Technological Innovation Strategies and Management of Public Enterprises in Bayelsa State

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Abstract
This study investigated the effect of technological innovation strategies in the management of selected public enterprises in Bayelsa State. Specifically, the study seeks to: evaluate the management knowledge of technology innovations; estimate the management adoption of technology innovations; determine the influence of management access on technology innovations; and ascertain the effect of deployment of technology innovations on the management process of public enterprises. The descriptive research adopted a survey design in gathering data. Correlational research design was also used to investigate the relationship between the study variables. Data was collected from the staff of the selected public enterprises in Bayelsa State (Bayelsa Oil Company Ltd, Bayelsa Transport Company, and Bayelsa Palms). Over 200 were studied using questionnaire links sent to staff via email and WhatsApp. The findings of the study revealed that there was a high level of management knowledge of technological innovations in public enterprises in Bayelsa State. There was a high level of management adoption/deployment of technological innovations in public enterprises in Bayelsa State. Access to technological resources significantly ($p<0.05$) influenced the adoption of technology innovations in public enterprises. There was a significant ($p<0.05$) positive relationship between the deployment of technology innovations and service delivery in public enterprises. Implementing technological innovations enhances service delivery, leading to improved efficiency, effectiveness, and customer satisfaction. Cost of acquisition and implementation of technological resources, lack of technical expertise, and lack of clear adoption strategies are significant barriers to the adoption of technological innovations in public enterprises. Based on these findings, it is evident that public enterprises in Bayelsa State need to focus on strengthening management knowledge of technological innovations, allocating resources effectively, and developing clear adoption strategies. By doing so, they can harness the potential of technological advancements to enhance service delivery, streamline operations, and improve overall organizational performance.

Keywords**:** *Technological innovation, management, public enterprises, adoption, deployment, service delivery, and organisational performance.*

1. INTRODUCTION

Public enterprises in Nigeria, defined as government-owned or controlled organizations, are crucial for economic development and public welfare. These entities play a vital role in providing essential services and goods while operating under the influence of government policies and public scrutiny (Ozioko, 2021). Despite the significant impact of public enterprises to the economy of Nigeria, they encounter challenges such as political interference, poor management, and corruption

(Taiye & Mayokun, 2019). Various reform strategies, including privatization, commercialization, corporatization, and public-private partnerships (PPPs), have been implemented to improve efficiency and minimize government interference (Ozioko, 2021). These reforms aim to enhance the quality of services and promote accountability.

Technological innovation is crucial for the effective management of public enterprises (Olawumi, 2020). The adoption of new technologies, systems, and processes can lead to improved performance and service delivery (Akintoye et al., 2019). Embracing technology innovation can enhance the quality, accessibility, and efficiency of services provided by public enterprises (Mukherjee & Ray, 2015). Technological innovation is a driving force in the global economy and a critical success factor for businesses in the 21st century (Bélanger & Carter, 2018). Public enterprises in Bayelsa State, Nigeria, must also leverage technological innovation to remain competitive and improve their operations (Hammed & Dada, 2022). Despite the government's recognition of the importance of technological innovation, its impact on public enterprise management in Bayelsa State is yet to be fully understood (Oladele & Adegboye, 2017).

1.1 Statement of the problem

Public enterprises in Bayelsa State, like in many other parts of the world, face challenges in managing their operations efficiently and effectively. One of the major challenges faced by these enterprises is the rapid pace of technological innovation, which has transformed the way businesses operate. In order to remain competitive and deliver quality services to the public, it is essential for public enterprises to adopt and implement technological innovations in their management processes. However, the extent to which public enterprises in Bayelsa State have embraced technological innovations remains unclear. There is a lack of empirical evidence on the knowledge and adoption of technological innovations among public enterprise managers, their access to technological resources, and the effect of deploying technological innovations on service delivery.

