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DETERRENCE TO IMPLEMENTATION OF ISO 55000 STANDARDS IN THE MANAGEMENT OF PUBLIC INFRASTRUCTURE ASSETS IN SOUTH-SOUTH NIGERIA

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Abstract

The study is aimed at assessing the deterrence to ISO 55000 in the Management of public agencies' infrastructure to improve its adoption in public asset management in South-South Nigeria. The study adopted a quantitative research design with a population of one hundred and sixty-three (163) Registered facility managers (builders) and estate surveyors in the civil service within Bayelsa, Rivers, and Delta States. The data collected were analysed using descriptive statistics of the mean. The findings of the study revealed that there is a very high level of awareness of ISO5500 standards in the study areas. The study found that ISO 55000 is not an alien concept among the professionals responsible for asset management in the study area. Also, the major barrier to the implementation of ISO 55000 in South-South Nigeria is the lack of legal accountability. On this note, the study concludes by recommending that the various states' houses of assembly should domesticate a law to back ISO 55000 as an internationally recognised standard for best practices in asset management in the various state-owned public agencies. Also, a proper framework considering the peculiarities of the study area should be developed and religiously pursued in the study area.

Keywords: Asset Management, Deterrence, Infrastructure, ISO 55000, Nigeria

Introduction

Infrastructure is not only the glue that holds economic activity together but has built relevance as an important economic activity in its own right. With the growth in capital investment in infrastructure assets to support the nation's economic development, emphasis must be placed on developing holistic approaches to infrastructure asset management to significantly reduce the cost of owning assets (Eric and Martin, 2006). However, many developing country agencies do not yet have a systematic process to manage their asset (Alkilani and Jupp, 2012). These countries develop asset management systems they need to understand the barriers they may face when implementing these systems (Wesam, Molenaar, and Amy 2017). implementing ISO 55000 can add significant advantages to any organization by increasing the asset's uptime and reducing maintenance costs (Asayel, Fatima and Nada *et al.*, 2018).

The Infrastructural report of Nigeria just like any third-world country is nothing to write home about. The housing situation is in a sorry state both quantitatively and qualitatively (Oyedele, 2018). Most infrastructures are now decayed and/or in a disservice and need repair refurbishment, rehabilitation, or replacement. Assets management is lacking in Nigeria and accounts for the dearth of infrastructure, the roads, public buildings, and bridges in Nigeria are allowed to decay; their parts rot, and in some cases collapse before they are attended to, these infrastructures are horrible states and are unsightly (Oyedele, 2018). Traditional management systems in developing countries like Nigeria are inefficient, costly, and a hindrance in their nations' attempts for development. In such a

situation, the key element of enhancing management systems is maximizing the efficiency of the existing infrastructure, and exploring the opportunities for cutting down the unnecessary costs in infrastructure asset management (Tafazzoli, 2017). Organisations want to deliver more for less in line with international standards to achieve their objective. Hence, the study is aimed at assessing the deterrence to ISO 55000 in the Management of public agencies' infrastructure to improve its adoption in public asset management in South-South Nigeria.

Review of Related Literature

Overview of ISO 55000 standard and challenges/barriers to infrastructure assets management

The ISO 55000 standard provides guidance related to the development of documented information specifying how organizational objectives are transformed into asset management objectives. In addition to documentation, the standard outlines the overall role and requirements of an Asset Management System (AMS). Considerations related to the context of the organization are used in the development of asset management policies, organizational objectives, organizational risk identification, and implementation of a Strategic Asset Management Plan (SAMP), Asset Management Plans (AMPs), and the creation and implementation of Standard Operating Procedures (SOPs).

Asset management is a management system that enables an organization to realize value from its assets in the achievement of its organizational objectives (ISO 55002, 2018). Asset management systems are systems that are systems used by an organization to direct, control, and coordinate asset management activities (ISO 55002, 2018). This International Standard (ISO 55000) specifies requirements for an asset management system within the context of the organization. This International Standard specifies the requirements for the establishment, implementation, maintenance, and improvement of a management system for asset management, referred to as an "asset management system". ISO 55000 can be applied to all types of assets and by all types and sizes of organizations. It is intended to be used for managing physical assets but can be applied to other asset types. It does not specify financial, accounting, or technical requirements for managing specific asset types.

