ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

ASSESSMENT OF FACILITY MANAGEMENT PRACTICES OF SELECTED PUBLIC AND PRIVATE BUILDINGS IN ADDIS ABABA

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The undersigned have examined the thesis entitled **"Assessment of Facility Management Practices of selected public and private buildings in Addis Ababa"** presented by **Abel Tsegaye,** a candidate for the degree of **Master of Science** and hereby certify that it is worthy of acceptance.

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Declaration

I hereby declare that this study entitled **"Assessment of Facility Management Practices of selected public and private buildings in Addis Ababa"**, is the outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestion of the research advisor.

This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters in Science in Construction Technology and Management (MSc) at Addis Ababa Institute of Technology.

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ABSTRACT

Facility Management studies and finds out a way to use a facility up to that pre-destined purpose by enhancing the efficiency and effectiveness without putting the facility in jeopardy. Facility Management has found popularity in different countries; since, its benefits are acknowledged by end users and owners of buildings. However existing buildings have a lot of shortage in providing appropriate services due to lack of proper facility management. This study has focused on facility management practice of public and private buildings and the services being given by facility management providing firms in Addis Ababa. Data for the study is collected in a case study approach from three distinct case studies and by interviewees and questionnaires to facility management firms, building owners and end uses of buildings. Based on the study, the current services being given by the existing facility management companies in Addis Ababa are of a property management type like security, maintenance, cleaning, and rental services. Furthermore, the research indicated that service being given by providers are in the early development stage; as the facility management practice is being operated by professionals with a very little facility management related background knowledge. In addition, it was found that most buildings don't have either facility management firm by themselves as department or hire service providers. Accordingly, the practice of facility management is found on its infant stage but it is expected to boom due to its benefits during operational phase of a building. Accordingly, for the successful operation of a building in the city, development of facility management and improvement of existing facility management practices by end users and building owners are recommended. Furthermore, enhancement of technology aided practices by service providers and training of professional in the field of area are recommended.

Key words: *Facilities, facility management, maintenance, property management*

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ACRONYMS

FM	Facilities Management
IT	Information Technology
PPM	Planned Preventive Maintenance
PC	Personal Computer
IoT	Internet of Things
AEC	Architecture, Engineering & Construction
BMS	Building Management System
CAFM	Computer Aided Facility Management
CAD	Computer Aided Design
DBMS	Data Base Management System
FMIS	Facility Management Integrated System
CN	Commercial Nominees

1 INTRODUCTION

1.1 Background

Construction projects have different phases. One of its phases is called the operation phase. As the other phases like design or construction or demolition phase, the operation phase also requires due attention for the proper utilization of the structure. The final target of any construction project is operating for its intended purpose; which is called the operation phase. Similar to other phases, the operational phase also requires proper management with distinct skills. Managing a structure on its operational phase is what we call Facility Management.

Facility Management can be defined as "An integrated attitude towards maintaining, cultivating and familiarizing the buildings of a corporation in order to create an atmosphere that strongly supports the basic objectives of that corporation" (Baldry, 2003). Building owners are obligated by their tenants to deliver the safest, healthiest indoor environment possible. This is something that soon will be taken for granted, right along with sufficient parking space, all time working elevators, attractive lobbies, and workable office spaces (Bas, 2004).

Facility Managers are the professionals most responsible for integrating people with their physical environment. As such, facility management is both a people and an environmental issue. The hybrid role of the facility manager as operations manager and compliance officer involves people and productivity, and the costs of managing each. The facility manager must coordinate policies and operations with industry standards and practices, as well as with regulatory mandates (Gustin, 2003).

In the supporting role of a facility manager, the potential range of management challenge is fundamentally as large as that of a normal general manager. The intricacy of the tasks managed range from simple to sophisticated, while the criticality of tasks cover the range from the operationally routine to the tactical and essential (Kincaid, 1994).

For a facility manager, the perception is basically the same. Rather than simply provide the finest service probable and hope for the best, facility managers should attain an awareness of customer prospects and actively manage them. Management implies an active rather than passive role by the service provider in inducing customer's perception of service accomplishment. Perception

involves obtaining, interpreting, picking and organizing sensory information. Since reality is so highly subjected to interpretation, managing customer insights is the real key to attaining service success (Hoots, 2004).

Facility managers play a greater part than maintaining flaws. They plan, preserve and control operations on a built infrastructure to make sure the day-to-day operations of the structure isn't affected. It is of consensus that the efficiency and effectiveness of an organization is influenced by the physical environment in which it operates in. A clear understanding of workplace and its influence upon user performance is vital if opportunities for performance enrichment are to be exploited (Baldry, 2003).

It is commonly agreed that the primary function of facility management is to handle and manage the supporting services to meet the desires of a company, its core operations and employee. FM is the support function harmonizing physical resources and workplace, and support services to user and course of works to support the core business of a company. The fundamental issues of FM practice consist of place or facility, people or user of the building, and course or activities in the facility. Nutt (2004) defines FM as the administration of infrastructure resources and services to support and sustain the operational strategy of a company through time.

The principal purposes of FM can be distinguished in two aspects: to support and sustain the operational works and activities of corporations and their staff, and manage work setting and support services (Chotipanich, 2004).

In other words, FM encompasses the management of a company's facility assets and support services in two levels: operational and strategic (Barrett, 1995) (Nutt, 2002). Operational FM involves short-term effects on a day-to-day level. An effective operational FM provides a safe and efficient working atmosphere which is indispensable to the performance of any business despite its size and scope of work. It can be said that the chief function of FM is operational function, the most visible part of FM. This operational function supports the basic routine, and steady needs of the business. On the other hand, FM can involve in several strategic matters such as property asset portfolio management, strategic property decision, and facility planning and development, which are related to policy and strategic plan of the organization (Chotipanich, 2004).

1.2 Statement of the Problem

Existing private or public owned buildings have a lot of shortage in providing appropriate services due to lack of proper management of facilities. Due to this, end users are being affected and losing their productivity. Not only to the end users, but lack of proper facility management is costing the life and service of buildings. Last but not least, prior studies conducted in the area of Facility management in Ethiopia are few and their focus were from the side of building owners of single company buildings likes a bank or single service types like Hospitals only.

As a result, these are the reasons why the research assessed facility management of selected buildings in Addis Ababa. In the research three different stakeholders are also incorporated: building owner, building end-users and facility management service givers.

1.3 Research Questions

Among other things the research is expected to address the following questions:

- Does the Practice of Facility Management exist in Ethiopia?
- What are the activities or tasks of a Facility or Property Manager that could be applicable in the Ethiopian context?
- Is there a need for Facility Managers in the Construction Industry?

1.4 Objectives of the Research

1.4.1 General objective

The general objective of this research is to assess the current practice of Facility Management of selected public and private buildings in Addis Ababa.

1.4.2 Specific Objectives

- To assess current practice of Facility Management in Addis Ababa.
- To assess the activities or tasks of a Facility or Property managers that could be applicable in the Ethiopian context.
- To assess the need for facility Managers in the Construction Industry.

1.5 Methodologies

- Three case studies with proper facility management were conducted.
- Both observation and survey methods of data collection in selected governmental and private buildings in Addis Ababa are used in the research.
- Questionnaires and Interviews were prepared. Building owners, facility managers and end-users of buildings filled and answered them.
- A detailed literature review on the subject matter was conducted.

1.6 Scope and Limitations of the Research

Although Facility Management covers all types of infrastructures located in the entire country, this research project will focus on Private and Government-owned buildings located in Addis Ababa.

1.7 Significance of the Research

There are a lot of buildings being constructed in Addis Ababa by the Government and Private owners for different purposes. The effectiveness and efficiency of the end-users of these buildings will depend on the facility management of the buildings. This research will assess the maturity of Facility Management practices of selected buildings in Addis Ababa that will help in creating awareness for building owners on the kinds of services being given by facility managers, motivating upcoming facility managers with the assessment of needs of the facility management services by building owners, and encouraging educational institutes to produce trained facility management professionals which in turn contributes to further research and the general advancement of the facility management industry by maximizing the utilization of the built environment.

