2.2. Innovation Capability (IC)

Innovation capability has dominated industrial core competencies which scholars, practitioners and business administrators' regards as intangible capital necessary for the sustainability of stakeholders' wealth. Innovation capability appeared in business disciplines through Schumpeter's classification of innovation as new process of production, identification of new market opportunities, discovery of new sources of supply and new product ([Schumpeter 1934](#)); this was further pronounced by Schumpeter's theory of creative destruction which describes how old products, services, process and methods are being replaced by new discoveries thereby rendering the first discovery obsolete ([Schumpeter 1942](#)). It is against this development that respected management scholar, [Drucker \(1985\)](#) contended that innovation is the process of building capabilities or utility that would serve as firm's strategic advantage. IC is concerned with the identification of new opportunities and development of new ideas that is in consonant with organisational goals ([Chuang et al. 2014](#)). On another hand, [Lawson and Samson \(2001\)](#) opined that innovation capability is an organisation's capability to process knowledge into new products and services for the purpose of meeting the needs of stakeholders. IC is also perceived as management's decision to develop new methods and strategies that would strengthen their resilience in the business hemisphere ([Bell and Hindmoor 2009](#)). [Esdar et al. \(2021\)](#) added that IC is the transformation of products, processes and marketing policies that would stop customers from patronizing complementary products. [Chen \(2009\)](#) perceived IC as a firm's process, structure and system that can be deployed to develop a product, marketing or process innovations. Innovation capability constitutes skills and knowledge that are relevant to absorb, comprehend, and strengthened old technologies so as to generate new ones ([Romijn and Albaladejo 2002](#)). Innovation capability is also conceived as procedure through which management improves other organisational capabilities as well as the resources needed to explore new opportunities to meet market demands ([Koc 2007](#)). Other scholars viewed IC as a way of changing the features of products for the sole aim of maintaining leadership in the industry ([Börjesson and Elmquist 2011](#); [Purwati et al. 2021](#)). [Esdar et al. \(2021\)](#) maintained that any organisation that fails to craft innovation capability would not be able to withstand competitors that have huge capital. In the context of financial service providers, continuous modification of product brands and services remain the key core competencies to outweigh rivals; this is the basis of why [Tuominen and Hyvönen \(2004\)](#) argued that service organisations must focus on process, product and marketing innovations

in order to remain relevant in their industry. Adding lubricant to the wheel of Tuominen and Hyvönen (2004), Mendoza-Silva (2020) contended that financial service providers need to employ necessary methodologies that would distinguish them from others. Financial service providers require workers that are acquainted with the current trends of the sector so as to boost the innovation capability of the industry.

Drawing from the above, Calik et al. (2017) asserts that innovation capability conceptualized with marketing innovation, process innovation and product innovation has the capacity of improving task performance, resilience, contextual performance and workplace commitment. In addition, Börjesson and Elmquist (2011) is of the view that IC should cover functional areas of management to avoid destructive compensation. Corroborating with Börjesson and Elmquist (2011); Torabi et al. (2020) opined that organisations that want to be responsible and sustainable, must be ready to absorb and utilize innovation capability to protect stakeholders' wealth; thus, in the environment of uncertainty, financial service providers need to embrace IC consciousness so as to withstand internal and external dislocation that may befall them. It is in this light that Hogan et al. (2011) alluded that organisations strategic advantage depend solely on their ability to develop new idea that would revamp product and service acceptance by prospective customers. Firms may have huge resources but may not have innovative competencies to tap from new market opportunities thereby losing huge amount of capital from the market (Benaim 2015; Sudolska and Łapińska 2020). Validated measures of innovation capability (IC) are product innovation, marketing innovation capability and process innovation capability (Camison and Villar-Lopez 2014; Nwachukwu et al. 2018; Opeke and Adelowo 2020); market innovation capability, product innovation capability, strategic innovation capability, process innovation capability, and behavioural innovation capability (Wang and Ahmed 2004; Purwati et al. 2021); operations innovation capability, marketing innovation capability, boundary management innovation, firm innovation, service innovation capability, process innovation capability, sustainability innovation capability, and technological innovation capability (Manimala 1992; Varis and Littunen 2010); however, this study adapted marketing, process, and product innovation capability as dimensions of innovation capability based on their reliability and universality in empirical investigations.

