



# Evaluation of Challenges of Maintenance Management of Commercial Buildings in Awka, Anambra State, Nigeria

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## Abstract

The study focused on evaluating challenges associated with maintenance management of commercial buildings in Awka with a view to proposing strategies for improving maintenance. The summary of four relevant strategies and challenges surveyed from related literatures were examined and reviewed. Pertinent data were obtained through reconnaissance and questionnaire surveys conducted on a sample of 341 respondents. Data for the study were collected through well-structured questionnaire administered to the Property owners, Property managers and Occupants of 37 selected plazas for the study. The population of the study comprises of 1011 Occupiers of the plazas, 37 Property owners and 17 Property managers.. Relative Importance Index (RII) was used to determine the significance of each strategies and challenges based on the respondent's rating. From the analysis of maintenance strategies, corrective maintenance, preventive maintenance, action based maintenance and emergency maintenance framework ranked first, second, third and fourth respectively. Analysis of maintenance challenges high cost of maintenance, lack of finance, lack of input of facility Manager at the design stage, and adequate maintenance policy framework ranked first, second, third and fourth respectively. The findings revealed among others that there is lack of adequate maintenance policy in the plazas. The research recommends that there should be maintenance policy guiding maintenance management of the building and Landlords should adopt preventive maintenance system so as to have effective maintenance of commercial buildings

**Keywords:** challenges, maintenance, management, maintenance strategies and commercial buildings

## 1. Introduction

The high demand for office buildings and commercial facilities has attracted investment and witnessed the development of high rise commercial properties/facilities in all the capital cities in Nigeria of which Awka is not an exception. Olagunju (2012) stated that buildings cannot remain new throughout their entire life and maintenance problems start to creep in once building projects are completed and maintenance are carried out on them in order to sustain the performance of the buildings and keep them in good condition. Adenuga and Iyagba (2008) opined that it is impossible to produce buildings which are maintenance free, but maintenance work can be minimized by good design and proper workmanship carried out by skilled experts or competent craftsmen using suitable codes of installation, requisite building materials and methods. However, to achieve excellent performance and yield maximum value on investment of commercial buildings, it requires proper maintenance management (Emma and Syahrul, 2009). British Standard Institute BS (2006) defines maintenance to be "the combination of all technical, administrative and managerial actions intended to retain an item or restore it to a state in which it can perform its required function". Yahya and Ibrahim (2011) opined that maintenance management refers to how well a building is maintained. Building maintenance management is an action which involves interacting or blends of technical, social, legal and economic elements that governs and manages the use of buildings (Francis and Lee 2001). It is a well-known fact that the primary objective of building maintenance is to preserve buildings in their initial functional,

structural and aesthetic states. This is to ensure that they continue to remain in such state and retain their investment value over a long period of existence (Adejimi, 2005; Ipingbemi, 2010).

Odediran, Opatunji and Eghnure (2012) opined that the ability of a building to provide the required environment for a particular activity is a measure of its functionality. Therefore as the components of a building begins to deteriorate, it becomes necessary to take measures to ensure that the desired characteristics of that facility which provides safety and convenience are retained. Commercial buildings are relatively complicated in maintenance management and carrying out maintenance on these facilities comes with serious problems and challenges such as high cost of maintenance, adequate maintenance policy framework, lack of finance, minimal or lack of input of facilities managers during the design stages (Timilli 2014; Ometehinshe, Dabara, & Guymu, 2015). Maintenance strategy in general includes Corrective, Preventive or Condition based maintenance. Work carried out in expectation of failure is referred to as preventive maintenance, and those carried out for restoring after failure is referred to as corrective maintenance (Waziri and Vanduhe, 2013). However there are different views on choosing appropriate maintenance strategy. Among various maintenance strategies, the effectiveness of planned preventive maintenance (PPM) is more challenged by the top management (Loosemore and Hsin, 2011).

This therefore presents the need for studying challenges of maintenance management of commercial buildings in Awka with the view to proffering strategies for improving maintenance.

## 2.0 Building Maintenance Strategies

Bergman and Klefsjo (2010) define maintenance strategy as the management method used in order to achieve the management objectives. Asylouf (2007) opined that maintenance strategy is a technique and/ or policies which depend on factors such as nature of the plant, the maintenance goals or the equipment that will be maintained, the work environment and the work. Salonen (2009), states that the strategy reflects the organization conception of its intended long – term goal and the approach to achieve it". Maintenance strategies are a means of transforming business priorities into maintenance priorities (Salonen, 2011). Maintenance strategy is adopted in order to extend the life cycle of buildings and its fittings services. The basic maintenance strategies include Preventive, Corrective and Condition Based Maintenance. According to Chan *et al.*, (2001), the time based, performance based, breakdown based, renovation – based and integration-based are also developed from the three basic maintenance strategies.

### Building Maintenance and Associated Challenges

As desirable as carrying out building maintenance, it is generally an undeniable fact that this comes with varied challenges which when not resolved or minimized defeat the aims and objectives of building maintenance and subsequently result in loss of return on investment. Some of the challenges identified by several researchers include adequate maintenance policy framework, high cost of building maintenance, and input of facilities management experts.