2 LITERATURE REVIEW

2.1 General

Though the concept of ecologically healthy cities has been discussed for quite 30 years (Register, 1987), eco-cities have entered into more mainstream discourse within the new millennium, largely thanks to two global phenomena, those of urbanization and global climate change. In terms of global climate change, there's widespread recognition for the requirement to re-orient urban development towards low-carbon infrastructure and also the necessity for cities to be ever-greener in environmental functionality and ethical terms, as city carbon emissions represent the one largest human contribution to global climate change process (Duren, R.M. and Miller, C.E, 2012).

Urbanization is negatively viewed by few as causing social inequality, environmental degradation, and sprawling infrastructure. Eco-city supporters contend that these drawbacks could even be countered through ethical and sustainable environments through the eco-city offering. Urbanization being a fast-growing challenge to human civilization, with over half of the world's population now living in cities and is forecasted to grasp 80 percent by 2050 (United Nations, 2015).

Building owners are obliged to their tenants to supply the safest, healthiest indoor environment possible. This might be often something that soon will be taken as a right, all along with adequate car automobile parking space, elevators that don't break down, lobbies that are attractive, and office spaces that are workable (BAS, 2004).

This Chapter includes a thorough literature review to supply a more robust understanding of the research approach and findings. Facility Management is defined well and other Technical factors that must be considered are well-elaborated.

2.2 Property Management Vs Facility Management

Facility management is a term which is closely associated with building management. More broadly, facility management should not only be understood as general building management connected with everyday building operation but it should also include long term planning and focus on its users (Marek, et al., 2009). It involves supporting services and coordinating functions necessary for maintaining, operating and managing physical assets and workplaces. As a result,

the needs of an organization and its employees can be met and successful business activities are enabled (Lavy, et al., 2010).

It's always been a matter of the essential variations between property management and facility management. Although confusions are expected, experts have a distinguishing line about the similarity and the distinct differences between the two (Qian, 2012). The confusion arises from the fine similarity modish of labor as both professions involve on the management of property. However, the aim and objectives between Property Management and Facility Management are unique. (Qian, 2012)

Property management is defined as managing a facility to exploit profit. There's no negative connotation to the word profit. In fact, various huge and well developed property management companies may give management trainings to facility managers. With a specific type and sophistication of property, customer-oriented property management makes good business sense. Nevertheless, the underside line is maximizing and making the foremost of those properties. Since many corporate facility managers also function as property managers, it's worthwhile to debate good property management. While there are many similarities, the facility manager should detain in mind the essential difference between himself and also the property manager. The approach to a typical problem may, in fact, be quite different (Cotts, et al., 2010).

Facility Management received recognition as a full profession within the 1970s in US and Canada (Brooks, A. & Atkin, 2005). According to (European Committee for Standardization (CEN), 2011), Facility Management is additionally expressed as a discipline of services management. And Service can be well-defined as an "intangible experience performed for a customer acting as a co-producer".

Facility Management is defined because the strategy of managing the agreed supporting services which improve the effectiveness of its primary activities ((CEN), 2006). The supporting services are associated with "space and infrastructure" and to "people and organizations" ((CEN), 2006). A facility's history includes detailed information in the form of drawing, manuals, repairs, renovations, and alterations, accumulated within the tactic of developing and operating the building facility. Within the life cycle of a typical facility, different personnel are involved within the design, construction and operation stages. Since within the life cycle of a typical facility,

different personnel are involved within the design, construction and operation stages the standard of documentation at each stage will affect the performance and management of the building facility. Facilities documentation becomes a resource for planning repairs, shutdowns and other maintenance and operational activities. Facilities operation documentation is an in-house tool for the facilities manager to manage his day to day operations, forward planning, budgeting and for objective management decisions (Clayton, 1996).

FM is defined because the blending and alignment of the non-core services required to operate and maintain a business to completely support the core objectives of a corporation. (Tuker & Pitt, 2009). FM should aim not only at simply reducing the operating expenses of a constructed facility, but also at improving the efficiency of the building facility (Alberto & Giulio, 2014).

Teaching and practicing FM encompasses several disciplines, among them engineering, architecture, management, business and construction. As a result, it's not well developed enough in any of those programs to a grade that covers the huge reasonably topics and aspects of FM (Lavy, 2008).

Facility Managers must balance competing interests and demands employed on them by the board-level management of a company. They're expected to use tools that increase their performance and visibility within the organizations. One altogether their major duties are visiting be a requirement to develop performance indicators that provide management with "intelligent" interpretation snap-shots of the business conditions, like about how the organization is performing, or how FM is contributing to the full effectiveness of the organization (Lavy, 2008).

FM and PM while they are disciplines that go hand in hand and have many similar aspects they have differences that can't be neglected. These differences are context dependent while one can do the other. FM is focused on the clients and facilitating the users in conducting activities of the organizations in order to achieve a goal. FM is achieved at a strategic level involving in the business part without completely alienating the operational aspect. Meanwhile PM is involved more on looking after the physical fabric of the building. Maintain the value of property in order for it to generate its optimal potential. It is more involved with tenants and lease agreement even though they are not limited to that. It is also commonly seen that PM are stationed at the area being managed and FM can be called when the need arises. Regarding the issue of hierarchy one doesn't

particularly belong as a subset to other as it depends on the situation or area in concern. For example when dealing with a hospital space even though that area is also a property, its main goal is service therefore a FM is best to handle the area leading the PM. On the contrary when dealing with residential area or shopping complex the PM is the main orchestrator with the FM as a subset. In conclusion these two aspects are over lapping and go in hand in hand putting their difference aside.

To place facilities management research in a broader context it is useful first to agree the roles and responsibilities typically ascribed to facilities managers. Facilities management is defined by the Library of Congress in the US as: The practice of co-coordinating the physical workplace with the people and work of the organization; integrates the principles of business administration, architecture, and the behavioral and engineering sciences. Within this definition the functional characteristics of facilities management are elaborated to include some 64 discrete activities. The International Facilities

Management Association (IFMA) and others have endeavored to organize these activities into broad categories of "knowledge" required for the comprehensive practice of facilities management. However, across this field the essential body of knowledge that facilities managers need consists of how to:

- Structure the multidisciplinary information which they require
- Value the information which they possess
- Present the information to inform the decision making of senior management

Develop management decision and policy formulation models. (McLennan & Nut, 2008)

2.3 Services in Facility Management

Facility management plays a support role within a corporation, or a support service to a company (Kincaid, 1994). Facility management could be defined as the mixing and alignment of the non-core services, including those involving buildings, required to operate and maintain a business to totally support the core objectives of the organization. Naturally facility management services are non-core in nature and if managed correctly, they must have a strategic importance of adding value to an organization‘s essential business provision. Higher learning institutions are recognized as a

service industry, which place greater emphasis on achieving the expectations and wishes of their customers and support services that are vital for institutions in providing better quality (British Institute of Facilities Management, 2010).

Many explanations of Facility Management include the term "service" repeatedly, there's still an actual necessity for a well-developed management understanding that reflects the service character of FM, while also accounting for its multidimensional management challenges. The domain of services management offers such an understanding that would be applied to FM (Coenen & Von Felten, 2012). Generally speaking, there are three appropriate attributes that customers could seek advice from consultants and experts when evaluating a product or service. The primary attribute is searching for qualities that attributes which are able to be evaluated before ordering and procuring a service or a product. Searching qualities include items like color, size and price. Traditionally, products like cars, clothing or furniture have strong search qualities because their attributes are often almost completely determined and evaluated before the acquisition. The second attribute is experiencing for qualities that only could even be evaluated after purchase or during the service experience. Samples of experience qualities are taste, time and reliability. Service products, like vacations and restaurant meals, are high in experience qualities because their attributes can't be fully known or assessed until they're being consumed. The third category is credibility qualities, includes characteristics that customers may find impossible to gauge, even after purchase or consumption. Samples of such service offerings include an appendix operation or brake repairs on a car. Few customers possess the medical or mechanical skills that are needed to gauge whether these services are necessary or are performed properly (Lovelock & Wirtz, 2007).

