

CHALLENGES TO THE ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN BUILDING MAINTENANCE IN NIGERIAN INSTITUTIONS – A CASE STUDY OF FEDERAL POLYTECHNIC, OKO

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Abstract: The upkeep and maintenance of educational buildings play a crucial role in ensuring longevity and sustainability. It is imperative to prioritize the maintenance of these resources to uphold the quality and functionality of the educational environment. Therefore, the maintenance level of educational buildings is very critical to the educational effectiveness and sustainability. However, despite the crucial role of these structures in the educational advancement and growth of the economy, the use of ICT in the maintenance of buildings in developing countries, particularly South Eastern, Nigeria remains below standard. Presently, there is limited or no research/data in Nigeria to assess how extensively the use of ICT in Facilities Management in Public Institutions. The aim of this research is to investigate the level of utilization of ICT tools in the maintenance of buildings in Federal Polytechnic, Oko, Anambra State with a view to improving the applicability of ICT tools in maintenance of building. The research adopted both the quantitative and qualitative methods where questionnaires and interviews helped elicit responses from the fifty-one (51) staff of the works and services department in the Polytechnics. Furthermore, the study reveals that the barriers to the utilisation of ICT tools in maintaining buildings include complexity of the ICT tools and more. The study strongly advocates that the school management should consider the adoption of ICT into the management of their facilities for optimal efficiency, effectiveness and sustainability

Keywords: educational buildings play, educational environment, Public Institutions, Federal Polytechnic.

1. INTRODUCTION

Over a building's lifespan, one key concept that cannot be avoided is maintenance as the building will certainly suffer defects overtime and will deteriorate to a terrible state if not properly maintained. As such, in order to keep buildings in a good condition at all times and in a state where they can always fulfill their intended purpose, they require constant maintenance. There is no exception to this requirement for public structures.

Regular maintenance is necessary to preserve the longevity and convenience of use of public buildings, given the large number of users that access and utilize them on a daily basis, as well as the large amount of revenue generated by state institutions (Ayokunle, *et al.*, 2024). A substantial percentage of a nation's investment goes toward infrastructure. For these facilities, which include public buildings, to fulfill the architectural and aesthetic goals for which they were designed, it is crucial that they are kept in good condition (Akadiri, *et al.*, 2012).

Oladimeji (1996) defined maintenance as the culmination of all the actions taken to keep something in or return it to a suitable condition. According to Onwuka (1989), maintenance management is the process of organising and managing building resources to guarantee that required renovations and repairs are completed as cheaply and efficiently as possible.

An important characteristic of a developed nation is its well-planned infrastructure development and maintenance, as this is crucial to the socioeconomic development of any nation. In light of this, many developed countries have well-maintained infrastructure that they rely on to support their economies. Hence, these countries take pride in maintaining their infrastructure and rely on it to draw tourists and generate income (Cobbinah, 2010). However, the case is different in Nigeria, as public buildings in the country are faced with continuous abandonment, hence, putting it in a deplorable state.

Unfortunately, most of the projects are left in a deplorable state as confirmed by Okolie (2011) that most buildings in most campuses across the higher education in south eastern Nigeria are in a deplorable condition due to lack of proper maintenance approach. In Nigeria, there are numerous expensive construction projects underway. This means that in order to avoid having a negative impact on the infrastructure, construction management techniques must receive careful consideration on the use of ICT. Maintaining educational structures is necessary to create an atmosphere that fosters creative teaching, learning, and research (Lateef, *et al.*, 2010; Olanrewaju and Anifowose, 2015). But, officials don't seem to care about maintaining existing buildings, rather, there is an increase in construction of new buildings, while letting the old buildings become dilapidated and neglected (Yusuf, 1998; Odediran, 2012).

Additionally, Adenuga (2010), assert that structural and aesthetic damage to public buildings in Nigeria is extremely bad and in disrepair. Adejimi (2005) blamed poor or nonexistent building maintenance for the high number of abandoned and epileptically operating facilities in Nigeria.

