

*Effective Facilities  
Management Through  
Management  
Information System: A  
Case Study Of  
Industrial Training  
Fund (ITF) Building  
Abuja*

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## ABSTRACT

Facilities management is concerned with the process by which organizations ensure that their buildings, systems and services support core operations while contributing to the achievement of their strategic objectives under stable business conditions. It focuses on matching limited resources to user needs with a view of securing higher quality, lower risks and value for money. Specifically, it deals with space design, construction, allocation, strategy, property asset management, maintenance and post occupancy evaluation of premises, inventory management, value management and life cycle costing, computerization and office automation, management of support services. As facility managers, the principle objective is to manage the existing facilities effectively in a cost effective manner and also ensure smooth running of business. It has been established that effective maintenance management requires adequate planning, foresight, monitoring and budgeting. The application of information technology in facilities management has been identified as essential for the success of facility management task. Facility managers can no longer keep the track of work order manually, the use of spreadsheet to carry out routine and preventive maintenance tasks is a less effective option to the use of computerized maintenance management systems being deployed recently by forward looking facility managers.

**Keywords:** Facilities, Management, Information Technology, Planning, Monitoring

## 1. INTRODUCTION

The Abuja area office of the Industrial Training Fund is presently situated at No 6, Adetokunbo Ademola Crescent Wuse II Abuja. It is no doubt an imposing architectural edifice equipped with state-of-the-art facilities which qualifies it as an intelligent building. These include; Access control, Multi-media conference hall, Fibre optic telecom system, Close Circuit Security (CCTV), Multi Channels DSTV, Creche, kitchen and staff canteen, Gymnasium, Clinic, 1 No. 200KVA and 3 No. 800KVA synchronized systems Generators together with a 2No. 1600KVA Transformer which compliments power supply from PHCN source. Other facilities include water treatment plants, 4No. Otis lifts et cetera.

Facilities thereon are managed by Achoru Associates (A firm of Estate Surveyors and Valuers) with the responsibility of coordinating effective facility management alongside various departments of the Fund. Some of its function is to ensure that all installed facilities are working at optimal efficiency and in terms of breakdown, provide prompt repairs and where immediate correction works could not be achieved, inform staff of the development as well as the recovery efforts that are being made and the possible time of reinstatement.

Consequently, an effective maintenance programme was designed sequel to its adoption by the management of the Fund; the Info Tech Unit Department was directed to develop integrated maintenance software for proper monitoring and coordination of maintenance activities in ITF. The system is user friendly and also accessible to all staff of the Fund via the Primary Domain Server (PDS).

In addition, a preventive maintenance programme was designed with adequate provision made for emergency maintenance. This is done with the aid of computer software which allows for scheduling, end-user fault reporting and checklist. The monitoring and servicing system have also been prepared for easy check on facilities condition as well as fixing of faults without physically moving around to each location. This entails correct diagnosis of defects, problems and also timely implementation of the correct remedial measures, based on sound technical knowledge, reach information system. Moreover, with the increase in sophistication of various facilities, it has become a priority to provide information enabled environment in facility management. This is necessary to keep adequate records of facilities and monitor their performance. The application of computer software in this regard has made it easy to achieve effective and efficient maintenance of ITF facilities. This study has become imperative in view of the importance of information technology in the act of facilities management. Facilities management as a specialized field is broad and involves a set of tasks which are interrelated. Thus, these activities require properly organizing, programming and monitoring periodically to avoid breakdown. The use of computer has not only helped in ensuring that these tasks are monitored but provide useful opportunity for quick information and actions through computer enabled reporting system and routine checks. The question is how effective are the various management tools used in the facilities management and what are the various constraints that can hamper on the effectiveness of the approach.

## **2. RESEARCH OBJECTIVE**

The aim of this study is to critically analyze the impact of computer application in the task of facilities management, using Industrial Training Fund area office Abuja as a case study. The followings are the objectives of the study:

- To examine the concept of Facility Management
- To bring out the necessity of information technology in effective management
- To examine the basic facilities management information tools that is put in place at ITF House.
- To examine the effectiveness of the facilities management strategy deployed in the management of facilities at ITF House.
- To X-ray the various hindrances in the information management tools
- To make necessary recommendation in the improved performance of facilities management tasks.