1.2 Objectives of the study

Based on the statement of the study problem, the aim of this study is to investigate the effect of technological innovation strategies in the management of selected public enterprises in Bayelsa State. Specifically, the study seeks to:

i. evaluate management knowledge of technology innovations in public enterprises in Bayelsa State;
ii. estimate management adoption of technology innovations in public enterprises in Bayelsa State;
iii. determine the influence of management access on technology innovations of public enterprises in Bayelsa State;
iv. ascertain the effect of deployment of technology innovations on the management process of public enterprises in Bayelsa State;
v. assess the relationship between deployment of technology innovations and service delivery of public enterprises in Bayelsa State; and
vi. determine constraints to the adoption of technological innovations in public enterprises in Bayelsa State.

1.3 Research Questions

1) What is the level of management knowledge of technological innovations in public enterprises in Bayelsa State?
2) What is the level of management adoption of technology innovations in public enterprises in Bayelsa State?
3) To what extent does access to technological resources influence the adoption of technology innovations in public enterprises in Bayelsa State?
4) What is the effect of deploying technology innovations on the management process of public enterprises in Bayelsa State?
5) Is there a significant relationship between the deployment of technology innovations and service delivery in public enterprises in Bayelsa State?
6) What are the main constraints to the adoption of technological innovations in public enterprises in Bayelsa State, according to public enterprise managers?

1.4 Research Hypotheses

Ho_1; The level of management knowledge of technological innovations in public enterprises in Bayelsa State is low.

Ho_2; The level of management adoption and deployment of technological innovations in public enterprises in Bayelsa State is low.

Ho_3; Access to technological resources has no significant influence on the adoption of technology innovations in public enterprises in Bayelsa State.

Ho_4; Deployment of technology innovations has no significant impact on the management process of public enterprises in Bayelsa State.

Ho_5; There is no significant positive relationship between the deployment of technology innovations and service delivery in public enterprises in Bayelsa State.

Ho_6; Cost of acquisition and implementation of technological resources, lack of technical expertise, and lack of clear strategy for adoption are not significant constraints to the adoption of technological innovations in public enterprises in Bayelsa State.

2. THEORETICAL FRAMEWORK

This study is anchored on the following theories:

The Resource-Based View (RBV) theory, proposed by Barney (1991), underscores that an organization's success hinges on its unique, valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities, particularly in the realm of technological innovation, guiding public enterprises in Bayelsa State to strategically leverage technology for an enduring competitive advantage (Boso et al., 2017; Ali et al., 2017).

Contingency theory introduced by Joan Woodward, Paul Lawrence, and Jay Lorsch in the 1960s asserts that effective management practices must be tailored to unique organizational situations, with no universal "best way" to manage (Donaldson, 2015), guiding the application of tailored technological innovation strategies in public enterprises, such as in Bayelsa State, Nigeria.

Innovation management theory, including open innovation, design thinking, lean startup, and disruptive innovation, offers unique insights into the innovation process, with open innovation leveraging external knowledge (Chesbrough, 2015), design thinking focusing on user-centric

design (Brown, 2018), lean startup promoting rapid experimentation (Ries, 2017), and disruptive innovation introducing accessible products (Christensen & Overdorf, 2016).

2.1 Gap in Knowledge

Despite the growing importance of technological innovation strategies in enhancing the management of public enterprises, there is a noticeable research gap in the literature regarding their effect in Bayelsa State, Nigeria. While a few studies have explored the topic at the national level, none has specifically focused on Bayelsa State, making it difficult to draw relevant conclusions that apply to the state. Therefore, there is a need for further research to investigate the effect of technological innovation strategies on the management of public enterprises in Bayelsa State, identify the constraints to their adoption, and propose recommendations for improving their implementation. Such research will not only fill the existing gap in the literature but also provide useful insights for policymakers, practitioners, and scholars interested in promoting technological innovation in public enterprises in Bayelsa State.

3. RESEARCH METHODOLOGY

The study employed a descriptive research design. The target population of the study included a variety of both permanent and temporary staff of the selected public enterprises in Bayelsa State (Bayelsa Oil Company Ltd, Bayelsa Transport Company, and Bayelsa Palms). Two hundred (200) staff were selected using snowball sampling and were studied using questionnaire links sent to staff via email and WhatsApp. Out of which 79 responses were retrieved and used for the study. Questionnaire was designed using five-point Likert scale and administered to the participants via face-to-face method. Descriptive statistics and Inferential statistics such as correlation analysis and regression were employed in the analyses.