On the other hand, studies carried out by Lateef *et al.* (2010), unveils and confirmed that there is a strong correlation between the effectiveness of educational buildings and the standard of education, because buildings are essential to tertiary institutions' ability to achieve their desired outcomes. In order to foster an environment that supports and encourages teaching, learning, innovation, and research, institutional buildings need to be properly maintained. This shows that it is extremely important that buildings in the institutions need to be kept in a safe condition and maintained properly at all times, in a bid to achieve a good study environment. Sadly, this is not the case as the traditional method of maintenance has seem to fail. In the traditional method, sometimes, due to a communication breakdown between the maintenance department, building users, designers, and building owners, maintenance-related issues reported by building owners do not reach the appropriate parties (Aris, 2006). The intended party is unaware of the issue in this scenario. Issues like this form one of the many reasons to consider weaving information and communication technology into the very fabrics of building maintenance in Nigerian institutes.

Moreover, all sectors in the world are witnessing a paradigm shift, from a traditional way of doing work to a computerized way of working, which the construction industry is not left out. This paradigm shift is made possible through technology. Technological development around the world is having an aesthetic effect on the construction industry (Odediran, 2002). These innovations of new technologies to the maintenance of public buildings are a beauty to behold if fully adopted. ICT has proven to be a vital tool in assisting the construction industry to cope with the increasing complexity of its products as well as the increasing demands of its clients and regulators and to enhance construction productivity (Liston, *et al.*, 2000).

According to Oloruntoyin and Adeyanju (2013), Information and Communication Technology (ICT) is a vehicle with great potential to improve or accelerate the developmental process of any developing nation. ICT can be seen as a system within a specialized framework to achieve particular tasks or objectives. Interestingly, the level of technologies available in today's marketplace is enormous, and the adoption of such technology in developed worlds for maintenance has moved from infancy to adequate (Lofgren, 2006).

Based on the variables discussed above, this study is therefore *aimed at* unraveling the level of adoption of ICT in Federal Polytechnic, Oko and also assess the challenges affecting the adoption of ICT in building maintenance processes in Nigeria. The objectives are to identify the ICT tools available for usage in building maintenance at the institution and to also unravel the challenges and barriers to the adoption of ICT for the purpose of building maintenance in the institution.

1.1 Problem Statement

All construction projects such as Institutional, commercial, and residential buildings require regular and effective maintenance in order to achieve the purpose and aim for which it was constructed and to aid sustainability. Ofide, Jimoh and Achuenu, (2015) observes that higher education institutions in Nigeria such as universities and polytechnics battle with the preservation of existing buildings within the campuses. The employments of ICT in the maintenance of building projects have the tendency of increasing the rate of information and communication processed in order to aid effectiveness. However, despite all of these advantages of ICT, the study found that the majority of Nigerian public institutions, including Federal Polytechnic, Oko, focus primarily on using the traditional technique of maintenance. The use of the conventional method for maintenance practice in many public institutions has been proven to be inadequate and insufficient due to the rate of deterioration and dilapidation observed in many schools Okolie (2011). On this note, this study tends to investigate the challenges affecting the use of ICT for building maintenance in the study area.

1.2 Aim and Objective

The aim of this research is to investigate the level of utilization of ICT tools in the maintenance of buildings in Federal Polytechnic, Oko, Anambra State with a view to improving the applicability of ICT tools in maintenance of building. The objective is to investigate the challenges affecting the use of ICT tools in the maintenance of buildings in the study area

2. LITERATURE REVIEW

Information and communication technology has an effective role in creating a suitable environment and increasing safety and security in buildings. Information technology is a technology that employs computers to gather, process, process, store, protect, and transfer information (Kuo, 2011). Zul-Atfi and Narimah, (2010), revealed in their research on the implementation of ICT for building maintenance, that ICT in maintenance management can be grouped into three areas named;

- i. General Software maintenance tools.
- ii. Information Technology-based systems tools.
- iii. Database maintenance tools.

In their review, Kans & Williamsson, (2010); Zulkarnain and Zawawi, (2011) went further to categorize the three areas as follows

- i. General software; word processor, spreadsheet, project management, and AutoCAD.
- ii. IT-based systems are Building Management Systems (BMS), Computerised Maintenance Management Systems (CMMS), Computer-Aided Facility Management (CAFM), Facility Management Information Systems (FMIS), Integrated Workplace Management Systems (IWMS), Building Information Model (BIM), and Internet of Things (IoT).
- iii. Database management system; electric meter reading database, water meter reading database, maintenance request details database, and Heating, Ventilation, and Air Conditioning (HVAC) system log sheet database.