Marketing innovation capability includes all current marketing tools that are used for advertising and promoting new services and products to existing and new customers (Edeh et al. 2020a). Marketing innovation capability is concerned with an organisation's implementation of new marketing approaches that is related to changes in product re-design, promotion, pricing, distributing channels and branding (Medase and Barasa 2019; Edeh et al. 2020b). Noticeable innovation capabilities in marketing area are changes in product packaging, reduction or increment of prices, changes in taste, improvement on quality or quantity (Grimpe et al. 2017; Wang et al. 2020). It has been shown that the essence of marketing innovation capability is to meeting consumer's need, positioning for new market openings which directed at increasing sales (Karlsson and Tavassoli 2016). Another indicator of innovation capability is process innovation capability which refers to the injection or introduction of new methods, techniques, equipment or machine for the production of goods and services by organisations (Damanpour et al. 2009; Sadiki and Lebailly 2020). For instance, when manufacturing firms want to change the product features such as shape, quantity, quality or taste, they would purchase another kind of machine that has the capacity of turning out the intended finished product. A process innovation capability is also regarded as the implementation of new improved method for the delivery of goods to customers and meeting future supply chains in the business hemisphere (Guisado-González et al. 2014; Plotnikova et al. 2016; Abdu and Jibir 2018). The essence of rolling out process innovation capability is to meet customers' constant demands as a result of competing complementary goods (Goel and Nelson 2018; Koffi et al. 2021). On the other hand, product innovation capability is associated with adding new features to existing products that would retain loyal customers and also attract new ones (Adegboyega 2017; Rajapathirana and Hui 2018). Some of the specific items in product

innovation capability include changes in specifications, size or shape of the product, user friendly, taste and technical usage. Koffi et al. (2021) maintained that product innovation capability is concerned with any strategy that would create new product out of the old ones with the aim of capturing market. On the one hand, Ganzer et al. (2017) is of the view that product innovation capability is usually pursued by manufacturing companies that transform raw materials into finished goods. In addition, product innovation capability encourages organisations to alter their resources into new offerings so as to exceed consumer expectations (Camison and Villar-Lopez 2014).

3. Research Problem and Objectives

The purpose of this research is to investigate the effects of knowledge management on innovation capability; however, one of the major problems that banks in sub-Saharan Africa faced is the lack of innovation capability consciousness which has weakened their technological structures leading to poor quality product and service delivery to teeming customers (Mugambi and Kinyua 2020; YuSheng and Ibrahim 2020). Nnodim et al. (2020) added that the inability of bank management to develop innovation capability is not associated with inadequate financial resources rather it is connected with insufficient knowledge in the workplace. YuSheng and Ibrahim (2020) concurred with Nnodim et al. (2020), and opined that the lack of knowledge necessary for developing new process, product and marketing practices has hindered innovation capability in the banking sector. Mugambi and Kinyua (2020) stressed that the essence of building innovation capability in the banking business is to remain relevance, provide contemporary services to customers' needs that would translate to high performance in terms of profitability and business expansion through effective implementation of knowledge management. Thus, management inability to employ knowledge management practices that would have encouraged employees who has specific knowledge in service delivery, technology, marketing, product development and competitive strategy in the banking sector has hindered their growth and development (Shawaqfeh et al. 2019; Opeke and Adelowo 2020; Khanal and Mathur 2020); it is based on these maladies that this study sought to build innovation capability through knowledge management in the banking industry.

The aim of this study therefore is to investigate the effects of knowledge management (KM) on innovation capability (IC) of financial service providers in sub-Saharan Africa. Specifically, the study sought to:

- (1) Examine the effects of knowledge acquisition on marketing innovation capability;
- (2) Investigate the effects of knowledge storage on product innovation capability;
- (3) Determine the effects of knowledge sharing on process innovation capability.

Drawing from the specific objectives above, the following research hypotheses were formulated.

H1. *Knowledge acquisition has significant effects on marketing innovation capability.*

H2. *Knowledge storage has significant effects on product innovation capability.*

H3. *Knowledge sharing has significant effects on process innovation capability.*

4. Materials and Methods

Research design employed in this study is cross-sectional survey which support the use of primary data such as questionnaire and interview for data collection (Saunders et al. 2009; Zikmund et al. 2013). Overall, 15 out of 24 deposit money banks were surveyed with purposive sampling in Southeastern Nigeria. Reason for selecting 15 deposit money banks in this study is because not all the 24 deposit money banks have their presence in south eastern parts of Nigeria. Thus, 920 staff constitute the total accessible population. A sample size of 272 was determined from the overall population by Krejcie and Morgan (1970). Researchers 272 copies of questionnaire to participants in their various offices during working days with two weeks target (Tuesday–Friday) since Monday's is usually