Facility services can even be defined as the supply of support to the primary activities of an organization, delivered by an internal or external provider. They're services associated with "space and infrastructure" and to "people and organizations (Coenen & Von Felten, n.d.). FM involves supporting services and coordinating tasks that are necessary for maintaining, operating and managing building assets and workplaces. As a result, the wants of a corporation and its employees can be met and successful business activities are enabled (Lavy, et al., 2010).

The supporting services in Facility Management are often in two levels: operational and strategic (Barrett, 1995) (Nutt, 2002). Operational services are the foremost visible services within the facility. They pander to the foremost regular and day to day needs of the organization with short

term results. It's the first function of Facility Management (Chotipanich, 2004). The alternative level of facility management is that the strategic level. Strategic level of Facility Management encompasses issues like property asset portfolio management, strategic property decision, and facility planning and development, which are associated with policy and strategic plan of the organization (Chotipanich, 2004).

Facility managers should be able to manage the whole chain of the processes that link together to deliver a service to customers. Failure to manage end-to-end processes can cause inefficiencies across the organization, which could be explanations for an absence of consistency, poor reliability in terms of quality and lead times and increased costs. Facility managers must not only handle the individual issues in managing back-office and front-office processes but also with the challenge of incorporating their activities with the core activities across the value chain of the main business. Managers often tend to make separations between their processes that coincides with the physical or geographical boundary of their responsibility. However, the matter that several customers face often occurs at the intersections between the varied back-office and front-office processes that combine to form the overall value chain. Nevertheless, by assessing and designing service processes from the angle of the customer being processed, it's possible to reveal the issues that occur at the interfaces. Accordingly, it's necessary for managers to want a process perspective instead of a functional perspective and to know the full process and the way they as managers fit into this process (Ware & Carder, 2012).

2.4 Building Maintenance

Oxford Dictionary explains the verb "maintain" as reason to continue. Building maintenance is defined as "work" so as to stay, restore or advance every part of a building, to keep up the performance of building fabric and its services and ambiances, to accepted standard and to sustain the utility and value of the building. It includes improvement, refurbishment, upgrading still as repair works of the current facilities (Pjavina & Geipele, 2013).

The necessity of maintenance arises because buildings inevitably deteriorate with time thanks to the effect of assorted causes. Building maintenance especially in public hospital buildings because the kind that might not stand the test of some time. Historically, in both public and also the private sectors, maintenance is seen as an avoidable task which is perceived as adding slight to the quality

of the working situation, and expending scarce resources which could be better utilized (Afolarin, 2012).

An important segment within the upkeep management system is that the analysis of defects within the buildings. Maintenance is now recognized as tool to encourage sustainability in buildings (Sahelu, 2015). Common types of building defects include: structural defects resulting in cracks or collapse; defective or faulty electrical wiring and/or lighting; defective or faulty plumbing; insufficient or defective drainage systems; insufficient or defective ventilation, cooling or heating systems; inadequate insulation or sound proofing; and inadequate fire protection/suppression systems. Additionally, dry rot, wood rot, mold, fungus, or termite or vermin infestation may also be the result of a building defect. An expert, like an engineer or architect are able to determine whether a construction problem is that the results of improper design, material, or workmanship (Ahzahar, et al., 2011).

According to (Lourenco, et al., 2006) humidity is a major source of problems in buildings worldwide, moisture can damage the building structure, the finishing and furnishing materials, besides being an on the spot explanation for human discomfort, high indoor humidity promotes mold growth, which can have adverse health impacts on the occupants.

(Ahzahar, et al., 2011) Also discuss building maintenance arranged through an accurate program of repeated maintenance plays a big role in preventing building defects. Buildings that neglect building maintenance may make up several defects which can cause structural failures.

(Bin Hashem, 2006) Discusses that the foremost obligation of maintenance unit is to keep up all the facilities and infrastructures. The main supporting system like lift system, air conditional system, air intake and outlet, electrical system, firefighting system, plumbing and sanitary system, cleaning services, civil and structural building, landscape, safety security, pest control, and telecomm system should be working properly with none disturbance that may affect the whole official procedure process.

Historically, in both public and so the private sectors, the maintenance is seen as an avoidable task which is perceived as adding little to the standard of the working environment, and expending infrequent resources which would be better applied. Management of any process involves evaluating performance, and maintenance management of buildings is not any exception. So as for

any maintenance manager to measure performance and set priorities, the organizational needs have to be considered i.e. the function and performance of buildings and their appropriate standards will be dependent on the user's insight and their primary needs (Sahelu, 2015).

Alner and Fellows stated the desires of building maintenance: (1) to approve that the buildings and their associated services are during a safe condition; (2) to make unquestionable that the buildings are fit use; (3) to confirm that the condition of the building meets all statutory requirements; (4) to hold out the maintenance work necessary to maintain the worth of the physical assets of the building stock; (5) to hold out the work required to take care of the standard of the building (Alner & Fellos, 1990).

Keeping a building throughout a condition within which it endures to fulfil its intended purpose and ensuring it presents a lovely exterior also are important factors made possible through proper building maintenance (Giepele & Pukite, 2017).

Maintenance is divided into two main categories namely corrective and preventive maintenance. Corrective maintenance, also discussed to as breakdown, failure-based, or run-to-failure maintenance, is that the simplest sort of classical maintenance policy. It has supported the concept that an item is employed until it disrupts, with the sole activity centering on repair and servicing of the parts. Preventive maintenance refers to cases where repairs or replacements occur without the occurrence of any specific fault. It is often subdivided into condition-based maintenance and time-based maintenance. Condition-based maintenance being a preventive maintenance approach where the thing is surveyed on a regular basis and also the object serviced or replaced when a specific condition is observed. Time-based maintenance is comparable to preventive maintenance, but responsibilities are executed at a frequency dictated by the course of time (Alberto & Giulio, 2014).

2.4.1 Maintenance policy

(Nibret, 2015) defined maintenance as;

> *"Work commenced in order to renovate every facility that is in every part of the site or building to an adequate standard."*

Maintenance policy is an instrument for maintenance personnel to plan their suitable maintenance policies. However, before maintenance program is set, maintenance personnel and top management are required to agree on maintenance policy because it requires strategic directions, as well as resources. The maintenance policy comprises of five major components, and different maintenance strategies are developed from these components. Without outlining this policy, maintenance, operational processes will be in a disordered manner (Nibret, 2015). According to (Chanter, 1996) the five major components are as follows:

- The total span of time allocated for maintaining to their present use
- The life necessities of the buildings and their fittings and services.
- The quality to which the building and its services are to be achieved after maintenance
- The response period necessary between defects occurring and repairs being carried out.
- The legal and statutory requirements for maintenance shall also be well-thought-out.

Building maintenance policy is a written document, and provides a management frame-work for the maintenance personnel to determine appropriate maintenance strategy and standard. Building maintenance policy and strategy are one of the main aspects of management of building maintenance operation processes. The three essential elements for formulating the maintenance policy are the choice of maintenance strategies, defining maintenance standards and allocation of maintenance resources. Maintenance activities could not be planned and implemented successfully without the understanding of these elements (Chanter, 1996).

Maintenance strategy in general contains corrective, preventive or condition-based maintenance. 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. Moreover, maintenance standard is difficult to agree with top management. Acceptable maintenance standard depends very much on available maintenance resources with consideration of common factors such as characteristics related to building, tenant, technical, administrative and political factors (Chanter, 1996).

Maintenance personnel at operational level argue that the maintenance budget is always below the needs. On the contrary, top management at the strategic level criticizes inefficiency of the maintenance organization. It is becoming more difficult to get more resources. Technology

becomes a tool for assisting maintenance personnel to improve building maintenance operation efficiency. It is recommended to use intelligent equipment and automatic maintenance scheduler to enhance maintenance, quality and efficiency maintenance allotted to a predetermined interval of time, number of operations, mileage, etc. (Chanter, 1996).

