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Facilities Management in Public Tertiary Institutions in Nigeria

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Abstract— *Facilities management is an integral part of the overall management of tertiary institutions. The actualization of the increasingly broadening goals and objectives of education demands the provision, optimal utilization and effective management of facilities. Advancement in science and technology, coupled with quantum leap in school enrolment, rising number of academic programmes and limited resources, necessitate the need for collaborative efforts that will bring in new ideas and perspectives to support modern methods of facilities management in order to improve the quality of teaching and learning in higher institutions. This research aims to contribute to the discuss that, facility management (or FM) as a sustainable tool, could enhance performance within the perspective of public tertiary institutions in Nigeria. Literature reviewed revealed the nature of FM practices in public institutions of learning. The factors impacting FM practices were examined. Data was collected using structured questionnaire administered on managerial and technical officers responsible for FM functions in Nigerian public institutions. Descriptive and inferential statistical tools were used to analyze the data collected. The research established the existence of a direct relationship between the quality of educational facilities and the quality of the products churned out of tertiary institutions. The research found that, despite the significant benefits of FM to the learning process, FM practice in public institutions remains bleak; preferring the reactive approach instead of the more result-oriented, proactive/preventive approach. The approach to managing public facilities has remained passive leading to obsolescence and decay of critical facilities. The key challenges to FM practice in Nigeria include low level of technology, poor policy implementation and poor funding. The study recommends the outsourcing of the technical expertise needed to salvage the deteriorating conditions of Nigerian public educational facilities. The reactive/passive FM practice in tertiary institutions should pave way to a more result-oriented approach that helps administrators and policymakers ascertain the condition of facilities and plan timely intervention.*

Keywords— *Facilities management, school management, facility maintenance, tertiary institutions, Nigeria, facilities funding, FM practices.*

I. INTRODUCTION

The construction industry has experienced an increase in the development and use of new building components and construction technologies over the last three and half decades, leading to a rise in the complexities of building systems; this is coupled with the evolving construction industry from a traditional crafting industry to a service-based industry which prompts the need for involving more professionals in the design and execution of building projects (Enoma, 2005). This emerging scenario, plus the number of rising competition, increased market activities, deregulation as well as the multiplicity of different service concepts have together led to a more dynamic industry with resultant pressure mounted on professionals and designers of building facilities to seek and include facility management (or FM) solutions into building systems and concepts.

Tertiary institutions are not only citadels of learning, they also afford nations the capacity to connect seamlessly with the new international knowledge system within the arena where an effective facilities management practice exists. Since the learning environment is a critical factor that determines effective teaching and learning, Price (2003) observed that deplorable facilities will pose serious threat to the achievement of this objective. In developed economies, challenges associated with ageing and expanding facilities have been identified by higher education leaders as major determinants of research and academic performance (Marmolejo, 2007). In developing economies like Nigeria, the need for better management of facilities in tertiary institutions is a matter of urgency, as revealed by the Nigerian Universities Commission (NUC, 2006), because they are central in supporting the core objectives of teaching, learning, and research. According to Gbadegesin and Aluko (2014), the dynamism in infrastructure financing approaches, reduction of government deficit and ageing/fading infrastructure in tertiary institutions necessitate the need for alternative infrastructure financing route and initiatives which must integrate the financing system as a way of improving the existing facilities.

Different definitions for facility management have emerged from individuals and organizations alike. From individuals' perspective, Enoma (2005) referred to FM as an age-old practice born out of necessity from when buildings were constructed to support human activities. Bennet and Iossa (2006) observed that decisions for requisite FM services were, hitherto, made intuitively without recourse to thorough analysis of what is required and how it is to be applied, and these decisions often come too little too late; after plans, designs, and costs are already in place, and construction, in most cases, has been completed. FM is responsible for coordinating all efforts related to planning, designing and managing buildings and their systems, equipment and furniture to enhance an organization's ability to compete fairly in a rapidly changing world. Other authors (Atkin and Brooks, 2000; Nutt *et al*, 2000; Fenker, 2004) have described FM as a process which ensures that buildings and technical systems support the operations of an organization using an integrated approach to operating, maintaining, improving and adapting the building and infrastructure of an organization to create an enabling environment that supports the organization's core objectives. In relation to educational facilities, Asiabaka (2008) described FM as the application of scientific methods

in the overall management of the physical learning environment for the purpose of achieving the educational goals and objectives.

FM's primary function is to handle and manage support services in order to meet the basic needs of the organization, its employees and core operations (Chitopanich, 2004). Lavy (2008) reiterates that a structured and organized FM has the potential not only to improve the physical appearance and performance of a building and its system, but also to facilitate end-users' satisfaction and improve the efficiency of maintaining and operating the building facility. The FM discipline in the past two decades has undergone rapid evolution, and its practice is gaining global acceptance. This, in part, maybe as a result of its rising importance among both owners and managers of these facilities who are beginning to appreciate the benefits of the concept, and the increasing pressure from tenants for more user-friendly customized premises (Udechukwu, 2008). The link between education and economic growth is well known (Oni and Alade, 2008). Education is on record as an enhancer of productivity and wellness, with the capacity to reduce adverse effects on life generally. This has made access to education a fundamental need of all people around the globe, and tertiary level education is perceived as a strong tool through which educational goals could be accomplished by nations.