sit-at-home as declared by the Indigenous People of Biafra (IPOB) in the south-eastern parts of Nigeria to push for the release of their leader, Mazi Nnamdi Kanu. Authorities has affirmed that the use of questionnaire for data collection provides researcher(s) with first-hand information that is accurate, timely, comprehensive and free from errors compared with secondary data that the source is questionable (Saunders et al. 2009). Albeit, some of the participants asserts that they may not be able to complete the questionnaire in two weeks as a result of their busy schedules. Due to the above challenge, the researchers extended the timeframe to one month. After collecting the instruments from the participants, it was discovered that only 259 copies were filled correctly and found valid for analysis. In terms of measurement, validated 15-items of Knowledge Management Questionnaire (KMQ) with Cronbach α coefficients between 0.71 and 0.78 containing knowledge acquisition, knowledge storage, and knowledge sharing was adapted from Valmohammadi and Ahmadi (2015) and Perevozova et al. (2019). The instrument was further affirmed by Mustafa et al. (2021); Shashkova et al. (2021); Tadesse (2020); Valmohammadi et al. (2019); Alias et al. (2018). On the other hand, existing validated a 14-item Innovation Capability Questionnaire (ICQ) containing process innovation, product innovation and marketing innovation with Cronbach α values between 0.69 and 0.83 was adapted from Chuang et al. (2014) and affirmed by Koffi et al. (2021); YuSheng and Ibrahim (2020); and Calik et al. (2017). Demographic profiles were analysed with frequency distribution while formulated hypotheses were analysed with linear regression with the aid of SPSS 21.0.

5. Results

Participants demographic profile results revealed that 174 representing 67.2% were males while 85 representing 32.8% are females (Table 1). Their working experience shows that 29 respondents representing 11.2% have been working with bank between 1 and 7 years; 158 respondents representing 61.0% have been working with bank between 8 and 15 years, and 72 participants representing 27.8% been working with bank between 15 years and above. Age of the participants revealed that 42 respondents representing 16.2% fall within 18 to 30 years; 75 participants representing 29.0 fall within 31 and 40 years, and 142 representing 54.8% fall within 41 years. Participants' educational qualifications shows that 95 respondents representing 36.7% hold diploma certificates; 133 respondents representing 51.4% hold bachelor degree; 12 participants representing 4.6% hold master degree; 14 participants representing 5.4% hold DBA (Doctor of Business Administration), and 5 representing 1.9% hold a PhD degree.

Table 1. Participants demographic profiles.

Demographic	Frequency	Percentage (%)
Gender		
Male	174	67.2
Female	85	32.8
Working experience		
1–7 years	29	11.2
8–15 years	158	61.0
15 years & above	72	27.8
Age-bracket		
18–30 years	42	16.2
31–40 years	75	29.0
41 years & above	142	54.8
Educational level		
Diploma certificates	95	36.7
Bachelor degree	133	51.4
Master degree	12	4.6
DBA	14	5.4
PhD degree	5	1.9

Source: Field work (2022).

Results from Table 2 revealed that knowledge management (predictor variable) dimensions have significant effects on the measures of innovation capability (criterion variable). Total variation in the criterion variables revealed that 39.2%, 56.6%, and 73.4% can be explained by knowledge acquisition, knowledge storage and knowledge sharing respectively.

Table 2. Hypotheses results.

R	R ²	Adjusted R ²	T-Stat.	Beta (β)	df	N	F Stat.	Std. Error	Sig.
0.626 ^a	0.392	0.389	12.864	0.626 *	3.88	259	165.480	0.044	0.000
0.759 ^a	0.576	0.574	18.686	0.759 *	3.88	259	349.152	0.042	0.000
0.857 ^a	0.734	0.733	26.637	0.857 *	3.88	259	709.555	0.029	0.000

Predictor: Knowledge management (KM); Criterion: Innovation capability (IC). **Note:** ^a (coefficient of determination); * (standard coefficients).

Specifically, knowledge acquisition has significant positive effects on marketing innovation capability (0.626 ^a; 0.000 < 0.005); knowledge storage has significant positive effects on product innovation capability (0.759 ^a; 0.000 < 0.005); and knowledge sharing has significant positive effects on process innovation capability (0.857 ^a; 0.000 < 0.005) which shows constant increase degree of correlation in the models. Furthermore, alternate hypotheses are accepted while null hypotheses are rejected because t-stat calculated (12.864; 18.686; 26.637) are less than the tabulated (3.332) and secondly, F-stat calculated (165.480; 349.152; 709.555) are also less than tabulated (3.88).