2.4.2 Types of Building Maintenance

British Standard 3811 classified building maintenance as follows:

1. Planned Maintenance: The maintenance organized and allotted with forethought, control and also the use of records to a predetermined plan.
2. Un-planned Maintenance: The maintenance performed due to no predetermined plan.
3. Preventive Maintenance: The maintenance carried at predetermined intervals or equivalent to prescribed standards and intended to scale back the probability of failure or the performance degradation of an item.
4. Corrective Maintenance: The maintenance carried out after a failure has already happened and planned to reinstate an item to a state during which it can make its required function.
5. Emergency Maintenance: A maintenance being executed immediately after a defect occurs to avoid serious consequences is called emergency maintenance. This is often stated to as day-to-day maintenance, emanating from such incidents as gas leaks and gale damage.
6. Condition-based Maintenance: The preventive maintenance introduced as a result of knowledge of the condition or status of an item from routine or continuous checking and evaluation process.
7. Scheduled Maintenance: According to (Afranie & Osei, 1999) the first goal of maintaining a building is to approve that the buildings continue to serve the purpose for which it was put up.

Planned Maintenance Vs Scheduled Maintenance

Maintenance planning is an essential element of the effective maintenance management. A number of tasks may have to be performed prior to commencement of a maintenance job; for example, procurement of parts, tools, and materials, coordination and delivery of parts, tools, and materials, identification of methods and sequencing, coordination with other departments, and securing safety permits. Maintenance scheduling is as important as job planning. Schedule effectiveness is

based on the reliability of the planning function. For large jobs, in particular those requiring multi-craft coordination, serious consideration must be given to using methods such as Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) to assure effective overall control.

Scheduled maintenance this is largely of the preventive maintenance type carried out to a predetermined interval of time, number of operations, mileage, such as checking rainwater gutters and servicing mechanical and clerical installations.

Planned maintenance deal on the details of how and what work will be completed where as scheduled deals with who will complete the work and when it will be completed. (Sahelu, 2015)

2.4.3 Purposes of Building Maintenance

According to (Afranie & Osei, 1999) the first goal of maintaining a building is to approve that the buildings remain to serve the purpose for which it was put up. The desires that maintenances are executed include:

a) to maintain the value of a building- a better maintained building usually has greater value, however, increased value could also be marginal as location and size of spot all play a vital role within the determination of value.
b) to confirm optimal use of buildings: - good maintenance should allow and make sure buildings to be used to their full potential.
c) to form or maintain appropriate appearance: - can make a positive contribution to external atmosphere and social conditions. Dilapidated buildings may contribute to social deficiency and badly preserved services and facilities, waste energy and resources and might affect the atmosphere.
d) to maximize the lifetime of main components and materials: - maintenance can reduce cost of subsequent maintenance by extending periods between repairs and replacements.
e) to ensure that buildings don't diminish from surroundings and also maintain an appropriate appearance.

2.4.4 Works not regarded as Building Maintenance

Queensland Department of Public Works (2011) regards the following conditions are not classified as maintenance:

- Enhancements and advancement to produce supplementary or new service capability or function.
- Advancement to satisfy new legal requirements being imposed by statutory bodies.
- Main refurbishment and substitutions to increase the valuable lifetime of the building.
- Restoration of the entire building to working condition after total or nearly total failure occurring (e.g. resulting from natural disasters).
- Work performed under guarantee or defects liability period by the constructing contractor.
- Operational tasks to enable tenancy and usage (e.g. Cleaning, security, waste management) and provide of utilities (e.g. energy, water and telecommunications).

2.4.5 Performance indicators of Building Maintenance

Highlighted on the view of point of the increasing expenses of new construction, the maintenance of existing buildings has developed in to being even more essential. The maintenance pointers are identified to complete with the performance indicators respectively which are known as the performance measurement system as labeled below

a) Functional- This aspect covers the management service delivery qualities or the service profiles that the management grasps.
b) Technical- Focuses mainly on the regular and scheduled maintenance services delivered to the end users of the buildings.
c) Image- Is to analyze the interior and exterior appearance of the buildings (Nik-Mat, et al., 2011).

2.5 Building Management

Building management refers to a set of actions required to retain the building in proper state as well as to maintain the property in order to use the building in compliance with the main aim of

the property. By contrast, building maintenance is a practical complex of actions, which help implement resolutions made throughout the building management process for housing and land maintenance and conservation. There are further several dozens of maintenance disciplines, but they can be assigned into hard services and soft services. Hard or technical services comprise effective, safe and harmless exploitation of conditioning equipment according to normative guidelines. Soft services mean cleaning of apparatus, monitoring of subcontractors' work (based on timetables for equipment technical check-up) and related events. PC software plays an ever-growing role for building management improvement. The scope of requisite work is mostly determined by the complexity of construction resolutions rather than by real client needs. There is a significant difference in process complexity of management of multi-story serial kind of living house and multi-functional high-rise building. Housing manager has the most authority to impact the life quality of building due to the allotted resources. It is imperative to comprehend the difference between real estate management and maintenance. It is obvious by observing the cash flow (Giepele & Pukite, 2017).

Management is an activity, which leads to a cash entry from an item (money in). However, maintenance delivers the wholesome functioning of an object for probable elongated time period with much lower costs (money out) (Giepele & Pukite, 2017). Management has pretty a varied variety of processes and is one of several real estate exploitation practices with its justly detailed roles and jobs (Giepele & Pukite, 2017).

Management is more linked to entrepreneurship. Proper management needs precise knowledge and practical talents. Decent management is when processes are clear and dependable; there is regular recording and contribution, and rapid response to client wants and grievances. This process is also time taking, knowledge-intensive and costly (Giepele & Pukite, 2017).

Throughout the management progression, landlords of building have to resolve several matters, such as how to establish building management effectively and in obedience with the prevailing regulations. They have to select the most suitable and economically justified management form (Giepele & Pukite, 2017).

Building management is a specific economic activity, a conventional of property maintenance, operation, overhaul and maintenance. This is a permitted and practical set of operations mandatory

for building maintenance and conservation of operating condition, as well as functionally essential for the maintenance of the land to ensure that property is used in harmony with the purpose (Giepele & Pukite, 2017).

FM has been attaining increasing recognition for the critical role it plays to produce efficiency and economic benefits in business endeavor (Alberto & Giulio, 2014).

It is the universal description for supervision and performing the routine tasks mandatory for real estate assets to function appropriately. The tasks implemented may contain executive management in forms of collections, record keeping, reporting, marketing management in forms of marketing strategy, occupant selection, lease schedules; security management, physical management in forms of maintenance, rehabilitation and restoration, space management, and acquisition and removal (Noor, et al., 2010). Property management also embraces asset management which deals with issues relating to the purchasing, selling and portfolio management of the real estate entity. The objective of a well carried out asset management is to produce real estate profits (Tuomela & Puhto, 2001). Define asset management as the over-all process of managing all features of real estate assets, including attainment and disposition, planning management strategies, management of building and real estate operations, monetary management and all features of accounting and recording on real estate held.

To full fill the aim of building facility management, building operation and maintenance policy, facility history, operation and maintenance manual, training for building maintenance staff‘s and information technology are very important and essential issues (Nibret, 2015).

2.6 Smart buildings

Intelligent or smart buildings are equipped with the monitoring gear system and integrated system for management of all installations in the building. The building can respond to the changes of outside and inside environments that leads and make change to the increase in functionality, comfort and user’s safety, and also to minimization of maintenance expenses (Giepele & Pukite, 2017).

Intelligent and smart buildings in actual sense are filled with devices connected to the internet creating a network of linked pervasive things, namely the Internet of Things (IoT). The IoT is one

of the vital components in building automation systems, as buildings can be instrumented and interconnected by means of up-to-date digital technologies (e.g., sensors, actuators, etc.) and often wireless communication technologies, provided that information about the condition and fitness of the physical infrastructure of buildings. This empowers efficient monitoring of resources and quick response to surprising situations (Giepele & Pukite, 2017).

2.7 Sustainability in Facility Management

The word sustainability originated from the verb to sustain by which the Oxford Dictionary defines as, *"To maintain or keep in existing"* (Oxford Dictionaries, 2011).