Despite the good demand and growth of utilization of ICT in building Maintenance in the country, there are still challenges to adoption of the technology. The main barriers to the adoption of ICT in building construction are often categorized as technical, administrative, and societal. Among the technical barriers are complexity, interoperability, and reliability, the social challenge is the 'fit', which is the capability of ICT building technologies and services to be integrated into the design, lifestyle, and general sense of home (Balta-Ozkan *et al.* 2013). However, bribery, inadequate funding, corruption, and occupants' improper use of facilities have made regular maintenance difficult in Nigerian institutions (Adenuga, 2010).

Belonwu, *et al.*, (2022) highlight some of the barriers to the use of ICT as: Computer Literacy, Financial Barriers: General lack of finance, high cost of ICT investment, maintenance cost, Organizational Barriers: Lack of business incentives, poor

ICT strategies, lack of training, lack of appropriate ICT support, People Barriers: Lack of personal incentives, lack of education/training/continuous professional development, cultural issues, Technology Barriers: Difficulties in using new technologies, lack of support from ICT Providers or ICT; Legal Barriers: Risks for liability, lack of legal support for use of ICT, security of ICT transactions, other issues for electronic information and documentation (Zachiang, 2017). They also listed other problems such as; the high cost of hardware and software, fear of virus attacks, high cost of employing computer professionals, fear of ICT making professionals redundant, and inadequate ICT content in construction education. Okafor, Ugwu and Nwoji (2018) identifies the following as the problems confronting the effective maintenance of buildings at the University of Nigeria, Nsukka: Lack of maintenance policy, Inadequate provision of funds for maintenance, Lack of timely response to a maintenance request, Poor maintenance work done by the maintenance unit of the institution, Corruption, Lack of experienced and well-trained building maintenance engineer,

Misuse of facilities by occupants, Change of government, Over-crowding, Poor architectural/structural design.

Ofide *et al.*, (2015) notes that funds are not always sufficient for maintenance works. Maintenance is only carried out subject to the availability of funds which automatically puts off cyclical maintenance until when funds are available to perform the tasks. Furthermore, they found out that most of the maintenance departments in the higher education institutions in Niger state do not conduct user satisfaction surveys; 83.3% do not follow maintenance standards in carrying out maintenance works; 33.3% combine both the use of telephone and memo writing as media for complaints and maintenance calls and that most of the institutions do not have maintenance manuals for their buildings. Over 80% of the institutions studied by Ofide *et al.* (2015) adopted reactive and corrective approaches to maintenance.

From the findings of Ofide, *et al.*; (2015), the following were identified as the threats to effective building maintenance management in public universities: Inadequate funds, shortage of staff (professional & tradesmen), users delay in reporting maintenance problems, electrical power fluctuation, lack of maintenance culture/misuse of building facilities by users, bottlenecks/loopholes in management, from the review, the following are the constraints to the adoption of ICT in building maintenance.

3. METHODOLOGY

The Federal Polytechnic, Oko is situated within Oko town in Orumba North Local Government of Anambra State. At inception in 1979, the institution was approved by the Anambra State Government as a College of Arts and Science designed to prepare candidates for the General Certificate in Education (GCE) examination at both the ordinary and advanced levels. On June 28,

1980, the institution was upgraded to the College of Arts, Science, and Technology, an elevation that made it more attractive to young school leavers who came in droves to seek the higher certificate that the College could then award. The College was formalized as the Anambra State Polytechnic, Oko through Edict No. 12 of 1985, published as a supplement to the Anambra State of Nigeria Gazette No. 24, Volume 10 of June 27, 1984. Finally, in 1993, the State Polytechnic was taken over by the Federal Government and was renamed Federal Polytechnic, Oko.

The study considered staff of the works and services department in the institute as they are the major individuals involved in the management of facilities, the questionnaire was shared to 51 staff of the works and service department and 8 of them were also interviewed. The variables of the questionnaire include demographic data on respondents, the ICT tools available for usage in building maintenance and challenges that affect the use of ICT in the maintenance of buildings in the institute. Data gathered were analysed through the SPSS 23 software with the use of descriptive methods statistical tools.

4. RESULTS AND INTERPRETATION

Table 1: Sex Distribution

Sub – Tittle	Frequency	Percentage (%)	Valid Percentage (%)
Male	40	78.4	78.4
Female	11	21.6	21.6
Total	51	100.0	100.0

Source: Field work 2023

Table 1 above indicates that majority of the respondents were male with 78.4% response rate while 21.6% of the respondents were female. This implies that the male respondents are more than the female respondents. This gender imbalance will not in any way affect the result of this study because majority of heads of department and staff of the works and service department in the school are male and building maintenance as a whole is mostly dominated by males in all parts of the world.