6. Discussion

This study was to fill existing lacuna in knowledge management (KM) literature by investigating its effects on innovation capability (IC) in the banking sector within sub-Saharan African work environment. In order to achieve the above aim of the study, the researchers enumerated three specific objectives and thereafter formulated three research hypotheses that are in line with the objectives. In line with the results on Table 2, this study found that knowledge management predicted innovation capability thereby affirming the findings of prior studies with regard to knowledge management. Results of prior studies such as [Rezaei et al. \(2021\)](#); [Alolayyan et al. \(2020\)](#); [Edeh et al. \(2020a\)](#); and [Li et al. \(2020\)](#) validates the finding of this study. The first finding which investigated the effect of knowledge acquisition on marketing innovation capability is consistent with [Rezaei et al. \(2021\)](#) investigation on knowledge management and business performance which they discovered that knowledge management has significant positive effects on enterprise performance; this result has shown that banks marketing innovation can be improved through the acquisition of relevant knowledge concerning customer demand, product satisfaction and affordability. The second finding with regard to knowledge storage, the result of [Alolayyan et al. \(2020\)](#) indicated knowledge storage predicted organisational performance. All the results of hypotheses one, two and three are consistent with [Edeh et al. \(2020a\)](#) finding which shows that knowledge management has significant relationship with employee prosocial behaviour in ICT companies in Nigeria. In the same manner, the finding of [Li et al. \(2020\)](#) correspond with third finding of this study which revealed that knowledge sharing has strong significant effects on process innovation capability. These results can be explained by the fact that deposit money banks under study are made up of educated personnel as seen in the demographic analysis, hence, disseminating knowledge to all areas of management are perceived as significance for promoting innovation capability of deposit money banks under study. Secondly, even though none of the prior study oppose these findings, what can be drawn from this study is that the business environment where the study was carried out maybe quite different compared to other geographical settings that subsequent studies may likely to be conducted.

7. Conclusions

This study is among the first to investigate the effects of knowledge management on innovation capability in the banking sectors in sub-Saharan Africa. Thus, the outcome of this study indicated that knowledge management when implemented would strengthen the innovation capability of service organisations such as the banking sector. It based on these findings that this study concludes that knowledge management predicted innovation capability. Secondly, knowledge management measured in terms of knowledge acquisition, knowledge storage, and knowledge sharing promotes innovation capability of service organisations; this has proven that intangible resources such as knowledge has the capacity to enhance innovation capability in banking sector especially as it concerns the major areas of business such as marketing, product and process of operation and service delivery. The finding of this study further affirms the significance of knowledge management on organisational performance, competitiveness, resilience capacity dynamic capacity and sustainability; however, it was discovered that no prior studies cited in this research opposed the findings of this study thereby creating another research gap that is expected to be filled by other researchers in the future. The implication of the finding is that managers and directors of banks should encourage knowledge management practices in their workplaces as this has proven by this study to improve innovation capability in terms of marketing innovation capability, product innovation capability and process innovation capability.

The theoretical contribution of this study is that financial intermediary practitioners would gain positive insight on the role that knowledge management play in enhancing innovation capability of businesses. Secondly, researchers that are interested in conducting further study on knowledge management may be guided by the measures employed in this study for their own study.

In terms of research limitation, this study employed cross-sectional survey which may deviate from further studies that would make use of longitudinal survey that takes longer period to collect data from target population. Geographical scope is another limitation of the study because similar study conducted in other countries may yield different results. The sit-at-home order by the Indigenous People of Biafra (IPOB) affected data collection for this study as banks and other businesses were not allowed to open for business on Monday's in the south eastern parts of Nigeria.

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References

- Abdu, Musa, and Adamu Jibir. 2018. Determinants of firms innovation in Nigeria. *Kasetsart Journal of Social Sciences* 39: 448–56. [\[CrossRef\]](#)
- Adegboyega, Idris Adegboyega. 2017. Impact of product innovation on organisational performance (A Survey of Nestle Nigeria Plc). *Journal of Marketing and Consumer Research* 37: 23–31.
- Alias, Nor Khadijah, Ahmad Nazri Mansor, Azmi Ab Rahman, Abdul Rahman Ahmad, and Ahmad Zam Hariro Samsudin. 2018. The impact of knowledge management towards employee's job satisfaction. *International Journal of Academic Research in Business and Social Sciences* 8: 245–65. [\[CrossRef\]](#)