### **3. LITERATURE REVIEW**

#### **3.1 DEFINITION OF FACILITY MANAGEMENT:**

The British Institute of Facilities Management (BIFM, 2009) defined facilities Management as “The practice of coordinating the physical workplace with the people and work of the organization, integrating planning, management and delivery of services to meet people’s needs within the living and working environment”. Macgregor (1989) also defines facilities management as the series of activities which enables a manager organize his duties through trained skills in ensuring that satisfaction is met by people living within a common space.

#### **3.2 CONCEPT OF FACILITY MANAGEMENT**

Facility management is a management concept encompassing the seven principles of management (Keady, 2009) that is; planning, organizing, controlling, motivating, coordinating, communicating and directing. These principles are coordinated to enhance the practice of facilities management. It is not just the management of assets like building and maintenance; it embraces all activities within a corporate body outside the mainstream of the firm.

At a corporate level, it contributes to the delivery of strategic and operational objectives. On a day-to-day level, effective facilities management provides a safe and efficient working environment which is essentially to the performance of any business whatever its size and scope facility management is a vital strategic discipline because it translates the high level strategic change required by senior decision makers into day-to-day reality for people in their work or living space.

Facilities management symbolizes construction, maintenance and adaptation to changing business needs. Facilities management involves the identification and control of capital costs, running costs, cost in use, life cycle costing and technology routing and emergency maintenance cost. Different facilities and assets which have common features are grouped in one category. Plant, equipment, materials, buildings and assets are regularly inspected, monitored and maintained.

The approach in facilities management is for company to concentrate on its core business in order to enhance company profitability, while the facilities management outfit of the firm takes care of the facility services (non-core business activities).

Facilities management is like contracting our management responsibility of obtaining value. It involves the following structural profiles.

- Building
- Maintainability
- Quality control

- Total quality management
- Management structure
- Cost/Budget Management
- Asset Management
- Change Management (including Human resources, communication and Performance measurement)

### **3.3 SCOPE OF FACILITIES MANAGEMENT**

Facilities Management is a multi-dimensional field which involves various segments of business operation. A wide variety of authors have identified diverse functions and activities of facilities management in different ways. Lai and Yik (2008), identified five major activities areas of facilities management namely, space management, real estate, premises operation, and project management and office services. She emphasized that premises operation has traditionally been the main area of facility management activities.

Jordani (2010), on his own part stated that the functions and activities usually performed by facility management professionals are quite broad and include the following; facilities inventory management, facilities requirement programming, facilities master planning, location/layout planning, facilities drafting, facilities cost accounting, real estate strategy, facilities movement coordination, project administration and implementation, facilities purchase coordination, maintenance planning, site management and overall facilities system coordination.

Worthington (2011) in his own way identified the roles of facilities management as property management, property maintenance, space planning, office service, structured planning and management of space versus reactive and adhoc policy which support and improve the effectiveness of its primary activities rather than hinder the organizations goals.

Generally, facilities management involved three (3) major sectors namely;

- Premises – includes real estate, plant and machinery, maintenance, space planning etc.
- Support services
- Information technology while the subsidiary sectors include infrastructural management and energy management.
- Health and safety environmental issues (Familoni, 2010)

However, in recent years, a heightened awareness of the facility management sector has expanded its scope to seeking new working styles and process especially in this technology driven age.

### **3.4 OBJECTIVES OF FACILITIES MANAGEMENT**

According to the Canadian's commissioner of corrective service, the major objectives of facilities management are:

- To ensure that real property, including facilities, equipment, roads and infrastructures are maintained in a manner consistent with their intended use at an acceptable cost, while providing for the productive employment and training of inmates.
- To ensure that the institutional physical plant is operated in an efficient, effective and safe manner, in accordance with applicable Federal, Provincial and Municipal regulations and standards.

### **3.5 APPLICATION OF COMPUTER IN FACILITIES MANAGEMENT**

The need for management information system in facility maintenance management was further emphasized by Levitt (2007) considering Maintenance Planning, Scheduling and Coordination. He eluded that, 'it is simply no longer an economically sound decision to manage a function as critical as maintenance without on-line informational support. The application of information technology presently applied in facilities management has made that task less assiduous especially with the use of various computer tools like spreadsheets, work plan and so on.

Facilities management information system (FMIS) is a system that ensures availability of quality records, feedback and feed forward mechanism in a user friendly and well structured way for effective decision making. Various FMIS Packages are available ranging from comprehensive and integrated one that addresses all aspects of facilities management to specialize package design to address a peculiar facility management.