According to many scholars the word sustainability has no sole definition. It has numerous definitions of sustainable development given in the literature (Galvic & Lukman, 2007). At time, sustainability is observed as an activity that has succeeded to maintain kaizen implementation at some point of improvement after a process perfection activity while in other contexts or maintaining wellbeing over a long, possibly even in limited age (Kuhlman & Farrington, 2010).

Sustainability in the constructed environment has been on the political and professional agenda for decades, and a diversity of definitions and tactics to sustainable development have emerged over time (Galamba, 2014). Growing demand on sustainability has directed to the appearance of sustainability professionals in the architecture, engineering and construction (AEC) industry who challenge old-style practices and methods of reasoning within the organization (Hughes & Hughes, 2013).

FM has the capacity to play a significant role in relation to an organization's environmental and social profile, as buildings and their operation and maintenance cost a great deal in energy and material consumption and can have a noteworthy effect on the health and well-being of building users, including operators and service personnel. FM in the public sector, or public FM, also influences the social features of sustainability at a local level; for example, the openness and accessibility of facilities to the general public are important for social coherence (Galamba, 2014).

(Elmualim, et al., 2010) note that a lack of support from senior management is a main barrier to SFM. The Albertslund course was not hampered by a lack of backing from senior management, as sustainable development has been on the political agenda in Albertslund since the built-up

expansion in the 1970s through the era of Agenda 21 in the 1990s and now with political drives of contributing to a sustainable evolution on the societal level. Other public authorities might be less experienced or might have a more narrow policy that legitimates only energy-saving activities, for example. It's debatable that with time and with a narrower focus, the framework can facilitate a constructive process for recognizing organizations' abilities and progress plans.

(Baharum & Pitt, 2009) Also stress the importance of a strategy in their literature review of Green Intellectual Capital. They suggest a different framework where Green intellectual knowledge is a combination of green human, structural and consumer needs.

To execute building sustainability assessment, scholars from Sweden and Lithuania present a new multi-criteria decision-making system to select principles for building sustainability assessment. The methodology of building certification system is integrated with the multi-criteria decision-making (MCDM) methods. The criteria set for assessment are determined based on the Swedish certification system Miljöbyggnad. Criteria weights are determined by applying the Analytic Hierarchic Process (AHP) method (Giepele & Pukite, 2017).

2.8 Building Management System

Building Management Systems (BMS) could be understood as a kind of module inside a wider Smart Grid system. Data captured by the Building IoT is often sent to Building Management Systems, which together with other tools assess the health and state of the building and its assets. The efficient monitoring of buildings encompasses creating, processing and communicating information, and therefore data has a pervasive effect on Smart (Intelligent) Buildings and will be used to manage and progress the integration of data that will activate building events and services. The system involves accounting, management and monitoring resolutions. Building Management Systems are the most effective solutions for conservation of buildings and energy savings, and they also incorporate multi-building utility systems, which permit efficiently and economically managing buildings (Giepele & Pukite, 2017).

One of the challenges in implementing a distributed smart building management system is to empower interoperability of many dissimilar computational platforms by providing a common protocol across a wide range of devices with different capabilities and resources (Elrei, et al., 2011). Smart meters offer a communication infrastructure amid building owners and tenants

(Pjavina & Geipele, 2013). The efficient building monitoring system enables the manager to save energy and produce a comfortable and safe setting for users. The Smart Building is an infrastructure for end-users in a power distribution network and improves the responsiveness, reliability, interactivity, and transparency in the distribution system. The aim of the Smarter Building Architecture is to deliver the efficient and smart operation and management of the building physical infrastructure (Giepele & Pukite, 2017).

Smarter Building architecture consists of a layered structure composed of three main modules for BMS: data collection, incident management and enhancement, and asset and work order management. The design of a smart building application based on this style is demonstrated and tried; the results confirm the viability and efficiency of the suggested framework (Ian, et al., 1992).

Building Management System emerges as an imperative tool for boosting operational efficiency of private and public buildings and campuses. Such an automation system will be an important element (a kind of module) of energy-efficient Smart Grid. The integration of BMS into a broader system will necessitate standard synchronization, closer communication among key elements of these systems – Advanced Metering Interface (AMI), Building Automation and Control System (BACS); high level applications that empower commercial models and enhanced Energy Data Management System (EDMS) as one of the key essentials of Smart Grids (Giepele & Pukite, 2017).

Automatic and Control Systems support these applications: automatic fault detection; assignment of interferences to maintenance operators; on-the-field support (such as aided fault location); and communication to occupants about the intercession status. Automated support for building maintenance provides several benefits: if we consider, for example, an office building, the automatic warning to each office occupant of currently booked maintenance operations and real-time conclusion of the intercession can radically decrease the intrusiveness of maintenance operators and meaningfully increase the general efficiency of an intervention (McIntosh, 2011). Building energy management system (BEMS), which makes up an integral part of a smart grid, enables building operators to monitor, manage and control the energy utilized in their buildings, thus dropping the demand and consumption of energy (Tepic, et al., 2015).

While conventional buildings have been practicing various energy saving and building management procedures by each building exclusively, the new innovation of Information and Communication Technologies (ICT) suggests appreciated solutions by enabling interconnection between building systems and miscellaneous devices, such as end-use appliances, mobile phones, automotive, and power grid (McIntosh, et al., 2011).

Flexible system for Building Lifecycle Management (BLM) comprises of energy management, facility management, maintenance management, and product/information traceability management functioned in a system to assistance users to integrate and re-claim building information and domain knowledge during the course of the building lifespan (Giepele & Pukite, 2017).

2.9 Computer Aided Facilities Management

This application of information and communication technology is quickly being positioned in facilities management (FM) to empower meeting human needs (Elmualim & Abayomi, 2009). Computer Aided Facilities Management (CAFM) is only a part of the total scope of facilities management. There are additional computerized systems such as Building Services Management Systems (BMS), Planned Preventive Maintenance Systems (PPMS) and Cable Management Security Systems (CCMS), even though allied are frequently in practice run as distinct systems (Donaldson, 1991).

Basically a CAFM system cartels a Computer Aided Design (CAD) system with a data base. The CAD system has been improved explicitly for the use of space developers and the data base has been structured to take input from drawings and to produce output in formats that are directly beneficial to facilities managers (Donaldson, 1991).

Since the 1990s computer-aided facility management (CAFM) has been providing efficient information technology (IT) gears for the mapping, evaluation and controlling of facility management structures and processes. Since then several software systems with various systematic attitudes, purposes and fluctuating degrees of accomplishment have been established on the market. Despite the mass of suppliers and users in the different branches of trade, there is still doubt concerning the processes and attainable effects. This is closely related to the deficiency of implementation frameworks (models) and well-documented case studies. In addition, little is

recognized about how CAFM is applied successfully and the aspects leading to success. From an economic point of view, it is very significant to support the process of implementation in order to evade wrong decisions and needless investments. Implementation strategies and formulae for success are particularly of great interest (Madritsch & May, 2009).

The growing comprehension of the prominence of premises by those accountable for guiding and managing businesses and corporations, together with the development of evermore complex buildings, has directed in recent years to the rise in the United Kingdom of the new profession of facilities management. Inevitably, this in turn has laid a whole new range of computer applications and systems that target to backing facilities managers in their job of providing efficient premises that meet the core organizational requirement. These include building management systems (BMS), planned preventative maintenance systems (PPMS), cable management systems (CMS) as well as CAFM systems. Although the first three categories are often allied to CAFM systems through data exchange routines, they are usually used separately (Varcoe, 1992).

CAFM systems provide facilities managers with a varied diversity of tools and capabilities which are founded on the integration of drawn information (computer aided design—CAD) and structured text/numeric based information (Database Management System—DBMS, and spreadsheets). The integration is attained through one of two alternative concepts.

i) The progress of a CAFM system, in its completeness, incorporating CAD and DBMS/ spread sheet functionality, as one integrated application, for example, Ground Modelling Systems draw base.

ii) The incorporation of existing CAD (e.g.: AutoCAD) and DBMS (e.g.: dBase) and/or spread sheet (e.g.: Lotus123) software by writing a supplementary portion of connectivity software and information management routines, for example, FMIS, AutoFM, Archibus, Micad (Varcoe, 1992).