- Almahadin, Hamed Ahmad, Anwar Al-Gasaymeh, Najed Alrawashdeh, and Yousef Siam. 2021. The effect of banking industry development on economic growth: An empirical study in Jordan. *Journal of Asian Finance, Economics and Business* 8: 0325–34. [CrossRef]
- Alolayyan, Main Naser, Abdallah Hassan Alalawin, Mohammad S. Alyahya, and Ahmad Qamar. 2020. The impact of knowledge management practice on the hospital performance in Abu Dhabi. *Cogent Business & Management* 7: 1827812. [CrossRef]
- Armstrong, Michael. 2009. *Armstrong's Handbook of Human Resource Management Practice*, 11th ed. London: Kogan Page.
- Bell, Stephen, and Andrew Hindmoor. 2009. The governance of public affairs. *Journal of Public Affairs* 9: 149–59. [CrossRef]
- Benaim, Andre. 2015. Innovation Capabilities—Measurement, Assessment and Development. Faculty of Engineering, Department of Design Sciences, Innovation Engineering. Available online: <https://lucris.lub.lu.se/ws/portalfiles/portal/5726507/7370550.pdf> (accessed on 23 May 2022).
- Börjesson, Sofia, and Maria Elmquist. 2011. Developing innovation capabilities: A longitudinal study of a project at Volvo Cars. *Creativity and Innovation Management* 20: 171–84. [CrossRef]
- Calik, Eyup, Fethi Calisir, and Basak Cetinguc. 2017. A scale development for innovation capability measurement. *Journal of Advanced Management Science* 5: 69–76. [CrossRef]
- Camison, César, and Ana Villar-Lopez. 2014. Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research* 67: 2891–902. [CrossRef]
- Chen, Chung-Jen. 2009. Technology commercialization, incubator and venture capital, and new venture performance. *Journal of Business Research* 62: 93–103. [CrossRef]
- Chen, Liang, Scott Ellis, and Clyde Holsapple. 2018. A knowledge management perspective of supplier development: Evidence from supply chain scholars and consultants. *Knowledge and Process Management* 25: 247–57. [CrossRef]
- Chiejina, Nduka. 2022. Banking Sector Contributes N168.4tr to GDP. *The Nation*. Available online: <https://thenationonlineng.net/banking-sector-contributes-n168-4tr-to-gdp/> (accessed on 18 May 2022).
- Chuang, Li-Min, Chun-Chu Liu, and Wen-Chia Tsai. 2014. The organizational innovativeness inventory for information and electronic enterprises: Development and validation. *Journal of Economics and Behavioral Studies* 6: 302–9. [CrossRef]
- Damanpour, Fariborz, Richard M. Walker, and Claudia N. Avellaneda. 2009. Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies* 46: 650–75. [CrossRef]
- Danyliuk, Viacheslav, Inna Riepina, Oleksandr Shafalyuk, Maria Kovylyna, and Vitalii Nitsenko. 2020. Functional and investment strategies of technical development of enterprises. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu* 3: 115–21. [CrossRef]
- Darroch, Jenny. 2005. Knowledge management, innovation and firm performance. *Journal of Knowledge Management* 9: 101–15. [CrossRef]