According to ISO 55000 (2014), this international standard is primarily intended for use by:

i. Those involved in the establishment, implementation, maintenance, and improvement of an asset management system;
ii. Those involved in delivering asset management activities and service providers; and
iii. Internal and external parties assess the organization's ability to meet legal, regulatory, and contractual requirements and the organization's requirements.

A study was also undertaken by Svendsen, and Tang (2018) aimed at identifying the main challenges faced by a local government in a newly-developing region when adopting a public asset-management framework. The findings indicated there were significant challenges that the (Indonesian case study) government had to manage when adopting a public asset-management framework. This includes the absence of an institutional and legal framework to support the asset-management application; the non-profit principle of public assets; multiple jurisdictions involved in the public asset-management processes; the complexity of local government objectives; the non-availability of data for managing public property, and limited human resources. Also, a further study on the study area by Hanis, Bambang, and Connie (2010) suggested that the government of Indonesia must address these challenges before accepting and applying a developed asset-management framework. The findings of this study are in

line with another study undertaken by Hokoma, Khan, and Khalid (2010).

A recent study undertaken by Gando and Amis (2013) reviewed the practices, challenges, and policy options used in municipal-asset water and sanitation sector(s) in newly developing countries. The results indicated that the water sector had gone through several reforms but had not resulted in any knock-on cascade into improved infrastructure asset management. Lack of financial resources, human resource expertise, and appropriate organizational strategy had constrained the adoption and application of systems-software for effective asset management. The researcher recommended that to improve asset management in the water and sanitation sector (of this developing region), there is a need to address: the absence of an asset management plan; the limited financial capability of the local authorities; the shortage of experienced personnel; the absence of a supportive organisational strategy; and, the lack of stakeholder commitment.

The research by Abuzayan, Whyte, and Bell (2014) citing Lemer and Wright (2000) demonstrated that improved infrastructure performance is achievable despite various obstacles (mentioned before) facing asset managers. The researchers undertook an integrated programme, namely, the infrastructure innovation partnership, aimed at transferring research, education, and technology to design, produce and publish new knowledge (knowledge management) that enables and encourages enhanced infrastructure performance, and a management and decision-support system. They found that a management system would provide responsible managers with significant information on the status and performance of their current infrastructure system and would provide a means for discovering how future demands and management policies may impact performance. Lemer and Wright (2000) as cited by Abuzayan *et al.* (2014) argue improvement can be attained by: increasing the overall returns of public assets and changing the old belief that public assets are free goods‘ (albeit without suggesting how this might be done); improving the scope, efficiency, and reliability of infrastructure technology; improving the effectiveness of human resource involved in the design, construction, operation, maintenance of infrastructure; acquiring more knowledge of infrastructure behaviour and then using that knowledge to improve design/ management; and, improving efficiency/reliability of infrastructure services delivery. The researchers proposed an intelligent-infrastructure-management-system IIMS framework as a computer-based management tool that would apply advanced information collection and management technologies to provide more efficient, accurate, and effective bases for making decisions about infrastructure.

Another study examining asset-management tools for municipal infrastructure planning in the construction industry was carried out by Vanier, Newton, and Halfway (2005), the study found that there was a need for decision-support tools for municipal-type organisations, and identified the challenges for life-cycle (maintenance/repair/renewal) costs planning faced by asset owners and managers. The study categorised various stages of asset management using the six “what” questions: What do you own? What is it worth? What is its condition? What is the remaining service life? What is deferred maintenance? The responses to these questions provided information on the currently available tools and techniques for asset management. From this data, Vanier developed an asset-management framework with each what ‘establishing a growing framework for asset-management plan implementation. This study, however, did not discover any comprehensive solution that addresses the current and future needs for investment planning for municipal engineers and managers unlike the study by Lemer and Wright (2000) which was able to identify

more criteria for an effective asset-management framework. However, Vanier considered integration with existing systems such as computerised maintenance management, geographic information, and corporate legacy systems to be the most significant challenge for developing and using decision-support tools in the area of asset management.