Table 2: The Age Distribution

Sub – Tittle	Frequency	Percentage (%)	Valid Percentage (%)
31 - 40 years	10	19.6	19.6
41 - 50 years	22	43.1	43.1
51 - 60 years	19	37.3	37.3
Total	51	100.0	100.0

Source: Field work 2023

The table 2 shows the age bracket of the respondents. 19.6% of the respondents were between the ages of 31 – 40 years while respondents between the ages of 41 – 50 years were the majority with response rate of 43.1% and 37.3% of the respondents were between the ages of 51 – 60 years. It is key to note that the questionnaire for this work was shared specifically among stakeholders in the school, from the heads of department to the staff in the works and services department, hence this age gap represents the age of the various stakeholders in this category.

Table 3: Highest Level of Education Attained

Sub – Tittle	Frequency	Percentage (%)	Valid Percentage (%)
HND	17	33	33
B.Sc.	25	49	49
M.Sc.	8	16	16
Ph.D.	1	2	2
Total	51	100.0	100.0

Source: Field work 2023

The table 3 shows that up qualification of the respondents. 33% of the respondents were HND holders, 49% were B.Sc. holders while 16% were M.Sc. holders and 2% being Ph.D. holder is the Director of the Works and Service Department . It can be assumed that the HND and B.Sc holders here are the technical staff from the works and service department while the M.Sc. were majorly the heads of various departments.

Table 4: Years of work Experience

Sub – Tittle	Frequency	Percentage (%)	Valid Percentage (%)
6 - 10 years	23	45.1	45.1
11 - 15 years	14	27.5	27.5
16 - 20 years	14	27.5	27.5
Total	51	100.0	100.0

Source: Field work 2023

The table 4 indicates that 45.1% of the respondents have been working in the institution for 6 – 10 years and 27.5% have been working in the institution for 11 – 15 years while 27.5% have been working in the institution for 16 – 20 years. This will strengthen the result of the study since majority have spent 16-20 year, they are equipped with valuable information needed for the research work.

Table 5: ICT Tools in Building Maintenance

S/N	ICT Tools	Tools Application	Very often(%)	Often (%)	Sometimes(%)	Rarely (%)	Never(%)
1	Computer Aided Facility Management Such as Mobile Phones, MS words, Spread sheets.	They are used for communication, correspondence, presentations, and recordkeeping purposes. It also helps to plan, execute and monitor all activities involved in reactive and planned preventative maintenance, space and move management, asset management, operational facility etc.	19 (37.3)	11 (21.6)	11 (21.6)	10 (19.6)	-
2	Building Management Systems (BMS)	It monitors, supervises, controls and reports on smart building technology systems. These systems may include access control, video surveillance, fire alarms, HVAC control, programmable lighting and electric power management.	- (0)	- (0)	- (0)	8 (15.7)	42 (82.4)
3	Computerized Maintenance Management System (CMMS)	This software solution allows a maintenance manager to oversee the maintenance histories and real-time conditions of assets and then automate tasks like maintenance scheduling, inventorying, work order fulfillment, and auditing. It helps optimize the utilization and availability of physical equipment like vehicles, machinery, communications, plant infrastructures and other assets.	- (0)	- (0)	- (0)	- (0)	51 (100)
4	Building Automation System (BAS)	The core functionalities of BAS are its control and operation system based on an occupancy schedule, proper functioning of the HVAC, elevators, fire prevention, security and other critical systems in the building.	- (0)	- (0)	- (0)	- (0)	51 (100)
5	Building Information Modeling (BIM)	It can be used for planning, design, construction, and operation of the facility. It helps architects, engineers, and constructors visualize what is to be built in a simulated environment to identify any potential design, construction, or operational issues.	- (0)	- (0)	2 (3.9)	3 (5.9)	46 (90.2)
6	Internet of Things	IoT devices in the form of wearables and smart device make work easier, construction sites can also use it to monitor their materials. Concrete sensors are one of the most prominent examples. By placing connected sensors in concrete, construction teams can remotely check in on the curing process or see if it needs repair.	- (0)	- (0)	- (0)	- (0)	51 (100)
7	Augmented Reality (AR)	AR technology can also be used for building maintenance and repair. By overlaying digital information onto physical objects, maintenance workers can quickly identify equipment and access information about maintenance procedures.	- (0)	- (0)	- (0)	- (0)	51 (100)
8	Artificial Intelligence (AI)	AI could be used to analyze data from building systems to optimize energy efficiency, indoor air quality, and other performance metrics. Simulating building efficiency with AI, for instance, allows the identification of potential energy-depriving areas for better design and construction.	- (0)	- (0)	- (0)	- (0)	51 (100)