A good FMIS should have the following components;

- Objectives
- Strategic plan
- Framework design
- Constituent application and systems
- Systems management
- Procedures
- Operations and maintenance
- Evaluation, selection and implementation

However, in displaying FIMS, the following should be taken into considerations;

- Identify the data that is required to utilize the features of the FMIS e.g. equipment inventory description, size, location, serial number, age, last service date.
- Provision of additional kinds of data needed to make the maintenance history complete
- Developing maintenance (predictive) plan including the parameters for such
- Identify maintenance actions required for each item, e.g. replacement, review repair etc.
- Develop a database for service providers including the addresses, telephones and contact persons

- Determine report generation templates, necessary for tracking the facilities, equipment history, scheduling maintenance and budget monitoring.
- Establish feedback facility that will help you monitor the condition or performance of each item and compare “as fund” conditions with predictive conditions to further your maintenance program.

It should be noted that feedback is the key to continuous improvement (Lai and Yik, 2012). The cliché that “garbage in, garbage out” is unfortunately very true. The data that is fed into FIMS will determine the quality and accuracy of the FIMS generated reports. Various examples of FIMS packages are Archibus/FM Enterprises, vision Enterprise, exegessy’s Asset Maintenance, APM (Advance Plant Maintenance), GP MTC-Maintenance Management System, Tabware-A-CMMS/EAM Solution and so on. The choice of any of these packages will depend on the operational requirement of each facility manager.

## **4. DATA ANALYSIS/FINDINGS**

### **4.1 DEVELOPING A DATABASE**

The database used for the facility management comprises of an asset master list which is generated by the Commission. Assets of the Commission are included in the database with the following details:

**Department:** The various departments of the Commission are listed and code numbers given for necessary referencing e.g. Administration code 101, Human resources code 108 et cetera.

**Asset Categories:** Assets of the Commission are classified into various categories with adequate referencing numbers e.g. Air conditioning units, televisions and refrigerators are classified as “office equipment” (OE), items like office tables, chairs and wall hangers are classified as “furniture and fittings” (FF), items like computer desktops, UPS, printers, scanners are classified as “computer equipment” (CE), Power Generating sets, treatment and water treatment plants are classified as “plants and machinery” (P&M), et cetera.

**Asset Location:** Location of each asset for easy tracking and identification e.g. Finance services department room 202.

**Asset numbers:** This is an asset tag assigned by Industrial Training Fund e.g. ITF/ADM/OE/A214/002. This is to identify office equipment in the Admin Department at room 214.

**Asset status:** This is a remark on the present condition of the assets, which could be new, just serviced or repaired, in storage etc. It helps to develop a maintenance plan for each asset at any time.

**Critically:** This is a specialized monitoring approach to ascertain whether the particular asset is critical (i.e. high priority) or Normal (regular asset). This is important in fashioning a maintenance program. For



example, critical asset should be given immediate priority in maintenance such as immediate replacement, repair or servicing before other assets.

Suppliers/Contractors: Asset master list includes such information as the details of suppliers, contractors/subcontractors and technicians of each asset. The names, address, contact person, designation, telephone are also provided for easy contact. For example, suppliers of computer-Zinox, Office-Area 3 Garki Abuja, Branch Manager-Engr Chikodi, Tel-080 -----, 09-2-----.

#### **4.2 DETERMINING THE SCOPE OF FACILITIES**

The facilities under the management schedule are as follows:

- Management and monitoring of both hard and soft services e.g. Access control, Multi-media conference hall, Fibre optic telecom system, Close Circuit Security (CCTV), Multi-Channels DSTV, 1 No. 200KVA and 3No 800KVA synchronized systems Generators together with 2No. 1600KVA Transformer complimenting power supply from PHCN source and water treatment plants, 4no. Otis lifts et cetera.
- Setting up, measuring and reporting on Key Performance Indicators (KPIs) relating to facilities.
- Managing health, safety and environment staff canteen and kitchen, Gymnasium etc.
- Maintenance of office building and architectural services – This includes replacement and repairs of damaged items, renovation and painting.

#### **4.3 SETTING UP FACILITY MAINTENANCE PROGRAM/S**

To ensure around the clock availability of service, four strategies are put in place.

##### ***Preventive Facility Maintenance Management Plans/Schedule***

This is an equipment maintenance work plan containing routine tasks and timing of those tasks with the aim of a continued functioning of equipment. Tasks have been scheduled using a module which allows for selection of activities using predefined parameters. For example, major servicing of generator sets is scheduled for every 3 months or after 200 hrs usage whichever is earlier. Maintenance checks are carried out on lifts on monthly basis and general servicing after 3 months.