As the concept of FM keeps evolving, real estate developers and business organizations face the stark reality that a fast and early decision-making process with regards to the service support required is crucial to ensuring that both buildings and services fit perfectly into the lifecycle costs as well as end-users' comfort. Emerging perspectives point to the increasing need to consider the rising and diverse needs for residential buildings. Fahnrich and Meiren (2007) observed that the same is true for office buildings, given the flexibility of people's work schedules and the rapidly blurring boundaries between work and private life. Studies conducted by Bennet and Iossa (2006) arrived at the conclusion that FM services tend to thrive better in the private sector than the public sector. Akinsola *et al.,* (2012) arrived at similar findings after his critical analysis of public buildings' neglect and deterioration in Nigeria. As a result, this study intends to appraise the FM practices in public buildings in Nigeria with the objective of identifying the existing FM practices in public buildings and ascertaining the factors which impede FM practice.

II. Literature Review

Buildings and other forms of physical structures are essential for human survival as they provide shelter and guarantee the well-being of people within the socio-economic, cultural and environmental setting in which human activities are carried out (Amusan *et al.,* 2019). Leung and Fung (2005) described facilities within the scope of tertiary institutions simply as those physical structures and their support systems which together provide a cozy atmosphere for students to be trained. Asiabaka (2008) added that school facilities are the content assets at the disposal of staff and students to optimize their learning productivity. These facilities may include, but are not limited to: housing complexes, apartment buildings, lecture theatres, lecture halls and classrooms, laboratories, sports complexes, office complexes, retail complexes, conference centers, clinics, restaurants, power and water supply systems, and road network, among others. The importance of education to humanity cannot be overemphasized.

Comprehensive definitions for FM have been provided by two world leading FM organizations i.e. British Institute of Facility Management (BIFM) and International Facility Management Association (IFMA). BIFM (2010) defined FM as "the integration of processes within an organization to maintain and develop the agreed services which support and improve the effectiveness of its primary activities". IFMA (2012) on its part defined FM as "the practice of coordinating the physical workplace with the people and work of an organization, (which) integrates the principles of business administration, architecture, and the behavioural and engineering services". Until recently, most scholars and practitioners shared the common view that FM is a discipline that is primarily focused on maintenance services for buildings and other physical resources owned by an organization - from a cost-cutting perspective. Lately, scholars and practitioners have come to appreciate that the contribution of FM to an organization is broader (Heng *et al.,* 2005; Alexander and Price, 2012) in the sense that apart from reducing running costs and maximizing usable space, it also supports and enhances both core and non-core business activities in an organization which requires the firm support and approval of top management (Tranfield and Akhlagi, 1995; Noor and Pitt, 2009; Barrett and Finch, 2014). As a matter of fact, Noor and Pitt (2009, pp.214-215) assert that FM does not only support the business of an organization, it shapes it. For this reason, Pitt and Tucker (2008) recommend the adoption of a strategic approach to FM by organizations.

Needless to say, the connection of FM to an organization's human resources, real estate, and Information Technology (IT) tasks has risen steadily. As a result, FM serves as a vehicle through which an organization provides and supports its buildings, systems and support facilities in order to fulfill strategic requirements in a conducive environment. Asiabaka (2008) in his study of the effects of FM in Nigerian schools underpinned the importance of effective management of facilities as it involves the provision, maximum use and optimal oversight of facilities. This is very central to achieving the objectives of education because of the vital role they perform in the fulfillment of educational aims and objectives. Sadly, literature on the practice of FM in higher institutions is limited. This is probably attributable to the findings of a research conducted by Ogbeifun (2011) on tertiary institutions, to the effect that FM practice is peculiar to each institutional setting. Using the qualitative research approach, the author stressed that the organizational structure, operational methods and FM functions are as diverse as the institutions themselves, since they are determined by various other variables such as: innovative technologies, university size, housing age, multi-campus, and how it reacts to increase in student registration. The author concluded that effective application of FM strategies could go a long way to impact a

school's overall performance, but that for FM to be a success, there must be genuine interaction between the academic and FM department. This argument is reinforced by Uko (2015) who stressed that facilities are an integral part of an institution, as they facilitate, interact and improve the accomplishment of educational objectives through the different FM stages of provision, utilization, maintenance, improvement and audit of the different educational facilities. It needs no emphasis that efficient FM is central to improving the overall efficiency of teachers as well as the overall performance of students in the long run.