Source: *Field work 2023*

Table 5 shows the responses from the heads of departments and staff of the works and services department in Federal Polytechnic, Oko. According to the above table, computer aided facility management such as mobile phones, MS words, spread sheets are used very often with an availability rate of 66.7% while 33.3% of the respondents also stated that computer aided facility management are used often. This implies that the use of MS words, spread sheets, and mobile phones for maintenance related issues are very often.

Furthermore, 80% of the respondents stated that Building Management System (BMS) has never been used in the institute while 20% stated that it is rarely used. 66.7% of the respondents also stated that Building Information Modelling has never been used for the purpose of building maintenance in the institute. 33.3% of the respondents stated that it is rarely used.

All of the respondents (15) agreed that computerized maintenance management system (CMMS), building automation system (BAS), internet of things, augmented reality and artificial intelligence have never been used for maintenance of the school buildings.

Table 6: Challenges Affecting the use of ICT Tools in the Maintenance of Buildings

S/N	Challenges	Strongly Agree (%)	Agree (%)	Undecided(%)	Disagree(%)	Strongly disagree (%)
1	Complexity	14 (27.5)	26 (51.0)	5 (9.8)	6 (11.8)	- (0)
2	Interoperability	4 (7.8%)	30 (58.8)	12 (23.5)	5 (9.8)	- (0)
3	Reliability	- (0)	13 (25.5)	14 (27.5)	16 (31.4)	8 (15.7)
4	Poor ICT strategies	7 (13.7)	16 (31.4)	11 (21.6)	15 (29.4)	2 (3.9)
5	Fear of ICT glitches	- (0)	25 (49.0)	7 (13.7)	19 (37.3)	- (0)

6	Poor architectural design	- (0)	4 (7.8)	14 (27.5)	26 (51.0)	7 (13.7)
7	Cost	7 (13.7)	26 (51.0)	11 (21.6)	3 (5.9)	4 (7.8)
8	Education	2 (3.9)	9 (17.6)	13 (25.5)	20 (39.2)	7 (13.7)
9	Finance	2 (3.9)	37 (72.5)	6 (11.8)	6 (11.8)	- (0)
10	Security of ICT	2 (3.9)	10 (19.6)	14 (27.5)	16 (31.4)	9 (17.6)
11	Lack of Legal support for ICT	7 (13.7)	11 (21.6)	15 (29.4)	18 (35.3)	- (0)
12	Lack of proper policy	- (0)	26 (51.0)	12 (23.5)	13 (25.5)	- (0)
13	Fear of ICT making professional redundant	- (0)	23 (45.1)	17 (33.3)	11 (21.6)	- (0)
14	Corruption	- (0)	29 (56.9)	9 (17.6)	13 (25.5)	- (0)
15	Regular Change in Management	3 (5.9)	19 (37.3)	7 (13.7)	15 (29.4)	7 (13.7)
16	Lack of Awareness	- (0)	9 (17.6)	12 (23.5)	23 (45.1)	7 (13.7)

Source: Field work 2023

Table 6 shows the technical, administrative and societal challenges of ICT in building maintenance. With regards to the technical challenges; complexity, interoperability, reliability, poor ICT strategies, fear of ICT glitches and poor architectural design were considered. For complexity, 33.3% of the respondents strongly agreed, while 66.75% agreed. With regards to interoperability, 26.7% strongly agreed, 26.7% also agreed while 46.6% were undecided. With regards to reliability, 60% of the respondents agreed while 13.3% were undecided and 26.7% disagreed. On Poor ICT strategies, 60% strongly agreed, while 40% agreed. On the fear of ICT glitches, 60% agreed while 13.3% disagreed and 26.7% strongly disagreed. On poor architectural design, 20% were undecided, 66.7% disagreed while 13.3% strongly disagreed.