- Drucker, Peter F. 1985. *Innovation and Entrepreneurship*. Oxford: Butterworth-Heinemann, Ltd. [CrossRef]
- Edeh, Friday Ogbu, and Edem Blessing Ukpé. 2019. Knowledge management and Employee effectiveness of Nigerian Deposit Money Banks. *International Journal of Management & Entrepreneurship Research* 1: 31–41. [CrossRef]
- Edeh, Friday Ogbu, Agnes Ugboego Chukwu, Ukamaka Azubuike Ngozi, and Felicitas Onwuegbul Obiageri. 2020a. Knowledge management and extra-role behaviour: The role of organisational culture. *Journal of Business and Management Studies* 2: 1–10. Available online: <https://al-kindipublisher.com/index.php/jbms/article/view/523> (accessed on 18 May 2022).
- Edeh, Friday Ogbu, Onyi Akachukwu Joseph, Ule Prince Alamina, Nelson Chibuike Osueke, and Uchenna Onyemaechi. 2020b. Entrepreneurial Innovation: A resilience strategy. *Sri Lanka Journal of Entrepreneurship* 2: 161–79.
- Esdar, Moritz, Ursula Hübner, Johannes Thye, Birgit Babitsch, and Jan-David Liebe. 2021. The effect of innovation capabilities of health care organizations on the quality of health information technology: Model development with cross-sectional data. *JMIR Medical Informatics* 9: 1–17. [CrossRef]
- Ganzer, Paula Patricia, Cassiane Chais, and Pelayo Munhoz Olea. 2017. Product, process, marketing and organizational innovation in industries of the flat knitting sector. *RAI Revista de Administração e Inovação* 14: 321–32. [CrossRef]
- Goel, Rajeev K., and Michael A. Nelson. 2018. Determinants of process innovation introductions: Evidence from 115 developing countries. *Managerial and Decision Economics* 39: 515–25. [CrossRef]
- Grimpe, Christoph, Wolfgang Sofka, Mukesh Bhargava, and Rabikar Chatterjee. 2017. R&D, marketing innovation, and new product performance: A mixed methods study. *Journal of Product Innovation Management* 34: 360–83. [CrossRef]
- Guisado-González, Manuel, Manuel Guisado-Tato, and Maria del Mar Rodríguez-Domínguez. 2014. Testing the relationship between product innovation and process innovation. A comparative analysis of tourism and manufacturing sectors. *European Journal of Tourism Research* 8: 66–82. [CrossRef]
- Hogan, Suellen J., Geoffrey N. Soutar, Janet R. McColl-Kennedy, and Jillian C. Sweeney. 2011. Reconceptualizing professional service firm innovation capability: Scale development. *Industrial Marketing Management* 40: 1264–73. [CrossRef]
- Iddris, Faisal. 2011. Innovation capability: A systematic review and research agenda. *Interdisciplinary Journal of Information, Knowledge, and Management* 11: 235–60. [CrossRef]
- Igbiosa, S. O., and Sunday Oseiweh Ogbeide. 2016. Banking sector development and performance of the Nigerian economy. *International Journal of Management Science Research* 1: 1–14.
- Ingram, Keisha LaRaine, and Vitalii Nitsenko. 2021. Comparative analysis of public management models. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu* 4: 122–27. [CrossRef]