The literature review will be concluded under the following three subheadings:

a. The Need for Educational FM

Since FM relies on the premise that the efficiency of an organization has direct link to the physical environment in which it operates, and that the environment can be improved to increase efficiency, it follows that the environment created for the users of a facility influences the performance of the activities carried out in the facility (Gagendran, 2000). In this respect FM serves as a bridge between changing workplaces and users (Alexander, 1996). For this reason, organizations require comfortable facilities that are cost-effective, run efficiently, and constitute added value assets to them (Douglas, 1996). The educational system has evolved in terms of its philosophy, expanded goals and objectives, new approaches to services delivery, multiplicity of curricula programmes and extra-curriculum activities, increase in school enrollment, modern community design, and introduction of Information and Communication Technology (ICT), and expanded academic support services, among others (Asiabaka, 2008). Nwagwu (1978) and Ogunsaju (2000) explained that the quality of education imparted on students has direct relevance to the availability or lack of physical facilities and the overall atmosphere in which learning takes place - since the facilities play a pivotal role in actualizing the educational objectives by meeting the physical and emotional needs of both staff and students. These physical needs are met through the creation of pleasant surroundings, friendly atmosphere, and an inspiring environment. In Uko's (2015) view, creating an appropriate educational atmosphere is pre-conditioned by the efficient management of educational facilities; adding that efficient FM is a forerunner to enabling development, utilization and maintenance which contribute towards improving teachers' overall efficiency and students' overall performance.

However, Asiabaka (2008) notes that the challenges posed by rapid increase in school enrollment, increasing number of academic programmes and limited resources require flexibility to be an integral part of the planning process, adding that the facilities provided should be able to meet immediate needs and serve new functions in the long run. One of the major challenges faced by tertiary institutions in Nigeria and abroad is that the initial planning design and construction costs of the facilities provided consume so much time and labour, while the impacts of operating the facilities are deferred to a latter time for others to figure out (Rose *et al.,* 2007). Once built, these facilities assume a life of their own - a permanent life - that requires costs to maintain far in excess of the initial design and construction. It is worth noting that educational facilities, like other material resources, are consumables. In the course of time, they get used up and need to be replaced or revitalized, With this in mind, it is important that those responsible for handling educational facilities in this era of declining resources and changes in educational programmes understand the FM issues, in order to effectively meet the needs of future generations of students, and teachers alike.

To be sure, FM is an aspect of education system that is generally being overlooked in Nigeria. This is because when new buildings are constructed and handed over to the authorities concerned, no plan is put in place for the maintenance of such facilities. Cases abound of several educational buildings that were built and gone on for decades without undergoing renovation or modernization to reflect changes in the educational system. And that is why educational administrators/managers complain of the gross inadequacy of the physical facilities available for academic and non-academic activities, majority of which are deemed architecturally obsolete, as they are no longer able to satisfy present needs or contribute to functional learning. In the bid to assess FM performance in higher education and check FM practices in higher education buildings in the USA, Amaratunga and Baldry (2000) and Lavy (2008), respectively, established that a structured and organized FM has the potential to improve the physical appearance and performance of a building facility and its systems, increase the users' level of satisfaction, and improve the efficiency of maintaining and operating it.

In a study conducted by Odediran *et al,* (2012) on the evaluation of maintenance practices among users of residential buildings in Nigeria, the authors found that most buildings do not have a maintenance manual, and the state of the economy was cited as a major factor affecting the poor practice of maintenance among users. Another study conducted by Adenuga *et al,* (2007) on factors affecting maintenance management of public buildings in Lagos, Nigeria, found insufficiency of funds for maintenance programs as the most significant factor inhibiting FM practice in Nigeria.

b. Factors influencing FM practices

Lind and Muyingo (2012) have identified changing weather conditions and the lack of maintenance culture as factors behind the ageing and deterioration of educational buildings and equipment. Furthermore, the maintenance of new buildings and the renovation and modernizing of old ones requires considerable expertise and commitment of material and human resources (Odediran *et al.,* 2014). Unfortunately, most administrators/managers of educational facilities lack sufficient knowledge of facilities maintenance planning. As a result, they fail to integrate the maintenance of facilities into the general management, to the effect that maintenance takes place only when problems arise leading to breakdown of the existing facility. As Asiabaka (2008) noted, the major problem in FM is the lack of policy guidelines for infrastructure development for educational facilities. According to the 21st

Century School Fund (2005), there should be a policy agenda that will entail an increase in public participation in the aspect of facilities planning, improved maintenance and adequate and equitable funding of facilities.

c. Strategies for Improving Educational Facilities

An effective FM plan should begin with the educational policy that caters to individual needs in a dynamic and knowledge-based economy. The need of FM for facilities in tertiary institutions cannot be overemphasized. In line with Asiabaka's (2008) thoughts, management has the responsibility to ensure that FM of facilities is a collective effort and the management processes involve planning, organizing, decision-making, leading, coordinating and controlling. Consequently, the expanded educational goals and objectives arising from changes occasioned by by socio-economic development demand the involvement of all concerned in the FM process. Informed inputs of experts and stakeholders, as well as collaborative efforts will trigger new ideas and perspectives on FM. Hence, an effective FM plan must be an integral part of the institution's overall master-plan that includes budget priorities for FM. Facility managers increasingly face challenges of planning and adapting the existing building facilities not only to meet educational requirements, but to also maintain them to achieve the longest and most cost-effective life from the facilities (Lavy, 2008). Atkin and Brooks (2003) suggest the need for strategic planning which must be accorded priority for sustaining institutional facilities at all critical stages of their lifecycle. The plan proposed should encompass the assembling of relevant facts related to the institution's objectives, its needs and politics, a review of resources processes, systems and physical assets; while leveraging their attributes in terms of space, functions and utilization. Next is the solution stage where the criteria for judging options, evaluating them against institution's objectives are assembled, and FM strategy is developed.