##### ***Predictive Facility Maintenance Management Plan/Schedule***

This is a maintenance work plan based on regular monitoring of the condition of equipment in order to avoid failure in future. The technique involves non destructive testing of equipment at any given time to ascertain the efficiency. It is usually employed on critical equipment to avert breakdown.

##### ***Breakdown Repairs and Replacement***



This involves work to restore damaged or worn-out equipment or items to a normal operating condition. The tasks require inspection of the particular item and replacement/repairs depending on the work required e.g. replacement of burned-out light bulb, replace cracked window panels etc. Efficiency of this approach depends on how soon the breakdown/faults are reported.

### *Cyclical Maintenance Plan*

These are usually put in place on a specific cycle, whether faults are detected or not. For example, computer sets are to be replaced after five years, internal painting to be done every two years etc. The former is to enhance the performance of the equipment whilst the later is to enhance the aesthetics of the building fabrics.

## **4.4 ADOPTING FACILITY MAINTENANCE TOOLS**

### *Maintenance Checklist*

The checklist is designed to capture the routine tasks that must be performed to ensure around the clock optimal performance of facilities. It is used in generating data on the technical condition and performance level of facilities in a given period of time. (A format of the check list is attached as appendix 1). The Checklist is mostly used to carry out preventive maintenance as observations made during the spot checks and routine checks are corrected immediately to avert unexpected breakdown of facilities. All information generated in the process is used to effect corrective maintenance e.g. repairs, replacement etc, thereafter, they are uploaded in the database to ensure up-to-date maintenance records at any given time.

### *Maintenance Frequency Schedule*

This is the planned preventive maintenance schedule developed for available facilities. It indicates the maintenance activities deployed and their frequency of occurrence. Like the checklist, the maintenance frequency schedule forestalls increasing decline of asset value of inefficiency facilities in terms of performance. This schedule is designed to alert the Estate and maintenance officer and other schedule officer on the activities to carry out at any particular date. It helps to prepare for activities that are not yet due. For example, it will alert the manager to notify the service provider of next service date and also helps in making provision for alternative.

### *End-User Fault Report form/e-Complaint form*

This is a format designed to enable the end-user/employees of the Commission to report on any fault observed and passed it through the network to the Estate and maintenance officers and the facility manager for action. The User keys in the various options indication such as the location, assets description and fault description in detail and thereafter clicks on the 'submit' button which sends/registers the request straight into the job table in the database.

On the complaint form are the following fields:

- Date of complaint: The user selects the date on which he/she is reporting the fault. This usually has a default date of the current day.
- Asset number: This is the asset tag as assigned by the asset managers; it is a combination of the user department, asset class, room and serial number e.g. ITF/Admin/FF/R332/001.
- Make: This indicates the manufacturer of the assets e.g. LG air conditioner, the make is LG and if its Panasonic air conditioner, the make is Panasonic. However, this field is not mandatory as some assets do not have makes e.g. furniture like tables and chairs.
- Model: This describes the actual model of the faulty asset E.g. LG 3000.
- Serial number: This describes the default serial number of the asset given by the manufacturer
- Location number: This describes the office or room number the asset is situated e.g. R332.
- Asset category: The assets are categorized into furniture and fitting (FF), e.g. tables, chairs and wall shelves, office equipment (OE), e.g. Air conditioners and Refrigerators. Computer equipment (OE), e.g. Monitors, UPS and Scanners. Plants and machinery (PM), e.g. power generating sets and water treatment plants.
- Staff name: The name of the staff reporting the fault. This is necessary because most times secretaries forward reports on behalf of their bosses.
- User: The staff to whom the asset is officially assigned to.
- Department: The department of the staff with the faulty asset
- Fault description: A detailed description of the fault and other observed symptoms.

### ***Activity report form***

This is a periodic report of array of maintenance activities that took place in a given period of time usually weekly and monthly. It gives details of faults report, inspections, observations and actions taken. It also captures the financial implications of remedial works and also makes provision for possible recommendation for management consideration on cost-cutting measures as a way of improving on quality of service.

### ***Updating the maintenance database***

The information in the maintenance data base is usually updated daily with list of observations as per the checklist, condition surveys conducted, repairs and replacement maintenance carried out. It also includes information on cost and other relevant information that will help the facility manager in keeping up-to-date maintenance records on facilities.