4. RESULTS

Table 1: Analysis of the level of management knowledge of technological innovations

SN	Survey Question	1	2	3	4	5	∑x	□	Remark
1	I am knowledgeable about the latest technological innovations relevant to my role in the organization.	5	12	5	23	34	79	3.9	High
2	The organization provides adequate training on the use of technology for management purposes.	7	14	6	23	29	79	3.7	High
3	The organization encourages the adoption of new technologies in its management processes.	2	1	5	27	44	79	4.4	High

Source: (Microsoft Excel, 2019)

Table 2: Analysis of the level of management adoption of technological innovations

SN	Survey Question	1	2	3	4	5	∑x	□	Remark
1	Technological innovations are effectively integrated into the overall management strategies of the organization.	5	10	7	30	27	79	3.8	High

2	The organisation invests sufficient resources to support the deployment of technological innovations.	9	16	9	28	17	79	3.4	High
3	Managers in the organization possess the necessary skills to utilize technological innovations in their decision-making.	8	13	10	26	22	79	3.5	High

Source: (Microsoft Excel, 2019)

Table 3: Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.341	.165		2.068	.042
	Access to Technological Resources	.947	.039	.940	24.068	.000

a. Dependent Variable: Adoption of Technological Innovations
Source: (IBM SPSS Statistics 27)

Table 4: Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.550	.189		2.910	.005
	Deployment of Technology Innovations	.830	.044	.907	18.941	.000

a. Dependent Variable: Management Processes
Source: (IBM SPSS Statistics 27)

Table 5: Correlations

		Deployment of Technology Innovations	Service Delivery
Deployment of Technology Innovations	Pearson Correlation	1	.937**
	Sig. (2-tailed)		.000
	N	79	79
Service Delivery	Pearson Correlation	.937**	1
	Sig. (2-tailed)	.000	
	N	79	79

**. Correlation is significant at the 0.01 level (2-tailed).
Source: (IBM SPSS Statistics 27)

Table 6: Analysis of the main constraints to the adoption of technological innovations

SN	Survey Question	1	2	3	4	5	∑x	□	Remark
1	The cost of acquiring and implementing new technology resources is a significant barrier to adoption.	2	2	8	45	22	79	4.1	High
2	The lack of technical expertise among staff is a barrier to the adoption of new technology resources.	0	2	4	43	30	79	4.3	High
3	The organization lacks a clear strategy for the adoption and integration of new technology resources.	1	2	5	35	36	79	4.3	High

Source: (Microsoft Excel, 2019)

4.3 Discussion of results

According to the study survey in Table 1, the majority (45%) of the respondents strongly agreed to the questions that supports the good management knowledge of technological innovations in the public enterprises in Bayelsa State. Consequently, the analysis revealed that the level of knowledge was high. This result is in consistent with Nwankwo and Olaleye (2020), which showed that knowledge management partially mediates the relationship between technological innovation and organizational performance.

Again, study survey in Table 2 showed that the majority (35%) of the respondents agreed to the investigative questions supporting the management adoption and deployment of technological innovations in public enterprises in Bayelsa State. The corresponding analysis have revealed that the level of management adoption and deployment of technological innovations in public enterprises in Bayelsa State was high. The result is in congruence with Alalwan et al. (2020), which revealed that perceived ease of use and perceived usefulness of technology innovations mediated the relationship between technological innovation and service quality. According to Chen et al. (2019) and Saeed et al. (2020), successful adoption and implementation of innovative technologies can lead to enhanced organizational performance and improved service outcomes. Furthermore, Saeed et al. (2020) stressed adopting technological innovations in public enterprises can also enhance internal communication and collaboration, facilitate knowledge sharing, and enable organizational learning.

Considering how access to technological resources influenced the adoption and deployment of technology innovations, survey in Table 3 showed that the majority (41%) of the respondents agreed that access to technological resources influenced adoption of technology innovations in public enterprises in Bayelsa State. The respective analysis revealed that the influence was positive and significant ($p < 0.05$). According to Lee et al. (2019) and Sivarajah et al. (2017), access to

infrastructure is crucial for the effective deployment of technological innovations. This includes having reliable and high-speed internet connectivity, hardware and software systems, and suitable data storage and processing capabilities. Public enterprises need robust infrastructure to support the integration and utilization of technological innovations in their daily operations.