Too (2010) undertook another study to develop approaches that could be adopted to overcome challenges and improve the performance of the assets of Brisbane Airport (BAC). Through a Case study approach data were collected from various interviews with senior managers responsible for the management of infrastructure assets as well as from a literature review. The challenges and approaches that were identified were categorised as broad strategic core processes required to contribute to the achievement of asset management goals. However, a need remains for future research to develop improved management processes to achieve optimal solutions. To develop a descriptive framework for strategic infrastructure asset management that can be applied to various types of infrastructure assets such as roads, rails, utilities, airports, and seaports.

In Nigeria, some of the challenges/barriers to asset management and maintenance as observed by previous researchers are:

1. **Lack of Recognition**: The first barrier to the adoption and advancement of asset management is found in the status that is often bestowed upon infrastructure asset management and maintenance groups within organisations. Recognition and prestige are always accorded to finance and investment activities of new construction and development. On the other hand, asset management is frequently associated with only maintenance, asset inventory, and related services and is therefore considered to be of less strategic importance (Too and Too, 2010). Consequently, the concept of asset management as applied to infrastructure organisation is viewed in research more from an operational (engineering and maintenance) and asset management functional perspective rather than from the strategic and holistic management perspective. This view is also echoed by Stapelberg (2016) who noted that most asset management frameworks fail to have a system-wide focus. The focus is more on individual assets rather than the long-term asset management needs of an organisation. Hence, a compelling argument against the progression of the concept of asset management is the general lack of interest from an organisation due to its operational perspective and therefore it is not able to contribute value to its stakeholders.
2. **Wrong Initiation and Delivery of Infrastructures**: Infrastructures are just means to an end and not ends in themselves. There must be a needs assessment, feasibility, and viability study, and effective planning before they are delivered. In Nigeria, most infrastructures are embarked upon because they are heads in accounts books to siphon money or as compensation to cronies and allies and not because they are necessary (Ogbimi, 2018).
3. **Lack of Effective Monitoring and Evaluation of Projects**: Monitoring and evaluation of infrastructure assets is a programme of continuous improvement. "Monitoring and Evaluation (M&E) refers to the process of monitoring a project and evaluating the impact it has on the target population to assess the success and impact of the project" (Oyedele, 2018). Infrastructure assets must be properly monitored and evaluated because of their critical functions in the community.
4. **Lack of Finance**: In recent years, there have been signs of deteriorating quality of infrastructure in some advanced economies. Indeed, EU countries, for example, have spent 70% of their public investment on maintenance costs

associated with past infrastructure investments (OECD, 2014). The spending agenda, scripted to achieve the long-term National Integrated Infrastructure Master Plan (NIIMP) also put expenditure on infrastructure maintenance at an estimated two percent of the GDP" (Ogidan, 2013). In this direction, the former Minister of National Planning, Dr. Shamsudeen Usman, stated that yearly investment in infrastructure will have to rise to $25 billion (about seven percent of the GDP) from the current $ 9 billion to $ 10 billion (about four percent of the GDP (Oyedele, 2018). Enough funds are not allocated to infrastructure assets maintenance finance in Nigeria. According to Nnodim (2018), Nigeria requires $15bn (N4.59TN at N306 to a dollar) worth of investments annually for 15 years to adequately develop its infrastructure nationwide (Oyedele, 2018).