- Karlsson, Charlie, and Sam Tavassoli. 2016. Innovation strategies of firms: What strategies and why? *The Journal of Technology Transfer* 41: 1483–506. [CrossRef]
- Kassaneh, Tomas C., Ettore Bolisani, and Juan-Gabriel Cegarra-Navarro. 2021. Knowledge management practices for sustainable supply chain management: A challenge for business education. *Sustainability* 13: 2956. [CrossRef]
- Khanal, Lekhanath, and S. P. Mathur. 2020. Challenges of implementing knowledge management practices in Nepalese financial institutions. *Nepal Journal of Multidisciplinary Research* 3: 34–51. [CrossRef]
- Kholiavko, Nataly, Liubov Popova, Maksym Marych, Iryna Hanzhurenko, Svitlana Koliadenko, and Vitalii Nitsenko. 2020. Comprehensive methodological approach to estimating the research component influence on the information economy development. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu* 4: 192–99. [CrossRef]
- Koc, Tufan. 2007. Organizational determinants of innovation capacity in software companies. *Computers and Industrial Engineering* 53: 373–85. [CrossRef]
- Koffi, Aka Lucien, Li Hongbo, and Samar Zaineldeen. 2021. Examining the impact of innovation types on Ivorian small and medium-sized enterprises (SMEs) performance and competitiveness. *International Journal of Academic Research in Accounting Finance and Management Sciences* 11: 305–26. [CrossRef]
- Komolafe, Babajide. 2022. Banks, Others Contribute N2.3trn to Economy. *Vanguard*. Available online: <https://www.vanguardngr.com/2022/02/banks-others-contribute-n2-3trn-to-economy/> (accessed on 13 May 2022).
- Krejcie, Robert V., and Daryle W. Morgan. 1970. Determining sample size for research activities. *Educational and Psychological Measurement* 30: 607–10. [CrossRef]
- Lawson, Benn, and Danny Samson. 2001. Developing innovation capability in organisations: A dynamic capabilities approach. *International Journal of Innovation Management* 5: 377–400. [CrossRef]
- Li, Cai, Sheikh Farhan Ashraf, Fakhar Shahzad, Iram Bashir, Majid Murad, Nausheen Syed, and Madiha Riaz. 2020. Influence of knowledge management practices on entrepreneurial and organizational performance: A mediated-moderation model. *Frontiers in Psychology* 11: 577106. [CrossRef]
- Mahmod, J. Alsamydai, A. M. Alnawas Ibrahim, and Rodina A. Yousif. 2010. The impact of marketing innovation on creating a sustainable competitive advantage: The case of private commercial banks in Jordan. *Asian Journal of Marketing* 4: 113–30. [CrossRef]
- Manimala, Mathew J. 1992. Entrepreneurial innovation: Beyond Schumpeter. *Creativity and Innovation Management* 1: 46–55. [CrossRef]
- Medase, Kehinde, and Laura Barasa. 2019. Absorptive capacity, marketing capabilities, and innovation commercialisation in Nigeria. *European Journal of Innovation Management* 22: 790–820. [CrossRef]
- Mendoza-Silva, Andrea. 2020. Innovation capability: A systematic literature review. *European Journal of Innovation Management* 24: 707–34. [CrossRef]
- Mills, Annette M., and Trevor A. Smith. 2011. Knowledge management and organizational performance: A decomposed view. *Journal of Knowledge Management* 15: 156–71. [CrossRef]
- Mugambi, Lucy Makena, and Godfrey M. Kinyua. 2020. Role of innovation capability on firm performance in the context of commercial banks in Nairobi City County. Kenya. *International Journal of Current Aspects in Finance, Banking and Accounting* 2: 14–23. [CrossRef]
- Mustafa, Rania, Mohamed Wahaba, Alaa El-Gharabawi, and Mohamed A. Ragheb. 2021. The impact of knowledge management on institutional performance through the balanced scorecard—An applied study on ports training institution. *Open Access Library Journal* 8: e6997. [CrossRef]
- Niqresh, Mohammad. 2021. The reality of applying knowledge management practices and its impact on achieving the quality of higher education in Jordan. *Journal of Educational and Social Research* 11: 9–22. [CrossRef]
- Nitsenko, Vitalii, Abbas Mardani, Ihor Kuksa, and Lyudmila Sudarkina. 2018. Additional opportunities of systematization the marketing research for resource conservation practice. *Management Theory and Studies for Rural Business and Infrastructure Development* 40: 361–68. [CrossRef]
- Nnodim, Ignatius O., B. C. Onuoha, and Richard S. Needorn. 2020. Marketing innovation capability and competitiveness of Nigerian quoted banks. *International Journal of Business and Economics* 8: 16–24.
- Nurdin, Nurdin, and Khaeruddin Yusuf. 2020. Knowledge management lifecycle in Islamic bank: The case of Syariah banks in Indonesia. *International Journal of Knowledge Management Studies* 11: 59–79. [CrossRef]
- Nwachukwu, Chijioke, Helena Chládková, and Olatunji Fadeyi. 2018. Strategy formulation process and innovation performance nexus. *International Journal for Quality Research* 12: 147–64. [CrossRef]
- Opeke, Rosaline O., and Oluremi Titilope Adelowo. 2020. Knowledge management strategies and profitability of selected deposit money banks. Information Impact. *Journal of Information and Knowledge Management* 11: 48–59. [CrossRef]
- Osaulenko, Oleksandr, Olha Yatsenko, Nataliia Reznikova, Denys Rusak, and Vitalii Nitsenko. 2020. The Productive Capacity of Countries Through the Prism of Sustainable Development Goals: Challenges to International Economic Security and to Competitiveness. *Financial and Credit Activity: Problems of Theory and Practice* 2: 492–99. [CrossRef]
- Perevozova, Iryna, Maryna Savchenko, Olga Shkurenko, Khystyna Obelnytska, and Nataliia Hrechany. 2019. Formation of Entrepreneurship Model by Innovation Activity of Industrial Enterprises. *Journal of Entrepreneurship Education* 22: 1–6.
- Plotnikova, Maria, Isidoro Romero, and Juan A. Martínez-Román. 2016. Process innovation in small businesses: The self-employed as entrepreneurs. *Small Business Economics* 47: 939–54. [CrossRef]