#### a. Building Maintenance Policy Framework

Building maintenance policy is a written document that provides a management framework for the maintenance personnel to determine appropriate maintenance strategy and standard. Building maintenance policy and strategy is one of the main aspects in management of building maintenance operation processes (Lee and Scott, 2008). The three essential elements for formulating the maintenance policy are the choice of maintenance strategy, defining maintenance standard and allocation of maintenance resources. Maintenance activities could not be planned and implemented successfully, without the understanding of these elements. Moreover maintenance standard is difficult to agree with top management (Wood, 2003a). Acceptable maintenance standards depends very much on available maintenance resources with consideration of common factors such as characteristics related to building, tenant, technical, administration and political factors (El- Haram and Horner, 2002).

#### b. Factors Contributing to High Cost of Building Maintenance

According to El-Haram and Horner (2002), there are numerous factors that are responsible for the high housing maintenance cost such as building characteristics, human aspects, ways of implementing maintenance and government policies. Al-khatam (2003) identified and grouped some of the factors into seven (7) categories which include engineering services, labour, building materials, environments, management and administration, budget and finance and building users. This was confirmed by Ali *et al.*, (2010) who found out that factors such as building materials, building

services, building age, expectation of tenants, failure to execute maintenance at the right time, maintenance factors, political, outstanding maintenance charges, over budgeting and other factors contribute immensely to high cost of maintenance. Other risk factors contributing to high cost of maintenance as a result of financial losses include poor design and construction practices, poor accessibility for maintenance, poor selection of materials, incompatibility poor specifications, non-availability of spare parts, lack of standard tools and instruments for regular maintenance and environmental conditions (DeSilva & Ranasinghe, 2012).

#### c. Input of Facilities Managers in the Design Stages of Building

Another challenge of building maintenance is the minimal consideration or lack of input from expertise of facilities managers who take oversight responsibility of maintenance management in the early design stages. Most of the challenges of building maintenance can be minimised if not avoided if the opinions or inputs of facilities management professionals are fully engaged on maintenance management techniques and operations for consideration during the early design stages (Williamson *et al.*, 2010). Also relevant information provided by facilities managers to designers minimise design errors that lead to unsatisfactory results during facilities maintenance operations phase (Jawdeh *et al.*, 2010). It is necessary to adopt maintenance input in the design stages to ensure that opinions can be used as reference for ease of maintenance in the future in order to reduce design defect which poses challenges for maintenance (Ali *et al.*, 2013). According to Omotechinshe *et al.*, (2015), maintenance aspect are scarcely considered in most design processes and maintenance professionals are rarely invited into the design teams, this often times raises or leads to maintenance problems which badly affect the performance of such buildings.

## 3.0 METHODOLOGY

The data for the research work was obtained through the use of structured questionnaires from the Property owners, Property managers and Occupants of 37 selected plazas for the study. The population of the study comprises of 1011 Occupiers of the plazas, 37 Property owners and 17 Property managers. 341 structured questionnaires were distributed which comprised of two sections. Section one captured the demographic profile of the respondents and the second section consist of four building maintenance strategies and challenges scored on a Likert Scale of 1-5 based on their significance. Descriptive statistics was used to analyse the demographic data of the respondents while Relative Importance Index (RII) was used to analyse the respondents' scores of the basic maintenance strategies and challenges. In this study, an ordinal measurement scale 1 to 5 was used to determine the effect level. Respondents were asked to score strategies and challenges associated with maintenance management of commercial buildings, according to the degree of important: where 1 = strongly agree; 2 = agree; 3 = undecided; 4 = disagree; 5 = strongly disagree.

The relative importance index (RII) is given by equation (1)

$$\frac{\sum WF}{N}$$

Relative Importance Index =  $\frac{\sum WF}{N}$   
Where W is the weighting given to each factor by the respondents, ranging from 1 to 5, F is the frequency of

responses and N is the total number of samples. The rating of all the strategies and challenges for degree of significance was based on the value of their respective relative importance index (RII).

#### 4.0 RESULTS AND DISCUSSIONS

##### 4.1 Profile of Respondents

**Table 1: Academic qualification**

Academic qualification	Frequency	Percentage (%)
FSLC	28	8
SSCE/WASC	100	30
HND/BSC	198	58
Masters/PhD	10	4
Total	336	100

From table 1 above, the demographical profile of the respondents indicated that 8% of the respondents have FSLC as their highest qualification, 30% have SSCE/WASC while 58% and 4% have HND/BSC and Masters/PhD respectively.

**Table 2: Years spent in the plaza**

Years spent in the plaza	Frequency	Percentage (%)
0-5	167	50
6-10	141	42
11 and above	28	8
Total	336	100

**Table 4: Ranking of Maintenance strategy adopted in the plaza**

S/N	Maintenance strategies	Scales and number of respondents					R II	Ranking
		5	4	3	2	1		
1.	Corrective maintenance	200	94	22	16	4	4.40	1
2.	Preventive maintenance	186	120	10	15	5	4.38	2
3.	Action based maintenance	160	137	28	7	4	4.32	3
4.	Emergency maintenance	99	200	5	28	4	4.08	4

Rank: (Strongly agree -5, Agree -4, Undecided-3, Disagree -2, strongly disagree -1)

From the analysis in table 4 above, it shows that corrective maintenance ranked first, preventive maintenance ranked second, action based maintenance ranked third and emergency maintenance ranked fourth. This implies that corrective maintenance is mostly adopted in maintenance of the plazas.