This is closely followed by the last stage where an implementable plan is established incorporating the key elements of procurement training and communication (Atkins and Brooks, 2003). Amaratunga and Baldry (2000) assert that facility performance appraisal ought to be a formal and regular operation; and optimization of FM performance should leverage indoor environment to support the institutional goals and objectives in the effective, efficient and equitable manner. This way, FM will ensure that buildings, system supports and core operations all contribute to achieving business goals, despite changing conditions. Asiabaka (2008) recommends facility audit comprising a comprehensive inventory of educational facilities that creates a standard method for establishing baseline information of the components, policies and procedures of both new and existing facilities. This audit enables planners, managers and staff keep track of the facilities, their conditions, service history, maintenance needs and location, through which an organization is able to provide facts not guess work, that inform plans for maintaining and improving the facilities, and establish a baseline for measuring progress of facility maintenance; and allow in-depth analysis of product lifecycles to take place on a routine basis.

Ikediashi *et al.*, (2012) recommend the outsourcing of FM services in tertiary institutions because of its capacity to boost overall service delivery, coupled with its wide acceptance in tertiary institutions around the world. Global Outsourcing 100, 2010 cited in Ikediashi *et al.*, (2012) is reported by the International Association of Outsourcing Professionals to be worth US$1 trillion, with India leading the pack.

III. Research Methodology

This research was conducted in 2019 covering two public tertiary institutions i.e. University of Jos, located on the Plateau in Nigeria's middle belt; and Yaba College of Technology (or Yaba Tech) which is the oldest Polytechnic in Nigeria, reputed to have produced some of the brightest brains occupying strategic positions in the country. Yaba Tech, which began as Yaba Higher College in the year 1934, and later renamed Yaba Technical Institute, is located in Nigeria's south western state of Lagos State. It finally adopted the name Yaba College of Technology (Yaba Tech for short) in 1963. What became University of Jos was established in November 1971 from the satellite campus of the University of Ibadan (which is the first University in Nigeria; birthed in 1948). Both institutions were deliberately chosen by the author based on their rich history and the qualitatively built infrastructure supported by architectural masterpiece structures to validate their suitability for this research.

The research examines the FM practices in Nigerian public tertiary institutions, bolstered by the following research questions:

(i) What are the existing FM practices in Nigerian public tertiary institutions?

(ii) What are the factors impacting these FM practices?

(iii) What are the FM strategies available for improving the state of facilities in Nigerian public tertiary institutions?

Data was collected using questionnaires administered on staff of these institutions who are in charge of FM. Consequently, the target population comprised staff members working in departments/units charged with FM functions such as quantity surveyors, architects, engineers, builders, estate surveyors and valuers, etc. Their work schedule entails working in works and maintenance department, physical planning and development department/unit, power section as well as parks and gardens department. The random sampling technique was adopted to arrive at the sample size used to obtain the opinions of the respondents on the questions raised by the research. A total of 110 questionnaires were distributed, and 66 were retrieved (i.e. 60% response rate); which was considered adequate and subsequently used for analysis of data. This was facilitated by how the respondents answered the questions raised and how quickly they were returned for he purpose of analysis.

The questionnaire was developed from the literature reviewed; broken in two sections accompanied by a covering letter introducing the focus of research and instructions to be followed by the respondents. the first section contained demographic information about the respondents including

their designation, status, academic and professional qualifications, and work experience. The second part contained the questions raised under specific objectives of the research with closed responses based on a Likert scale of 1-5; where 1 and 5 represented the least and highest rank values, respectively. Copies of the questionnaires were administered to the various offices of the respondents. Data collected were analyzed using the descriptive and inferential statistics including percentages, mean score, and Analysis of Variance. Percentage was used to show the ratio of the responses among some of the demographic characteristics and personal profile of respondents, which include the category of their jobs, position, academic qualifications and work experience in the tertiary institutional system. And Analysis of Variance was used to ascertain the level of significance of the research constructs such as FM practices in use, factors impacting FM practices, and available strategies for improving the general state of educational facilities within the confines of this research.