5. **Poor Quality of Infrastructure**: Most of the infrastructure assets are of poor quality. Infrastructure assets delivery involves engineering, procurement, construction, installation, and commissioning (EPCIC). Engineering involves the conception, planning, and design of the infrastructure. After the conception, planning, and design are the procurement of infrastructure assets. The problem with the quality of infrastructure assets in Nigeria stems from conception, planning, and design (Oyedele, 2018).
6. **Lack of Technical Know-how**: Nigeria lacks technical know-how to manage infrastructure assets in Nigeria. For example, infrastructure assets like healthcare equipment, radio transmission equipment, and telecommunication infrastructure assets are mostly imported into Nigeria. Their maintenance is hindered by the fact that this equipment is not manufactured in Nigeria. The parts of the products required for repair and overhauling may be obsolete at the time damages occur (Oyedele, 2018).
7. **Lack of Legal Framework**: Maintenance requires a legal framework about who should be responsible. In some instances, the suppliers or contractors should be mandated, through contract, to be in charge of the infrastructure assets for a minimum of five years. However, the retention clause or warranty period usually stipulates that the contractor or supplier of products and goods will be in charge of repair or replacement for six months (the warranty period on homes built in Great Britain is ten (10) years according to National House Building Council (NHBC) Buildmark warranty) (Oyedele, 2018).
8. **Technology**: The technology for effective maintenance of infrastructure in Nigeria is scarce (Oyedele, 2012). Modern asphaltic road pavers, sludge dislodge-like Agitating radiators, high-rise façade cleaning equipment, and concrete cutters are scarce in Nigeria (Oyedele, 2012).
9. **Lack of maintenance economy**: According to This Day newspaper (2018) During a seminar held to commemorate the World Facilities Management Week in Lagos on the 28th of May 2018, part of the commemoration of the World Facilities Management Week Former Minister of Power, Works, and Housing, Babatunde Fashola, stated that "the biggest challenge of the Nigerian economy was the persistent inability to articulate a sustainable national and sub-national policy framework that will ensure the regular and effective maintenance of public assets, buildings, utility infrastructure, and facilities" (Ajakaiye, 2018). There is a need to build a maintenance economy that is more than a maintenance culture. Maintenance economy is the conservation of materials by every individual involved with maintenance to ensure the proper use of parts and labour, leading to the durability of infrastructure assets (Ajakaiye, 2018).
10. **Bad political environment**: The political environment in Nigeria is still

turbulent. The private sector still finds it difficult to do business with governments on credit because public sector clients do not pay on time for the infrastructure procured (Oyedele, 2018).

11. **Poor patronage of PPP**: Public-private partnership (PPP) is still in a rudimentary stage in Nigeria. PPPs can be a tool to deliver much-needed infrastructure services (World Bank, 2018). According to the World Bank (2018), "2017 was a good year for Public Participation in Infrastructure (PPI) investments in IDA countries. Private participation in infrastructure (PPI) investments in International Development Association (IDA) countries totaled US$7.9 billion across 35 projects in 17 countries in 2017, compared to US$2.9 billion in 2016 across 18 projects in 10 countries. In Nigeria, the contribution of the private sector to public infrastructure assets finance is less than $ 100 million in 2018 (Oyedele, 2018).

RESEARCH METHODOLOGY

The research method that was used in this work is quantitative research design" because the phenomenon under research investigation is of the present and this method ultimately deals with the situation under investigation. This survey was carried out through the administration of structured closed and open-ended questionnaire(s) on professionals that are in charge of management and maintenance of public assets in South-South Nigeria.

The population of the study is one hundred and sixty-four (164) professionals. These professionals are in charge of the management and maintenance of public assets in the study areas which comprised ninety-one (91) registered Estate Surveyors in the civil service (decree 24 of 1975) and seventy-three (73) facility managers (builders) (see Table 1). The study is limited to only three states within the south-south zone due to the massive infrastructure development identified in the selected areas and these states are Bayelsa, Rivers, and Delta States. There was no sampling in this study since the population size was manageable.

The researcher personally distributed copies of the questionnaire to the respondents with the help of three research assistants (one from each state under investigation), who were briefed on how to administer the instrument. Quantitative data collected using a structured questionnaire was analysed by the use of descriptive statistics using the Statistical Package for Social Sciences (SPSS) and presented through percentages, means, and frequencies.

Table 1: Population distribution of the states' public agencies registered asset managers in South-South Nigeria

S/N	State	No. of Registered Estate Surveyors	No. of Registered Facility Managers (Builders)
1	Bayelsa	17	13
2	Rivers	42	35
3	Delta	32	25
	Total	91	73

Source: States' Civil Service Commission (2023)

applications or software programs that are specifically designed for use on mobile devices, providing instant access to specific services. These technological innovations, with their diverse functions across various areas of life, have become essential for real

estate professionals aiming for efficient service delivery. Mobile technology is also seen as a ready-made solution to various real estate issues, including record keeping, data management, data retrieval and updates, letter dispatch, tenant meetings, and more. Additionally, mobile technology offers the advantage of a more flexible work environment for real estate professionals. It has revolutionized the practice of real estate by enabling data gathering, information dissemination, property search and listing, cash transactions, and more.