**Table 5: Level of maintenance**

Level of maintenance	Frequency	Percentage (%)
Very high	68	20
High	180	54
low	60	18
Very Low	28	8
Total	336	100

From the table 5 above, the analysis shows that 20 percent of the respondents agree that the maintenance levels are Very high, 54 percent agree that maintenance levels are high, 18 percent agree on low while 8 percent of the respondents agree that maintenance levels are very Low. .

From table 2 above, it shows that 50 percent of the respondents have spend 0-5 years in the plaza, 42 percent have spent 6-10 years while 8 percent have spent 11 years and above.

**Table 3: Occupation**

Occupation	Frequency	Percentage (%)
Civil servant	42	12
Trading	155	46
Self employed	127	38
Others	12	4
Total	336	100

From table 3 above, it shows that 12 percent of the respondents are Civil servant, 46 percent are trading, and 38 percent are self employed while 4 percent of the respondents are others.

##### 4.2 Maintenance strategy adopted in the plazas

The study presents the analysis of the Maintenance strategies adopted in 37 selected plazas. These strategies have been identified and ranked according to their relative importance Index (RII). The result is presented in Table 4.

**Table 6: Period of maintenance**

Period of maintenance	Frequency	Percentage (%)
Whenever is remember	33	10
Always	35	10
Quarterly	9	2
Annually	123	37
Whenever fault is detected	136	41
Total	336	100

From the table 6 above, the analysis shows that 10 percent of the respondents agree that period of maintenance are based on whenever is remember, 10 agree on always, 2 percent agree on quarterly, 37 percent agree on annually while 41 percent agree on whenever fault is detected.

**Table 7: Response to the challenges associated with maintenance management of the plazas scored on the degree of importance**

S/N	Challenges	Scales and number of respondents					R II	Ranking
		5	4	3	2	1		
1.	High cost of maintenance	167	138	23	8	-	4.38	1
2.	Lack of finance	155	127	42	12	-	4.26	2
3.	Lack of input of facility Manager at the design stage	166	110	33	15	12	4.20	3
4.	Adequate maintenance policy framework	123	119	23	55	16	3.83	4

From the analysis in table 7 above, high cost of maintenance ranked first, lack of finance ranked second, Lack of input of facility Manager at the design stage was ranked third and Adequate maintenance policy framework ranked fourth. This implies that high cost of maintenance is the most significance challenge facing maintenance management of commercial buildings in Awka.

**Table 8: Annual amount of rent paid**

Rent paid Annually	Frequency	Percentage (%)
N50,000-N150,000	138	41
N151,000-N250,000	167	50
N250, 0 00 and above	31	9
Total	336	100

From table 8 above, it shows that 41 percent of the respondents agree that annual amount of rent paid ranges from N50,000-N150,000, 50 percent agree from N151,000-N250,000 while 9 percent accept that N250,000 and above are the annual amount of rent paid.

**Table 9: Yearly expenditure on maintenance**

Yearly Expenditure	Frequency	Percentage (%)
N20,000-N30,000	39	12
N31,000-N40,000	33	10
N41,000-N50,000	139	41
N51,000 and above	125	37
Total	336	100

From table 9 above, it shows that 11 percent of the respondents agree that yearly expenditure on maintenance ranges from N20,000-N30,000, 10 percent agree from N31,000-N40,000, 41 percent from N41,000-N50,000 while 37 percent accept that N51,000 and above are the yearly expenditure on maintenance

**Table 10: Building maintenance policy**

Responses	Frequency	Percentage (%)
Yes	166	49
No	170	51
Total	336	100

From the analysis in table 10 above, it shows that 49 percent of the respondents agree that they know about building maintenance policy while 51 percent of the respondents are ignorant of building maintenance policy

**Table 11: Policies guiding the maintenance of the plaza**

Responses	Frequency	Percentage (%)
Yes	166	49
No	170	51
Total	336	100

From table 11 above, it shows that 49 percent of the respondents agree that there are policies guiding the maintenance of the plaza while 51 percent of the respondents agree that there are no policies guiding the maintenance of the plaza.

### 5.0 Conclusion

Building maintenance management ensures that building facilities retain their structural, functional and aesthetic conditions throughout their lifespan and reduce unnecessary expenditures. Maintenance management of commercial building is faced with many challenges which when not handled properly would affect the performance of the building.

### 6.0 Recommendations

From the study the following recommendations were made.

1. Landlords should adopt preventive maintenance system so as to have effective maintenance of commercial buildings

2. There should be proper input of facility Manager at the design stage.
3. There should be prompt response to reported defect by the landlords so as to reduce the cost of maintenance work.
4. Availability of adequate maintenance funding so as to increase the standard of the building
5. There should be maintenance policy guiding maintenance management of the building.

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