2.10 Facility Management Practices in different countries

Facility Management Practices in Ethiopia

The number of staff in the public hospitals of Addis Ababa is inadequate and they do not have much experience on hospital maintenance. Also the type of maintenance all public hospitals implement is immediate and corrective maintenance, only few hospitals execute routine and preventive maintenance. The maintenance requisition forms are the main tools to detect the problems on the buildings and the maintenance departments took few hours to respond to maintenance requests. The major operational state of building elements like service lines are in bad situation and inmost of public hospitals routine / periodic inspections by the maintenance departments are not well exercised. There is an adoption of maintenance log-book but the existence of formal maintenance policy guiding the maintenance work execution is uncommon. Delays in carrying out maintenance works at public hospitals in Addis Ababa are mainly due to non-availability of spare materials. In addition not having enough staff and enough budget are the main problems found in the hospital building maintenance departments. The misuse of health facilities from patient`s attendants is also the biggest problem. It is also revealed that maintenance operatives are not well motivated and this was attributed to poor pay and lack of training/development in executing the desired maintenance in the hospitals. Other reasons are lack of working tools, equipment, materials. The manpower and resource of maintenance departments are under-utilized by the management. The maintenance departments will not stay long with their current condition to give full service which they are expected to render (Sahelu, 2015).

On the other hand service provision of FM is poor regarding to on time preventive and corrective maintenance of office equipment, timely response to emergency request, periodic preventive maintenance of generators, office equipment and furniture , removal of old and broken furniture and equipment form branches and reselling it to generate income for the bank (Abera, 2017).

When we come to property administration effectiveness, FM of the bank didn‘t establish appropriate data base for stocks control and reporting system, there isn‘t safety precaution system in the ware house of the bank, FM doesn‘t regularly review the economic

performance of properties owned by the bank to increase rental income nor did they make use of IT (Abera, 2017).

Lack of proper planning, building operation and maintenance policy, detail record of the building, specific organization or association, regular training for building management staffs and facility management experts have an effect on building facility management. Breakdown building maintenance type is the most frequently practice in the studied universities. The main problems encountered during building facility management are Lack of organized facility management department and Lack of professional associations, conferences, and short courses to get updated information about building facility management (Nibret, 2015)

Facility Management Practices in Other Countries

There are also different cultures of facility management across the globe. In some regions, architectural companies and FM providers have begun to seek out ways to establish more effective communication processes. This is particularly true in wealthier parts of the world, where there is a more established culture of facility management providers and more resources available to invest in enhancing design practices. However, for architectural firms that are engaged with work in developing countries, good communication between designers and FMs can still be a serious problem, one that can be complicated by multi-directional cultural and linguistic obstacles. For example, TX A&M University's campus building in Qatar was designed by a Mexican architect, developed by a Chinese construction firm, and is now being operated by a Lebanese facility management firm. The context of a non-local design team and international collaboration can present even greater difficulties for the already-problematic communication process between designers and FMs. During the past few decades, the field of facility management has been greatly expanded and professionalized in some regions, with the understanding that the effective maintenance of the physical environment is vital to the success and well-being of building occupants, especially corporate occupants (Grimshaw & Keeffe, 1993). The growth of large facility management firms has, in some parts of the world, allowed for a more proactive and integrated approach in which FMs collaborate with external technicians, suppliers, consultants and other professionals –including architectural designers –to help improve the efficiency and reduce the costs of building operations (Federal Facilities Council, 2001). This integrated approach becomes increasingly useful as buildings become larger, more complex and more challenging to

maintain. In today's world, FMs are called upon to confront the rapidly changing needs of building tenants, the growing importance of energy efficiency and the never ending expansion of new architectural materials and design concepts.

The current state of facility management in the UK, the USA, and the Middle East several of the preliminary discussion questions in the semi-structured interviews were focused on identifying the current state of the facility management field in the three regions being studied. Thus, unsurprisingly, many of the themes that emerged during the data analysis were related to this topic.

The interviewees were asked about the current state of the facility management industry in their home countries, and they were also asked to discuss their perceptions of the differences in the industry between the UK, the USA and the Middle East. With regard to the United Kingdom, a central theme that emerged in the interviews was the view that the facility management profession in this region was approaching a state of comfortable maturity. Those who held this view indicated that facility management teams in the UK were no longer considered a "side note "or afterthought to other aspects of building design, but were instead fully integrated into the business model: I think in the UK we have a greater presence, so people have a greater understanding of what we can bring to the table (Kalantari, et al., 2003). We are starting to lead projects. I believe facility management industry has grown in last five years and become a well-established field. Several interviewees expressed the belief that facility management had gained in respect in the UK starting in the 1980s, partly because buildings were becoming more complicated, and partly because the public sector was beginning to outsource its buildings and support services to private firms. Another theme that emerged was a significant level of professional differentiation within the faculty management field in the UK. One of the interviewees, for example, took pains to classify the different kinds of FMs that one might encounter. In the schema that this participant provided, "Level 1" (the lowest status) included employees who conducted the ongoing daily maintenance and mechanical operation of buildings. "Level 2"included better-educated FMs who had come to the field from other professions. "Level 3" (the highest status) included FMs who had received formal training in facility management as a profession and often carried titles such as Head of Workplace. The development of these higher levels of professional respectability was seen as a sign that the field was increasing in maturity. A few of the interviewees, however, had a less positive perception of the current status of the field in the UK. One participant indicated that recent

developments seemed to be less about improving services and more about increasing hierarchical control: When my partner and I first came together in the late 1980s, facility management included meetings with the fledgling Institute of Facilities Management and the Facilities Management group of the Institute of Administrative Management. In the late 1990s, these merged into the BIFM [British Institute of Facilities Management]. At the time, we had great hopes for the development of facilities management as a profession. Sadly, however, it had become more of an Instrument of corporate takeover; and often offers a mediocre service –certainly worse than that achievable by good in-house FMs. This same interview participant volunteered several hypotheses about institutional obstacles to better collaboration between FMs and designers in the UK. The suggestions were as follows: The most profitable approach to facility management may conflict with the best design solution. When the short-term profits of FM firms are the primary consideration, there is little incentive to strive for optimal performance. FMs tend be better at dealing with symptoms (i.e. fixing things when they go wrong) than they are at examining underlying causes (why things went wrong in the first place). Once an FM firm has an established portfolio of buildings, there are significant dangers in sharpening up their operational performance in any one of them. Doing so leads their clients to ask things like, "why did not you do this last year? "Or "Why are not you doing the same in the other buildings that you are managing? "The fear of standing out and becoming a target of criticism reinforces a tendency toward mediocrity. These negative outlooks indicated that the changes accompanying a more hierarchical/ professionalized climate of facility management operations might not be universally positive or well-received. A final theme that emerged in the interviews was that an aging employee population was an important problem currently facing FMs in the UK. There seemed to be a significant consensus that many of the "old guard "were preparing to retire, and that there were inadequate provisions to pass on their experience to younger FMs. The younger generation was seen as having greater respectability and technical savvy, but there were concerns that the practical knowledge and experience of the older generation were being abandoned. Thus, there seemed to be a distinct generational shift occurring in the nature of the profession, one that included both gains and losses and that was regarded more positively by some and less positively by others. Concerning the USA, only one consistent theme emerged from the interview data. This theme was a concern about the inadequacy of professional FM training programs in the region. The study participants indicated that finding qualified employees

was a significant challenge in the USA, and that the younger generation did not seem to express a great interest in the field: For these types of jobs the average age is about 55 and 60. It is very difficult finding a young person who is interested in operating buildings (Kalantari, et al., 2003). The two big challenges are training and old generation of facility managers. The interviewees indicated that the US public lacks understanding about the exact functions of FMs, and that formal training programs for FMs in the country's university system are scarce. As a result, several interviewees suggested that during the next 10 years there is likely to be an inadequate number of new professionals entering the facility management industry in the USA, which may pose a serious risk to the stability and service quality of the profession (Kalantari, et al., 2003).