Results

Level of awareness of ISO 55000 standards among public asset managers in the study area

Table 2: Assessment of the level of awareness of ISO 5500 as the standard of public asset management

Respondents	Very highly	Highly	Average	Low	Very low
Response	78	34	21	16	11
Percentage of the responses	48.75	21.25	13.13	10	6.87

Source: Field Survey, 2023

real estate industry, providing a range of benefits such as improved data gathering, information dissemination, property search and listing, cash flow forecast, and virtual inspection. All of these conveniences can now be accessed from the comfort of our homes or offices (Cradduck, 2013; Oyetunji, Ojo and Oyetunji, 2018). Mobile technology is also becoming increasingly prevalent in Nigeria and other developing countries. For instance, in 2020, it was estimated that between 25 and 40 million smartphone users existed in Nigeria with a population of about 200 million people (O'Dea, 2020). This rise in smartphone usage has allowed various sectors, including the financial sector, to effectively utilize mobile technology to provide services to their customers. However, the real estate sector in Nigeria and many developing countries lags behind when it comes to the adoption of mobile technology for service delivery. Despite a few real estate listing applications like Jiji.com, ToLet.com, PropertyPro.ng, and Kobo Rent, the industry as a whole has not fully embraced mobile technology (Aihie, 2019; Kakulu, 2003; Olufunso, 2020). The extent of awareness and usage of mobile technology in real estate practice in developing countries like Nigeria remains largely unknown. This is noteworthy considering the significant contribution of the Nigeria real estate sector to the country's GDP.

In recent decades, the sector's contribution to the GDP has increased from 3.5% to 13.4%, indicating an impressive annual growth rate of 11.2% (Elile, Akpan, and Raju, 2019). One area that holds great potential for enhancing project management in the real estate sector is the application of Information and Communication Technology (ICT). Globalization and advancements in technology have given rise to new challenges across various domains, including real estate project management. Practitioners in this field now confront the need to embrace new techniques and more efficient approaches to managing, tracking, and storing information. This investigation aims to explore the various factors influencing the adoption and utilization of ICT in real estate project management in the South-East region. By understanding these factors, it becomes possible to identify opportunities for improvement and potential barriers to overcome.

Table 2 shows that respondents were asked to indicate their level of awareness of the ISO 5500. It was evident that there is a very high level of awareness of ISO 5500 standards in the study areas by the professional bodies in charge of managing public assets in the study areas 78 (48.75%) agreed that the awareness is very high and 34 (21.25 %) agreed to have a high level of awareness of the standard. The

results also revealed that 21 (13.13%) and 16 (10%) of the respondents agreed that professional bodies in charge of managing public assets in the study areas have average and low levels of awareness of the ISO 5500 respectively while 11(6.87%) agreed that the awareness level is very low.

The result revealed that there is a very high level of awareness of ISO 55000 standards in the study areas by the respondents. That is, about 70% of the respondents asked are aware of ISO 55000 (see Table 2) This disposition was buttressed by the agreement of professionals in the different locations across south-south Nigeria to the fact that the level of awareness of ISO 55000 varies for professionals based on their experience and exposure. This comes as no surprise as the standards of the ISO (International Standard Organization) are usually taught as part of the tertiary curriculum and also as registered professionals ISO standards must be part of their day-to-day work ethics. This is a guide when the level of awareness can be used in navigating the implementation of the standard.