In terms of the effect of deployment of technology innovation on the management process, the survey in Table 4 found that majority (54%) of the respondents agreed with the claims made by the investigators to support the effect of deploying technology innovations on the management process of public enterprises in Bayelsa State. Further, the respective analysis revealed that the effect was positive and significant ($p < 0.05$). This result is in agreement with Nwankwo and Olaleye (2020), which showed that technological innovation positively affects organizational performance. Similarly, Adeleke et al. (2021) and Daramola et al. (2021) found that technological innovation positively and significantly influenced the financial performance, operational performance, and overall performance of public enterprises in Nigeria. The studies further affirmed that the adoption and deployment of technological innovation have the potential to enhance the performance of public enterprises in Nigeria. In the same vein, Ozioko (2021) and Alhassan and Salia (2021) contends that technological innovation significantly influenced the financial performance, operational performance, and overall performance of public enterprises in Ghana. According to the study, technological innovation plays a crucial role in enhancing the performance of public enterprises in Ghana. Do et al. (2023) also contends that technological innovation influences firm performance.

Survey in Table 5 equally revealed that the majority (46%) of the respondents, agreed with the claims to affirm the relationship between deployment of technology innovations and service delivery in public enterprises in Bayelsa State. However, the respective analysis revealed that the relationship was positive and significant ($p < 0.05$). This result is in agreement with the study of Hammed and Dada (2022), which revealed that the use of technological innovations such as computers and other ICT facilities have and play a significant role on the service delivery of information managers. Similarly, Alalwan et al. (2020) showed that technological innovation positively affects service quality in the banking sector in Jordan.

Finally, the study survey in Table 6 showed that the majority (52%) of the respondents agreed that cost of acquisition and implementation of technological resources, lack of technical expertise, and lack of clear strategy for adoption hinder the adoption of technological innovations in Bayelsa State. The respective analysis revealed that the effect of the constraints was high. According to Dioha et al. (2022), the cost of acquisition and implementation of technological resources is often a major challenge. Adeyemo and Adeyemo (2019) also stressed that public enterprises may face financial constraints, limiting their ability to invest in expensive technology infrastructure, software, or equipment. This can impede the adoption of innovative technologies that require substantial upfront investments. According to United Nations. (2023), a lack of technical expertise within public enterprises can hinder the successful adoption of technological innovations. This shortage of technical expertise can create barriers to adoption and limit the ability to harness the potential benefits of technology (Ajayi & Omoregie, 2018). Lastly, according to Olalekan & Akomolafe (2019), the absence of a clear strategy for the adoption of technological innovations can hinder progress. The study stressed that without a clear strategy, decision-making processes may be uncertain, and efforts to adopt technological innovations can lack direction. However, it suggests that developing a comprehensive strategy that aligns with the organization's objectives and addresses potential barriers is crucial for successful adoption.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

This study underscores the high level of management knowledge and adoption of technological innovations within public enterprises in Bayelsa State, Nigeria.

The findings emphasize the significant role of access to technological resources in driving technology adoption and its subsequent impact on the management process and service delivery.

However, notable barriers such as cost implications, technical expertise gaps, and strategic ambiguity hinder the full realization of technological innovation potential in these enterprises.

Addressing these challenges is crucial for harnessing the benefits of technological advancements and enhancing the overall efficiency and effectiveness of public enterprises in Bayelsa State.

5.2 Recommendations

Public enterprises should implement comprehensive training programs to enhance the technical knowledge and expertise of public enterprise managers, enabling them to effectively leverage and manage technological innovations.

They should as a matter of fact establish mechanisms to ensure easier access to technological resources, including fostering collaborations with technology providers, government agencies, and private sectors to reduce barriers to adoption.

They should equally develop a well-defined and adaptable strategy for the adoption and deployment of technological innovations, tailored to the unique needs and challenges of Bayelsa State's public enterprises.

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