The interviewees agreed that facility management in the Middle East was a new but rapidly expanding field. Fueled by wealth from oil production, all aspects of architecture, construction and associated fields have been growing strongly in this region and were Predicted to continue to do so throughout the fore seeable future. The interviewees emphasized, however, that facility management is still a fairly immature industry in the Middle East. They explained that the vast majority of the region's people were not even aware that such a profession existed. Four out of five of the interviewees based in Qatar also mentioned that the quality of workmanship was a particular challenge for the region's FMs. They cited a lack of consistent production standards, as well as language barriers and an absence of formal training systems, as the primary obstacles facing their profession. Another important theme that emerged in the interviews was that the effectiveness of facility management in the Middle East was hampered by the rigid social hierarchy of management levels in this region. Several participants cited conflicts of interest and cultural barriers between different levels of management, and suggested that in many cases upper- level decision makers had only a shallow understanding of actual facility management operations. One of the interview participants added that there was a huge difference between the salaries of individuals in upper levels vs. those in the lower levels, and that access to the best paying positions was largely based on personal background rather than merit. Such a situation, the interviewee suggested, contributed to a sense of indifference when it came to improving the quality of facility management services (Kalantari, et al., 2003).

The practice of property management in Hong Kong follows traditional styles that can be observed in other developed countries. In the simplest terms it can be defined as the total care of the building

during the operation stage; the extent of management service will vary according to the building's use, quality, size, location and age, the ownership profile, and the capability and strategy of the property management company itself. The quality of the building is a very important determinant of the extent of management service to be involved. Buildings of higher quality are ordinarily provided with correspondingly higher management and maintenance standards, often entrusted to professional property management agents. A more comprehensive and high-standard management service is much more easily realized in prime buildings usually situated in high-rent locations. The size of the property also determines the extent of management likely to be involved. For example, a 20-unit building would probably not need a full-time manager but owners may need to retain a management consultant on a fixed-fee basis. Conversely, a professional property manager would be unlikely to show interest in the management of such a relatively small property. In slightly larger properties, fiscal management services may be needed so that assessments can be collected regularly and a budget plan followed.

With very large properties full momentum staff consisting of leasing agents, a building supervisor, and maintenance and security crews will be needed. Large properties usually justify the formation of a separate management entity. If such a body is not created then there must be provision for a large on-site management organization headed by a resident manager and assisted by several professionals.

Location can also be an important management consideration, especially with properties involving a high degree of head office supervision. This is particularly relevant to small single-block properties where management supervision is carried out by a district supervisor whose duties include monitoring the performance of caretaking staff assigned to the property. It would obviously be beneficial in terms of time, cost and efficiency if such properties were located close to one another. The age of the property is very significant since there is close correlation between this and the number of facility failures giving rise to increased maintenance costs. Often this situation coincides with a lower affordability of occupants and some design and workmanship faults in the structure, the net result being a cut back in the management service provided. By way of example, Hong Kong boasts a large number of flatted-factories, buildings of up to 20 story's in height which accommodate a multitude of individual companies engaged in light industry, normally component assembly. Some of these flatted factories are old overcrowded buildings

which do not have the benefit of modern facilities. Notwithstanding, to maintain business advantage, tenants still need to be able to operate at a pace that matches their competitors. Chaos can result in the form of lift failure, congested common areas or utility services interruption. In addition, breached regulations for fire safety and means of escape are occasionally discovered rendering a positively dangerous environment in which to work. Tenants are not prepared to pay more for what they consider to be an inadequate property management service; the owners will not inject more capital unless they can be sure of an economic return; and so the inevitable downward spiral of reduced management services gathers momentum (Baldwin, 1994).

International comparisons of facility management cultures

One of the strongest comparative themes that emerged during the interviews was that the facility management industry is more mature and firmly established in the United Kingdom than in the USA. A commonly cited piece of evidence in support of this assessment was that there are a much larger number of educational programs giving degrees or certificates in facility management in the UK. In addition, several of the interviewees mentioned that the facility management industry was more heavily established in Europe in general before it began to emerge in the Americas. When comparing the Middle East to the USA and the UK, a central theme was that the Middle East suffered from greater problems regarding communication breakdowns, conflicts and cultural divergences. One study participant who had experience working in both the UK and Qatar indicated that there were greater problems concerning trust and responsibility in management–employee relations in the Middle East: We have to do cost-ownership [in the UK] but they [in the Middle East] do not. If I go back to[Building X in the UK], I had six thousand people coming to the building each day –one security guy, one-person reception, and nobody goes longer than 30 seconds to get in over there [in the Middle East] you have one person [screened by] three security guys, and it can be an hour to get in. Other interviewees cited cases in which attempts to provide knowledge management throughout the life cycle of an architectural project floundered due to language barriers and inefficient management processes. All of the interviewees who had an opinion on the differences between the regions (24 of 30 individuals) stated that communication problems between diverse cultural outlooks and worldviews was a factor that made facility management more difficult in the Middle East. The interviewees also agreed that as a result of these difficulties, there was currently very little

collaboration between designers and FMs in the Middle East. Some of the informants pointed out that the Middle East Facility Management Association was working on a benchmarking report that would emphasize the need for such collaboration, but at the time of the interviews, this effort had not yielded much in the way of practical progress. While the collaboration between FMs and designers in the UK and the USA was not always seen as productive, the interviewees agreed that this collaboration was better than the comparative situation in the Middle East, where for the most part it was not happening at all. Designers 'perspectives on international collaboration with facility managers the designers who contributed to the qualitative interviews largely affirmed the need to improve the collaboration process, especially in international remote-design contexts. Several of the designer participants took pains to demonstrate their desire to collaborate, offering statements such as: We appreciate the input from FMs and we believe that the relationship with FMs can bring a useful hands-on experience to the design process. However, when it came to the details of such collaboration, or specific knowledge about the concerns of FMs in different countries, the designers whom we interviewed could only offer vague and general information. It became clear in our interviews that the designers had very limited awareness of the specific local and industry-specific concerns and challenges that we were hearing from the FMs. At the same time, the designers identified several of the same obstacles to collaboration that FMs put forward, including a lack of shared terminology and a lack of institutional incentives for integrating FM perspectives into the design process. In a future companion study, the researchers plan to conduct a more detailed survey of designer perspectives tailored to identify their particular outlooks and professional concerns in relation to collaborations with FMs (Kalantari, et al., 2003).

2.11 Summary of literature review and gap identification

2.11.1 Summary of literature review

Facility management is a discipline which engages with giving supporting services to end-users of a facility in a more organized and productive manner rather than exploiting a simple profit from a facility. It always try to manage a building efficiently and effectively with regular maintenances and providing services. Thus, facility management embraces the concepts of cost-effectiveness, productivity, improvement, efficiency, and employee quality of life. Currently, computer aided facility management is being used widely in the developed world to enhance the quality of facility management service giving.

2.11.2 Gap identification

The buildings being constructed in Addis Ababa desperately need a system of facility management to be established. Managing a facility properly and professionally is the foundation for the effectiveness and efficiency to be acquired in any endeavor going on in the facility. In a civilized and more digitalized time like ours, building tenants depend on the facility real time for the works they undertake. They also rely on different services that need a full time attention to succeed in their works. A lack of proper and highly advanced facility management will not only affect the productivity of the end users or tenants but also it will deteriorate the quality and life time of the facility itself.

This paper will attempt to assess the current practice of facility management in Addis Ababa and it will try to understand any effort to optimize the productivity of the end-users and building owners.

3 RESEARCH DESIGN AND METHDOLOGY

3.1 Overview of Research Process

Research has its special significance in solving various operational and planning problems. The main role of this chapter is to describe the research method adopted. It presents the type of methodology adopted, the data collection methods and instruments used as well as the analysis techniques used.