IV. Interpretation of Results

Table I provides the demographic characteristics of respondents comprising employees of the tertiary institutions (University of Jos and Yaba College of Technology) in Nigeria and members of the different professional bodies practicing in the Nigerian construction industry. The professional bodies covered by the research include the Nigerian Institute of Quantity Surveyors, Nigerian Institute of Architects, Nigerian Society of Engineers, Nigerian Institute of Builders, Nigerian Institute of Estate Surveyors and Valuers, and other related bodies. The characteristics assessed include the different categories of their jobs, position, academic qualifications and professional bodies affiliated to, and work experiences within the tertiary institutional system.

Table I shows that 27 (40.9%) of the respondents are technical officers engaged in the services of the two tertiary institutions under review, while 21 (31.8%) occupy managerial positions in the system. This means there are more technical staff than managerial staff in the institutions. Furthermore, from the assessment of managerial officers, 14 (21.2%) of the staff are principal officers, 24 (36.4%) occupy senior managerial positions, and 20 (30.3%) are managerial (facilities) officers. As for the technical officers, 11 (16.7%) are chief technical officers, 12 (18.2%) are assistant chief technical officers, 15 (22.7%) and 26 (39.4%) are principal technical officers and senior technical officers respectively. This indicates that there are more experienced technical officers than managerial officers engaged in FM practices within the system.

Table I also examined the designation of the respondents, and shows that 22 (33.3%) are engineers, 10 (15.2%) are architects, 8 (12.1%) are estate surveyors and valuers, 7 (10.6%) are quantity surveyors; and 4 (6.1%) are builders; while 15 (22.7%) are of other allied professions working in the maintenance and works departments/units of the tertiary institutions. Table I also shows the highest qualifications of the respondents, with 8 (12.1%) as holders of Master of Science/Technology, 24 (36.4%) are holders of Bachelor of Science/Technology certificates, 26 (39.4%) hold Higher National Diploma/Post Graduate Diploma, and 8 (12.1%) are holders of National Diploma certificates. These array of academic qualifications buttresses the point that the respondents' information is reliable for the research work.

Furthermore, the level of professionalism of the respondents was ascertained, and the results in Table I shows that 17 (25.8%) were members of the Nigerian Society of Engineers (MNSE); similarly, 8 (12.1%), 6 (9.1%), 5 (7.6%) and 3 (4.5%) were members of Nigerian Institute of Architects (MNIA), Nigerian Institute of Estate Surveyors and Valuers (MNIESV), Nigerian Institute of Quantity Surveyors (MNIQS), and Nigerian Institute of Builders (MIOB), respectively. It is worth noting that 27 (40.9%) of the respondents belong to other allied professional bodies, and/or are not fully registered members of the professional bodies listed above. This means that majority of the respondents are affiliates of the various professional bodies, while the remainder are either under training or awaiting their induction into the different professional institutions. Lastly, the work experiences of the respondents was examined, and shows that 8 (12.1%) had garnered field experience above 30yrs, while 20 (30.3%), 28 (42.4%), and 10 (15.2%) had work experiences of 20-30yrs, 10-20yrs and below 10yrs, respectively.

FM practices in Tertiary Institutions

The method adopted over the years for the management of facilities by the two tertiary institutions selected for the research was appraised. The result in Table II shows that the FM practices in the tertiary institutions, ranked 'reactive' as the preferred FM practice with a mean score of 3.95; in second place was 'reliability-centered' practice with a mean score of 3.80; and in third and fourth place are 'predictive' and 'preventive' practices with 3.42 and 3.39 mean scores, respectively. The 'corrective' much like the 'proactive/planned' approach brought the rear with 3.27 and 3.23 mean scores, respectively. Sadly, as old and as historic both institutions are, their approach to FM practices is neither proactive or result-oriented. These tertiary institutions, much like most other tertiary institutions across the country, wait until facilities are non-functional before probable action is taken to restore them to their original state for use. This conclusion is based on the fact that the predominant FM practice is the 'reactive' approach based on the ranking shown in Table II. The level of significance of these practices was tested to show that the highest ranked practices are significant at $\rho \leq 0.005$. This finding does not tally with the argument projected by Price and Pitt (2011) that FM practice in organizations has grown from the traditional management approach of buildings to the more proactive approach. This failure conforms with the report presented by Lavy (2008) that organizations and institutions are yet to recognize how facility management can boost their business performance and success. This reality has been revealed by this research that despite the promise of optimum returns occasioned by proactive FM practice, Nigerian tertiary institutions are yet to adopt the innovative side to FM practices. This point is buttressed by Adewunmi *et al.,* (2009) who observed that the focus for FM of buildings

and infrastructure in Nigeria is mainly for investment purposes only.