With regards to the administrative challenges; cost, education, finance, security of ICT, and lack of legal support were considered. In the case of the cost, 66.7% of the respondents strongly agreed while 33.3% agreed. On education, 13.3% of the respondents strongly agreed, 26.7% agreed, 6.6% were undecided while 53.4% disagreed. For finance, 20% strongly agreed while 80% agreed. On security of ICT, 13.3% strongly agreed, 20% agreed while 66.7% disagreed. On lack of legal support for ICT, 20% strongly agreed while 80% agreed.

With regards to the societal challenges; lack of proper policy, fear of ICT making professionals redundant, corruption, regular change in management and lack of awareness were considered. For lack of proper policy; 20% strongly agreed, 80% agreed. On fear of making professionals redundant, 13.3% agreed while 86.7% disagreed. On corruption, 13.4% strongly agreed, 33.3% agreed, 20% were undecided, 20% also disagreed while 13.3% strongly disagreed. On regular change in management, 13.3% of the respondents agreed while 86.7% disagreed. On lack of awareness, 13.3% strongly agreed, 20% agreed while 66.7% disagreed.

5. DISCUSSION

The Discussion of findings on this study will be done based on the objectives of the study.

5.1 Existing information communication technology tools available for the maintenance of buildings in Federal Polytechnic, Oko

The study considered various ICT tools used in the maintenance of buildings in a bid to identify the exact tools used in the Federal Polytechnic, Oko. The findings of this research unraveled that generally there is a low availability of ICT tools being engaged for the maintenance of buildings in the institute as tools such as computerized maintenance management system (CMMS), building automation system (BAS), internet of things, augmented reality and artificial intelligence were never used for maintenance of the school buildings. A huge majority of the respondents also stated that building management system (BMS) and Building Information Modelling were never used too, while a very low percentage stated that it is even rarely used. The most used ICT tools in the study area were mobile phones, MS words and spread sheets (computer aided facility).

5.2 Challenges affecting the use of ICT tools in the maintenance of buildings in Federal Polytechnic, Oko

Findings of this study had unraveled that there is a low availability and utilisation of ICT tools for the purpose of building maintenance, hence, this section proceeds to understanding the challenges that has limited the availability and use of these tools in the study area. Furthermore, these challenges were divided into 3 sections namely technical, administrative and societal challenges.

The technical challenges identified included complexity, reliability, poor ICT strategies, and fear of ICT glitches. The administrative challenges identified included the cost of these ICT tools, the inability of the institute to finance its procurement and a lack of legal support. The societal challenges identified included lack of proper policy and corruption.

The findings of this study affirm that of studies from Belonwu *et al.*, (2022) who identified barriers such as lack of finance, high cost of ICT investment, maintenance cost, poor ICT. Furthermore, the study aligns with that of Okafor, *et al.*, (2018) who asserted that lack of maintenance policy, corruption and change of government are the major causes of public building deterioration at the University of Nigeria, Nsukka.

6. CONCLUSION

The study investigated the level of utilisation of ICT tools in the maintenance of buildings in Federal Polytechnic, Oko, Anambra State with a view to improving the applicability of ICT tools in maintenance of building and management practices. The research employed a quantitative research method in its findings, as fifteen (15) questionnaires were shared particularly to the staff of works and services department in the institute.

Based on the findings of the study, the following conclusions can be made: that the use of ICT tools for the maintenance of buildings are extremely poor as most of the tools have never been used in the study area. The only ICT tools in use are MS words, spread sheets, and mobile phones for building maintenance related issues. The study further concluded that the barriers to the utilisation of ICT tools in maintaining buildings in the Federal Polytechnic, Oko are complexity, reliability, poor ICT strategies, and fear of ICT glitches, the cost of these ICT tools, the inability of the institute to finance its procurement, lack of legal support, lack of proper policy and corruption.

7. RECOMMENDATION

Based on the findings of the study, the following recommendations were made:

- i. The institution needs to adopt the usage of ICT tools in the maintenance of their buildings.
- ii. Building users should be oriented on how to imbibe a healthy maintenance culture.
- iii. Carrying out regular building surveys should be done as this would help in identifying a defect at infancy stage and get it tackled immediately before it gets worse.
- iv. The school management should improve on the budget allocation for building maintenance and should as well encourage more of in-house execution of maintenance works as it proves cost effective.

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