- Purwati, Astri Ayu, Budiyanto, Suhermin, and Muhammad Luthfi Hamzah. 2021. The effect of innovation capability on business performance: The role of social capital and entrepreneurial leadership on SMEs in Indonesia. *Accounting* 7: 323–30. [\[CrossRef\]](#)
- Rajapathirana, R. P. Jayani, and Yan Hui. 2018. Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge* 3: 44–55. [\[CrossRef\]](#)
- Razi, Mohamed Jalaldeen Mohamed, Md Habibullah, and Husnayati Hussin. 2019. Knowledge management behavior among academicians: The case of a Malaysian higher learning institution. *Journal of Information and Communication Technology* 18: 183–206. [\[CrossRef\]](#)
- Rezaei, Forouzan, Mohammad Khalilzadeh, and Paria Soleimani. 2021. Factors affecting knowledge management and its effect on organizational performance: Mediating the role of human capital. *Advances in Human-Computer Interaction* 2021: 1–16. [\[CrossRef\]](#)
- Romijn, Henny, and Manuel Albaladejo. 2002. Determinants of Innovation Capability in Small Electronics and Software Firms in Southeast England. *Research Policy* 31: 1053–67. [\[CrossRef\]](#)
- Sadiki, Jacques, and Philippe Lebaillly. 2020. Determinants of process innovation in small food manufacturing firms in South Kivu (eastern part of the Dr Congo). *International Journal of Applied Business and Economic Research* 18: 29–38.
- Saunders, Mark, Philip Lewis, and Adrian Thornhill. 2009. *Research Methods for Business Students*, 5th ed. London: Pearson Education Limited.
- Schumpeter, Joseph A. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle*. Cambridge: Harvard University Press.
- Schumpeter, Joseph A. 1942. *Capitalism, Socialism, and Democracy*. New York: Harper & Bros.
- Shashkova, Nina, Iuliia Ushkarenko, Andrii Soloviov, Oleksii Osadchyi, and Vitalii Nitsenko. 2021. Behavioral Segmentation of Baby Food Consumers: Risk Areas, Possible Solutions. The Case of Ukraine. *European Journal of Sustainable Development* 10: 349–64. [\[CrossRef\]](#)
- Shawaqfeh, George N., Bader A. Alqaied, and Mohammad S. Jaradat. 2019. The impact of knowledge management on the performance of commercial banks' employees in Jordan (a field study on commercial banks' employees in Irbid governorate of Jordan). *European Journal of Accounting, Auditing and Finance Research* 7: 1–16.
- Sudolska, Agata, and Justyna Łapińska. 2020. Exploring Determinants of Innovation Capability in Manufacturing Companies Operating in Poland. *Sustainability* 12: 7101. [\[CrossRef\]](#)
- Syed, Aneela, Nagina Gul, Hadi Hassan Khan, Muhammad Danish, S. M. Nabeel Haq, Bilal Sarwar, Usman Azhar, and Wahab Ahmed. 2021. The impact of knowledge management processes on knowledge sharing attitude: The role of subjective norms. *Journal of Asian Finance, Economics and Business* 8: 1017–30. [\[CrossRef\]](#)
- Tadesse, Dereje Kefale. 2020. The impact of knowledge management towards organization performance. *IOSR Journal of Business and Management* 22: 37–48. [\[CrossRef\]](#)
- Torabi, Mashallah, Reza Safdari, Saharnaz Nedjat, Kazem Mohammad, Maryam Goodarzi, and Hossein Dargahi. 2020. Design and psychometrics of the assessment instrument for innovation capabilities of medical sciences universities using the cube model approach. *Iran J Public Health* 49: 323–31. [\[CrossRef\]](#) [\[PubMed\]](#)
- Tuominen, Matti, and Saara Hyvönen. 2004. Organizational innovation capability: A driver for competitive superiority in marketing channels. *The International Review of Retail, Distribution and Consumer Research* 14: 277–93. [\[CrossRef\]](#)
- Valmohammadi, Changiz, and Mohsen Ahmadi. 2015. The impact of knowledge management practices on organizational performance: A balanced scorecard approach. *Journal of Enterprise Information Management* 28: 131–59. [\[CrossRef\]](#)
- Valmohammadi, Changiz, Javad Sofiyabadi, and Bahare Kolahi. 2019. How do knowledge management practices affect sustainable balanced performance? Mediating role of innovation practices. *Sustainability* 11: 5129. [\[CrossRef\]](#)
- Varis, Miika, and Hannu Littunen. 2010. Types of innovation, sources of information and performance in entrepreneurial SMEs. *European Journal of Innovation Management* 13: 128–54. [\[CrossRef\]](#)
- Wang, Catherine L., and Pervaiz K. Ahmed. 2004. The development and validation of the organizational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management* 7: 303–13. [\[CrossRef\]](#)
- Wang, Yonggui, Aoran Hong, Xia Lib, and Jia Gao. 2020. Marketing innovations during a global crisis: A study of China firms' response to COVID-19. *Journal of Business Research* 116: 214–20. [\[CrossRef\]](#)
- YuSheng, Kong, and Masud Ibrahim. 2020. Innovation capabilities, innovation types, and firm performance: Evidence from the banking sector of Ghana. *SAGE Open* 10: 1–12. [\[CrossRef\]](#)
- Zikmund, William G., Barry J. Babin, Jon C. Carr, and Mitch Griffin. 2013. *Business Research Methods*, 9th ed. Boston: Cengage Learning.