TABLE 1. Demographic Characteristics of Respondents and Projects

Categories of Respondent	Frequency	Percentage (%)
Job Categories		
Managerial Officer	21	31.8
Technical Officer	27	40.9
Users	18	27.3
Total	66	100.0
Position of facilities managerial officer		
Chief officer	2	3.0
Assistant chief officer	6	9.1
Principal officer	14	21.2
Senior officer	24	36.4
Facilities officer	20	30.3
Total	66	100.0
Position of facilities technical officer		
Chief officer	11	16.7
Assistant chief officer	12	18.2
Principal officer	15	22.7
Senior officer	26	39.4
Facilities officer	2	3.0
Total	66	100.0
Designation of facilities managerial/technical officer		
Engineer	22	33.3
Architect	10	15.2
Estate surveyor and valuer	8	12.1
Quantity surveyor	7	10.6
Builder	4	6.1
Other allied professionals	15	22.7
Total	66	100.0
Professional qualification of facilities managerial/technical officer		
Member, National Society of Engineers (MNSE)	17	25.8
Member, National Institute of Architects (MNIA)	8	12.1
Member, National Institute of estate surveyors and Valuers (MNIESV)	6	9.1
Member, National Institute of quantity surveyors (MNIQS)	5	7.6
Member, National Institute of Builders (MNIOB)	3	4.5
Others	27	40.9
Total	66	100.0
Academic qualification of facilities managerial/technical officer		
MSc	8	12.1
BSc	24	36.4
HND/PGD	26	39.4
National Diploma	8	12.1
Total	66	100.0
Years of work experience of facilities managerial/technical officer		
Above 30 years	8	12.1
20 - 30 years	20	30.3
10 - 20 years	28	42.4
Below 10 years	10	15.2
Total	66	100.0

TABLE II. FM practices

FM practices	MS	Ranking	SD	F	Significance
'Reactive'	3.95	1	2.345667	5.704	0.001
'Reliability-centered	3.80	2	2.21117	5.601	0.002
'Predictive'	3.42	3	1.87759	4.738	0.004
'Preventive'	3.39	4	2.35486	3.760	0.014
'Corrective'	3.27	5	1.98736	6.893	0.003
'Proactive/planned'	3.23	6	1.89768	2.609	0.012

Factors impacting FM practice

Table III looked at the factors which influence the choice of FM practices often utilized by the tertiary institutions. Two factors, level of technology and state of deterioration of facilities emerged top of the pack with score of 4.25 each. This is no surprise going by the evaluation report of Nigerian Universities Commission (NUC, 2006) on state of infrastructure in Nigerian universities which revealed that physical academic facilities are in deplorable states. Asiabaka's (2008) study supports this finding by reporting that available facilities in most tertiary institutions are deemed obsolete even as many of them have gone beyond 50 years without any form of renovation or modernization despite changes occurring in the educational system over time. The author substantiated further that changes in weather conditions plus the lack of a maintenance culture result in the ageing and

continuous deterioration of educational buildings and facilities in Nigeria. Repairs take place only when problems arise leading to breakdown of the existing facility. This scenario was reflected even in developed economies through Kowalski's (1983) report which stated that educational facilities in the United States of America are not only ageing but also undergoing technological and societal changes. Rose *et al.,* (2007) through their more recent study of the United States' situation, confirmed that most of the educational facilities once conceived and built, more often than not, assume a life of their own; very long and permanent life, at that.

Other significant factors revealed by the research are problems associated with policies' implementation, funding/financing, age of facilities, obsolescence of facilities, attitude/misuse of facilities by end-users and poor maintenance culture with mean scores of 4.18, 3.97, 3.86, 3.74, 3.66 and 3.58, respectively. These findings are equally supported by previous studies conducted by Onifade (2003) who reports that overcrowding has led to the deterioration of the facilities installed; Asiabaka (2008) who asserts that overcrowding has resulted in overstretching the facilities provided because of incommensurate increase in the number of students as compared to the population of students originally planned for; Adenuga *et al.,* (2007) reported that maintenance management in public institutions in Nigeria has suffered from lack of funds over long periods, which explains why most of the older public facilities suffer general neglect. This report is supported by another report of a study conducted in Malaysia which found that maintenance performance is influenced by insufficient allocation of maintenance funding. In another study, Odediran *et al.,* (2012) ascertained that economy is a major influence on the practice of maintenance, worsened by a poor maintenance culture among users of facilities in Nigeria. As a matter of fact, the findings in Table III resonate with Asiabaka's (2008) report which identified array of factors responsible for influencing FM practice in Nigeria such as lack of policy guidelines for infrastructural development, lack of knowledge of managerial processes in connection, nonchalant attitude to decay of public facilities, dearth of trained personnel, lack of adequate skills as well as inadequate funding. This assertion is supported by a study conducted in some Asian countries by Chandrashekaran and Gopalakrishnan (2008) who found that insufficient funding and lack of a centralized information on the conditions of facilities affect FM practices pertaining to major repairs and replacement of ageing facilities.