### ***Analyzing Maintenance Checklist***

Data generated have included the condition of each asset which helps in planning for their maintenance. For example, where an asset has been tagged as performing poorly, an immediate contact is made to the supplier/subcontractor for servicing or maintenance check. The contact is made possible through the data available in the master list where the details of all suppliers, manufacturer and contractors are available. Where replacement is recommended, an immediate requisition is sought from either the store or the procurement unit. In line with the checklist design, maintenance checks are usually periodical (i.e. daily, weekly or monthly), and reports are entered by the schedule maintenance officer (e.g. supervisor), and forwarded to the facility manager for prompt attention.

### *Analyzing End-User fault Report*

On receipt of the End-user fault report via the Primary Domain Server (PDS), the facility manager enters in the fault and immediately undertakes the inspection of the asset for fault diagnosis. This enables facility manager to know the extent of the fault and remedial action required. Once the fault is corrected, same is also recorded as an update.

The job table has a prompt that usually pops up when the database is opened indicating that there are requests sent in by users which requires the attention of the desk officer in the Estate and maintenance unit and the facility managers. This allows the maintenance officers ample time to access the faults and plan for immediate remedial action after which the right technician is deployed to effect repairs or replacement as the case may be.

### *Analyzing maintenance service schedule*

Data generated service from feedback from members of staff on the quality of services rendered by the various providers e.g. Cleaning company, security outfit and the facility manager with respect to their efficiency and performance are periodically analyzed to know whether their contract should be renewed or not. Similarly, the schedule is usually monitored vis-à-vis by the Estate and maintenance officers who act as intelligent client liaison officers to all service providers by project managing them in delivering quality services to ITF and also reporting on Key Performance Indicators (KPIs) relating to facilities. The data form schedule officers are taken seriously in decision taking.

### *Asset Information*

Assets are updated regularly to know their status and present performance. Also, new assets are added into the list with details on the location, suppliers and criticality status.

The information is entered in the database and where certain assets have been replaced; same is removed from the register for proper records. Usually, a message is sent electronically to alert the schedule officer and the

facility manager of a new addition or removal of damaged item, through the Primary Domain Server (PDS) who in turn up-date the existing assets list.

#### **4.5 SUMMARY OF FINDINGS**

The effectiveness of any facility information management system (FIMS) is dependent on the following:

- The reliability of the data imputed into the system is essential to the work of the Facility management team as they say garbage in garbage out.
- Cooperation of end-users by reporting immediately any observed defect for quick remedial action is key to effective maintenance services delivery.
- Integration of the existing computer infrastructure with the new application software is equally essential.
- The facility manager's ability to respond quickly to any information generated from the feedback system.
- Provision for back up equipment to ensure that works are done without delay.
- The efficiency will also depend on the type of facility maintenance plan and schedule put in place by the facility managers as well as the monitoring process as the system cannot be operated alone.

#### **5. CONCLUSION**

Everything of value needs maintenance. The value may be its cost, the job it does, the quality of its production, the havoc it may cost or any combination of these. Facilities maintenance is an important aspect of corporate business management. It is necessary for better productivity and safe workplace. However, with the diverse nature of the activities involved, an efficient support system will be required to enable the facilities manager perform the task effectively. The use of well designed software will lessen the task and ensure that the maintenance activities are well planned, scheduled and monitored through pre-established modules and checklists. As it is widely said, the illiterates of tomorrow are not those who cannot write but those who cannot take advantage of computer education. A facility manager who cannot use the information technology cannot perform satisfactorily in the face of modern challenges.

#### **6. RECOMMENDATIONS**

For effective use of computer in facilities management activities the following are suggested:

- Data input from all users of facilities should be detailed and comprehensive. This will help for effective monitoring and tracking of the facilities.
- Faults should be reported immediately observed so that necessary actions are taken

- Predictive maintenance should be given adequate budget priority and not to be treated on emergency basis.
- Provision should be made in the store for spare parts for easy repair and replacement of some critical equipment and for reduction of down time.
- Operators and supervisors of facilities should conduct routine function checks and should produce daily reports on the performance of the facilities and not wait until the facility breakdown. This will enable the Estate and maintenance unit prevent sudden breakdown of critical equipment in ITF.
- Adequate budgetary provision should be made for facility management activities at ITF to enable the unit effectively meet the challenges of keeping the facilities at optimal level of efficiency at all times. Immediate approval for financial request should be given priority especially during emergency situations without undue bureaucratic requirements.

High quality workmen with experience who must be at the beck and call of the facility managers should be used to handle maintenance repairs and other related works.

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