Barriers to ISO 55000 standard management and maintenance of public infrastructure assets in the study area

Table 3: Barriers to ISO 55000 standard managing public infrastructure assets in the study areas

Items	SA	A	D	SD	U	T	$\overline{X}$	Ranking
	5	4	3	2	1			
The wrong motive for the infrastructural project	58	48	25	19	10	160	3.78	6
Lack of effective evaluation and monitoring of public infrastructure	46	70	20	16	8	160	3.81	5
Lack of finance for infrastructural project management	40	59	21	18	13	160	3.70	7
Poor quality of public infrastructure and maintenance culture	62	53	24	11	10	160	3.90	4
Lack of required technology and technical know-how	43	66	18	12	21	160	3.61	11
The public not being counted as owners of public infrastructure	48	59	18	21	14	160	3.66	10
Absence of legal framework on duties and the people involved in the various aspects of asset maintenance (Lack of Legal Accountability)	101	30	21	6	2	160	4.38	1
High level of financial corruption amongst government ranks	98	34	16	8	4	160	4.33	2
Poor maintenance culture	59	64	14	10	13	160	3.91	3
Poor patronage of public and private partnership	46	61	26	10	17	160	3.68	9
Inconsistent Organisational and institutional change of government parastatals	57	48	24	21	10	160	3.7	8

Source: Field Survey, 2023

Table 3 shows the mean scores of the responses of the respondents on barriers to implementing ISO 55000, on public assets in the study areas. The result revealed that items 21 to 31 have mean scores of 3.78, 3.81, 3.70, 3.90, 3.61, 3.66, 4.38, 4.33, 3.91, 3.68 and 3.7 respectively. This showed that all the mean scores of items 21 to 31 were above the decision point of 3.00; hence, they agreed that barriers to implementing ISO 55000, on public assets. The table indicates that the absence of a legal framework on duties and the people involved in the various aspects of asset maintenance (Lack of Legal Accountability) is ranked as being the highest barrier to implementing ISO 55000 in the study area,

The findings of the study revealed that the absence of a legal framework on duties and the people involved in the various aspects of asset maintenance (Lack of Legal

Accountability) is the highest barrier to implementing ISO 55000 in the study area (See Table 3). The results revealed the respondents rated all items as barriers impeding the implementation of ISO 55000 standards managing public infrastructure assets to a high extent. These include a lack of legal accountability, a High level of financial corruption among government ranks, a Lack of finance for infrastructural project management, poor quality of public infrastructure and maintenance culture, inconsistent organisational and institutional change of government parastatals, and so on.

This finding aligns with Ogunlan and Abednego, *(*2006) who asserted that consequences that could result from poor materials management include: insufficiency of material for production on site, forcing contractors to produce non-conforming products. Firstly, the use of insufficient quantities of materials could lead to the partial or entire collapse of a structure. Weak spots on a structure are liable to collapse, because of inadequate strength to withstand both the dead and imposed loads. Secondly, it could lead to a lack of patronage of the contractor, implying that the contractor cannot secure contracts, and ultimately result in liquidation. This means that both the contractor and his/ her employees will be non-operational and unemployed. Thirdly, it is a measure of a contractor's competence. A collapsed building, which is attributable to inadequate strength of components of a building, could either be a result of a lack of construction knowledge on the part of the contractor, or the contractor's use of less quantity of materials for production.

The findings also agreed with Nnodim, (2018) whose investigation revealed that poor patronage of public and private partnerships wrong motive for the infrastructural project, Lack of effective evaluation and monitoring of public infrastructure, and Lack of required technology and technical know-how are characterized by construction and maintenance of the public asset. The study went further to observe that the identified barriers narrowed the benefits of ISO 55000 to traditional asset management systems because of non-legal backing to domestic the adoption of the document.

Conclusions and Recommendations

Based on the findings of this study, it was concluded that ISO 55000 is not an alien concept among the professionals responsible for asset management. The major barrier to the implementation of ISO 55000 in South-South Nigeria is the lack of legal accountability. The various states' houses of assembly should domesticate a law to back ISO 55000 as an internationally recognised standard for best practices in asset management in the various state-owned public agencies. These will ensure that the right skill is hired for the right job in our public agencies and checkmate corruption. Conclusively the level of awareness of ISO 55000 in the study area is high and some of the provisions of ISO 55000 are practiced traditionally in parts, without compressive legal backing to adopt the document as a standard template for asset management in the various state public agencies.

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