TABLE III. Factors impacting FM practices

Factors	MS	Ranking	SD	F	Significance
Level of technology	4.25	1	0.75443	6.798	0.000
State of deterioration of facilities	4.25	1	0.75443	6.798	0.000
Policies' Implementation	4.18	3	0.64842	8.807	0.000
Funding/financing	3.97	4	1.14756	11.618	0.000
Age of the facilities	3.86	5	1.17078	10.541	0.000
Obsolescence of facilities	3.74	6	1.11786	9.087	0.001
Attitude/misuse of facilities by end-users	3.66	7	1.11854	8.845	0.002
Poor maintenance culture	3.58	8	1.09678	9.078	0.000
Private public partnership initiative	3.53	9	1.22675	10.778	0.000
Users' appreciation/knowledge of FM	3.24	10	1.12789	12.097	0.001
Policies guiding FM	2.81	11	1.33274	5.853	0.003
Size of plants/equipment	2.66	12	1.10682	6.901	0.015
Design scopes and concepts	2.64	13	1.29067	10.498	0.000
Knowledge of FM by the administrator	2.63	14	1.33245	12.089	0.000
Training and development of personnel	2.52	15	1.27483	7.528	0.052
Weather conditions	2.37	16	1.25268	5.166	0.007
Quality of components and materials	2.22	17	1.94256	6.662	0.008
Adequacy of information for FM	2.19	18	0.95492	4.984	0.101
Skill status of managerial/technical officers	2.18	19	0.83160	5.798	0.019
Administrator's human relations skills to-assemble and use relevant FM personnel	2.06	20	0.73305	2.267	0.088

TABLE IV. Criticality of factors influencing FM practices

Most critical factors	More critical factors	Least critical factors
Level of technology, State of deterioration of facilities, Policies' implementation, Funding/financing, Age of the facilities, Obsolescence of facilities, Attitude/misuse of facilities by end-users, Poor maintenance culture, and Public private partnership initiative.	*Users' appreciation/knowledge of FM, Policies guiding FM, Size of plants/equipment, Design scopes and concepts, Knowledge of FM by the administrator, Training and development o personnel.*	*Weather conditions, Quality of components and materials, Adequacy of information for FM, Skill status of managerial/technical officers, and Administrator's human relations skills to assemble and use.*

The bottom-ranked three factors listed in Table III are adequacy of information for FM, skills status of managerial/technical officers and administrator's human relations skills to assemble and use relevant FM personnel with MS of 2.19, 2.18 and 2.06, respectively. Based on submissions by respondents, these factors emerged bottom of

the pack because the applicability of these characteristics of the FM officers could have been influenced by the type of FM practice in use within the target tertiary institutions under review.

Further examination of the factors led to the classification of these factors on the basis of how critical they are to FM practices; i.e. most critical, more critical and least critical. Table IV provides a glimpse of how critical the factors identified *inter alia* are, by ranking the mean scores (MS). The *most critical* factors are those factors with MS that are not less than 3.50 on a rating scale of 5.00 (maximum). The *more critical* factors are those with MS ranging from 2.50 to 3.49; while the least critical factors are those with MS less than 2.50.

Steps towards improving FM practices

Table V provides insights into the strategies available for improving and enhancing conditions of facilities within tertiary institutions. From the list of strategies in Table V, outsourcing of technical personnel and enhancing managerial/objectives are the twin most preferred and widely used strategies in Nigerian tertiary institutions with a MS of 4.85 each. As shown, the 'outsourcing strategy' was so ranked because major components of these facilities are procured abroad and installed by experts with the wherewithal to handle critical components of the facilities. Unfortunately, most of the present day technical officers are lacking in the requisite skills required to handle these components. hence, whenever there is a need for repairs outsourcing the expertise needed becomes a necessity, which according to Ikediashi *et al.*, (2012) has the capacity to improve the overall service delivery in tertiary institutions. The authors added that the practice is gaining widespread global acceptance in higher institutions of learning. Enhancing the managerial goals and objectives of tertiary institutions is equally considered a key strategy for improving FM practices. Other potential strategies include inspection of facilities, FM planning, facilities auditing, evacuating damaged component and servicing, and replacement of equipment with MS of 4.73, 4.59, 4.34, 4.18 and 3.92, respectively. Interestingly, even with a high MS of 3.28 out of 5.00, 'strategic planning' emerged the least ranked factor. The level of significance of these strategies was tested and all found to have significance of $\rho \leq 0.005$. These outcomes are supported by earlier studies conducted by Pathirage *et al.*, (2008) who reports that the formulation of an FM strategy, implementation of techniques and performance evaluation are imperative in the management of knowledge as it pertains FM in organizations. Lavy (2008) revealed that facility managers are often confront challenges of planning and adapting existing buildings to meet educational requirements and maintaining same to meet long and most cost-effective lifespan. In Sweden, Lind and Muyingo (2011) found that there are many uncertainties which affect the planning of building maintenance such that they make detailed, long-term plans meaningless.

TABLE V. Steps towards improving FM practices

Steps for improving FM Strategies	MS	Ranking	SD	F	Significance
Outsourcing of technical expertise	4.85	1	1.98755	2.786	0.001
Enhancing managerial goals/objectives	4.85	1	2.03701	13.189	0.000
Inspection of facilities	4.73	3	1.29045	8.576	0.003
FM planning	4.59	4	1.77980	2.754	0.001
Facilities auditing	4.34	5	1.88778	7.817	0.046
Evacuating damaged component	4.18	6	1.90217	7.565	0.092
Servicing and replacement of equipment	3.92	7	2.11023	13.278	0.000
Strategic planning	3.28	8	1.14596	11.286	0.000

Asiabaka (2008) found that the expanded educational goals and objectives of tertiary institutions have necessitated the involvement of more informed and expert views from a broad range of knowledge in the FM process which have ushered into FM new ideas and perspectives. He adds that an FM plan must begin with the educational philosophy that serves the needs of individuals in a dynamic and knowledge-based economy. He concluded by asserting that without accurate information, made possible through facility audit planning of managerial officers, FM will be needless and meaningless. Dror (1967) had earlier established that an FM plan must be an integral part of the overall institutional master plan which must include budget priorities for FM. According to Planning Guide for Maintaining School Facilities (2003), facility audit is a rich source of information on the status of educational facilities which will assist facilities officers carry out periodic planning and aid them in taking appropriate steps from time to time. Whitford (2006) found that an understanding of the existing conditions of the systems and components of buildings is a critical aspect of FM; which as explained by Kaiser (1989), is because FM is a process that is used to evaluate and report the condition of buildings, facilities, utilities and equipment. As a matter of fact, Marteinson (2003), Toro (1995) and Setzer and Zuschlag (1995) stated that a complete facility assessment report contains information on the existing conditions of the facility, residual service life of its components, funding details related to short and long-term maintenance and renewal forecasts and recommendations. For institutional facilities to be sustained, Atkin and Brooks (2003) stress that strategic planning must be accorded priority.

FM consists of technical and managerial strategies; where the technical strategy caters for the practical aspects of damages and deterioration on the facilities, while the managerial strategy takes care of policies that guide technical personnel at any point in time. This probably explains why *'enhanced managerial goals and objectives'* was rated so highly, tying in first position with *'outsourcing of technical expertise'*; implying that if the managers fail to improve their goals and objectives of enhancing facilities, the technical

officers will have no sense of direction in their operations. It is therefore imperative for FM managers to formulate time-bound goals and objectives that will continually enhance the conditions of facilities and FM practice for optimal results.

The third ranked strategy in Table V is 'inspection of facilities' which is a technical function. This strategy will enable managerial officers know the state of facilities at all time, and assist them to formulate time-bound policies for institutions. The saying: 'he who fails to plan, plans to fail' resonates here in the sense that FM plans are essential to improving FM practices in organizations. A management plan is required to guide technical and managerial officers navigate the expectations in terms of the performance of facilities in the organization over a period of time.

Facilities auditing entails the assessment of the state of facilities for the purpose of determining the necessary steps to be taken to improve condition of facilities. This is a critical step that helps to make FM activities both productive and relevant. Otherwise damage to facilities could get to point of non-repair, thereby crippling the component and affecting the overall performance of the system. In the unfortunate event of this happening, removal of the defective component maybe a way of sustaining the efficacy of facilities in the organization. Lastly, strategic planning is important because the methodology involved in the management of components may differ from facility to facility; hence FM managers must be proactive as they set goals and plan efficient FM practices.

V. CONCLUSIONS

This research has established the existence of a direct relationship between how educational facilities function and the quality of knowledge acquired by the students under given conditions of the facilities within which they operate. The research examined FM practices being utilized by Nigerian tertiary institutions. It found that tertiary institutions have more technical than managerial officers with the requisite skills, knowledge and experience in FM. it discovered that the officers responsible for FM have adequate academic qualifications, many of whom are registered members of various reputable professional bodies. Majority of these technical and managerial officers have work experience of 10 years and above. The research found that the predominant FM approach adopted for use by most tertiary institutions in Nigeria for the management of educational facilities is the 'reactive' FM practice. And this is the case irrespective of how old the facility is. Sadly, but not surprising, the proactive approach which is more result-oriented is the least used by most tertiary institutions in the country. Similarly, the study found that the most critical factors which influence the adoption of result-oriented FM practices are level of technology, state of deterioration of facilities, poor implementation of policies and poor funding, among others. Assessment of the possible strategies that could be harnessed by facility managers to enhance the conditions of facilities in tertiary institutions recommends the outsourcing of technical expertise (or personnel). Other significant strategies include enhancing managerial goals and objectives, productive inspection of facilities, the formulation of time-bound FM plans, the provision of guidelines for audit of facilities that will provide timely information for maintenance, and evolving strategic plans and alliances that will facilitate improvement of the conditions of facilities in Nigerian tertiary institutions.

In collaboration with existing literature, this research concludes that FM practice in Nigerian tertiary institutions is still shallow, not proactive or preventive as should be the norm. Action in respect of maintenance is taken mostly after facilities have broken down and in need of repairs. As a result, most of educational facilities in the country are obsolete and/or in deplorable conditions. FM practices face stiff challenges of poor funding, and there is a general lack of FM policies, and where they exist, there is the problem of implementing the policies in the management system of Nigerian tertiary institutions. The approach to FM is generally *ad hoc* in nature in our higher institutions of learning.

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