This research desires to contribute knowledge towards solving problem, to private and public owned buildings stakeholders by creating awareness about the importance of facility management and it identifies problems in the building facility management practice for improvement. Based on the statement of problem, first a review of literatures on the subject was undertaken. After the literature review work, both observation and survey methods of data collection in selected governmental and private buildings in Addis Ababa are used in the research. Questionnaires and Interviews for this purpose are prepared to be completed and answered by building owners, facility managers and end users of buildings. Three case studies on three buildings with proper facility management are conducted to match to what has been discussed in the literature.

The purpose of the research and the nature of problem to be solved have a significant bearing on the methodology that needs to be adopted. As mentioned in the introduction chapter, there are three objectives for this research:

- To assess the practice of Facility Management.
- To assess the activities or tasks of a Facility or Property managers that could be applicable in the Ethiopian context.
- To assess the need for facility Managers in the Construction Industry.

3.2 The Research Instrument

In order to find answers to the research questions and to achieve the objectives of the study, the case study method of qualitative and quantitative research is used to collect the research data. This is achieved through the combination of referring literature written on facility management and

gathering data through questionnaire and structured interview. This questionnaire survey has both open-ended and closed-ended questionnaires.

3.3 The Research Questionnaire Design

The research, Assessment of facility management practices of selected public and private buildings in Addis Ababa is investigated by addressing questions focused on building facility management system and practice, building operation and maintenance, documentation and information technology applicable to facility management, problems and challenges in facility management practice and causes of problems and challenges in facility management. The questionnaire design was based on a combination of an extensive review of literatures dealing with building facility management. Questions were developed from the information gathered from literature and best practices of facility management supplemented to achieve the research objectives. The questionnaire form, which was accompanied by a cover letter, was a mix of structured (closed) and unstructured (open) type of questions for obtaining as much information as possible.

3.4 Research Sample Selection

In the case of population it is known that there are few facility management service giving firms and a number of buildings across Addis Ababa. However, this thesis emphasis and considers public and private owned buildings in Addis Ababa. The research sample consists of three facility management service giving firms for detailed case study and thirty (30) buildings from the private sector and public owned buildings, which are selected by purposive sampling method to represent different types of buildings. From both public and private owned buildings, mixed use buildings, residential apartments, hotels, and hospitals are targeted in this research.

3.5 Research Analysis

The descriptive statistics are a method of analysis that provides a general overview of the results and used to analyze the result of questions. Rating scale is one of the most common formats for questionnaire respondents on their views or opinions of an event or attribute. In this regard,

participants were asked to indicate the level of the implementation components of facility management and causes of problems on building facility management implementation by rating them on five point scale, (1 = very low, 2 = low, and 3 = medium, 4 = high, 5 = very high).

3.6 Data Analysis and Interpretation

The analysis and interpretation of the collected data are carried out according to their type and nature by relating to basic questions of the study. First, the collected raw data through case study, questionnaire, interview, personal observation and documents were organized in to a form that can give meaning, and then structured and analyzed using simple mathematical applications of descriptive statistics, figures, inferential statistics and discussions like percentage, frequency and figures employing Microsoft Excel, and described in the statements. Moreover, the qualitative data was analyzed and interpreted by relating and triangulating with quantitative data findings and with having a focus group discussion. This was employed to ascertain content validity of the data.

Research Objective	Tool/ Methodology Used	Expected Out Put
To assess current practice of Facility Management in Addis Ababa.	Questionnaires Interviews Case Study	Getting a clear understanding of the current practice of Facility Management in Addis Ababa.
To assess the activities or tasks of a Facility or Property managers that could be applicable in the Ethiopian context.	Questionnaires Case Study	Finding out the major activities or tasks being given by Facility Management service givers.
To assess the need for facility Managers in the Construction Industry.	Questionnaires Interviews	To assess the need of producing facility management professionals.

4 DATA COLLECTION, ANALYSIS OF FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the findings, analyses and outcomes of the questionnaire, interview and case study. The main findings are summarized in this chapter based on the following research objectives:

1) To assess the practice of Facility Management.
2) To assess the activities or tasks and need of a Facility or Property managers that could be applicable in the Ethiopian context.

3) To assess the need for facility Managers in the Construction Industry.

4.2 Assessment on the Practice of Facility Management and its Maturity level

4.2.1 Function of the buildings assessed

This section aims at giving a background knowledge on the different functions of the samples considered in this research. A total of 90 questionnaires were distributed on 30 different building facilities and 3 interviews were held and analyzed in this research. The targeted building facilities are located in Addis Ababa, which are of mixed use, hospital, residential apartment, and hotel facilities with a facility age of 1 year up to 80 years. The data collection targeted facility owners, facility managers (whether in-house or acquired firms) and end users of the facility.

Function of Facilities assessed	**Number of facilities**	**Private / Public**
Mixed Use building facilities	15	All private
Hospital facilities	6	4 Public 2 Private
Residential Apartment facilities	6	2 Public 4 Private
Hotel Facilities	3	All Private

Table 4.1 Functions of the buildings assessed

4.2.2 Practice of Facility Management

Before assessing the types of services being given to facility users and the maturity level, this section aims to assess the number of facilities being managed by facility management firms, indoor facility management departments and the facilities with no managers. Figure 4.1 shows this assessment.

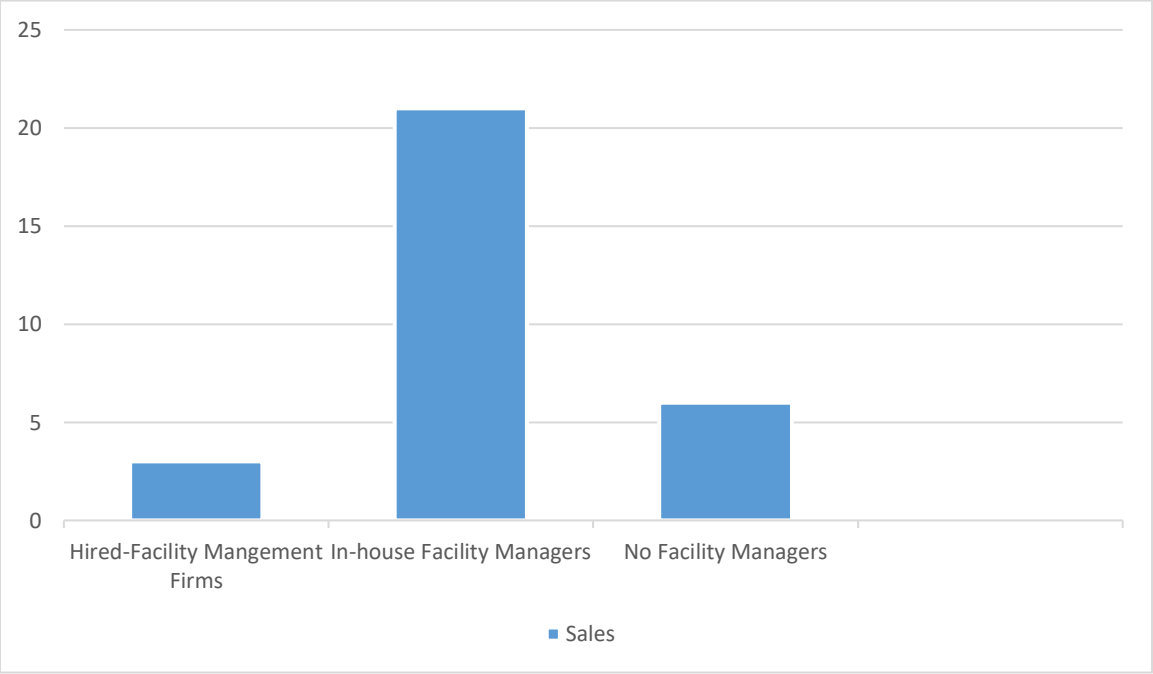

Figure 4.1 Assessment of facility managers.

4.3 Assessment on Tasks of a Facility or Property Manager

4.3.1 Types of services being acquired

This will help understand the types of services given among the sampled facilities and get a clear understanding of the types of services being available. Based on the data collection procedures, the types of services being commonly acquired by facility users are maintenance services, cleaning services, security services, utility services (like electricity, water, internet, lifts and the like) and parking services. The services are shown in Fig. 4.2 with their correspondant dominance in facilities.

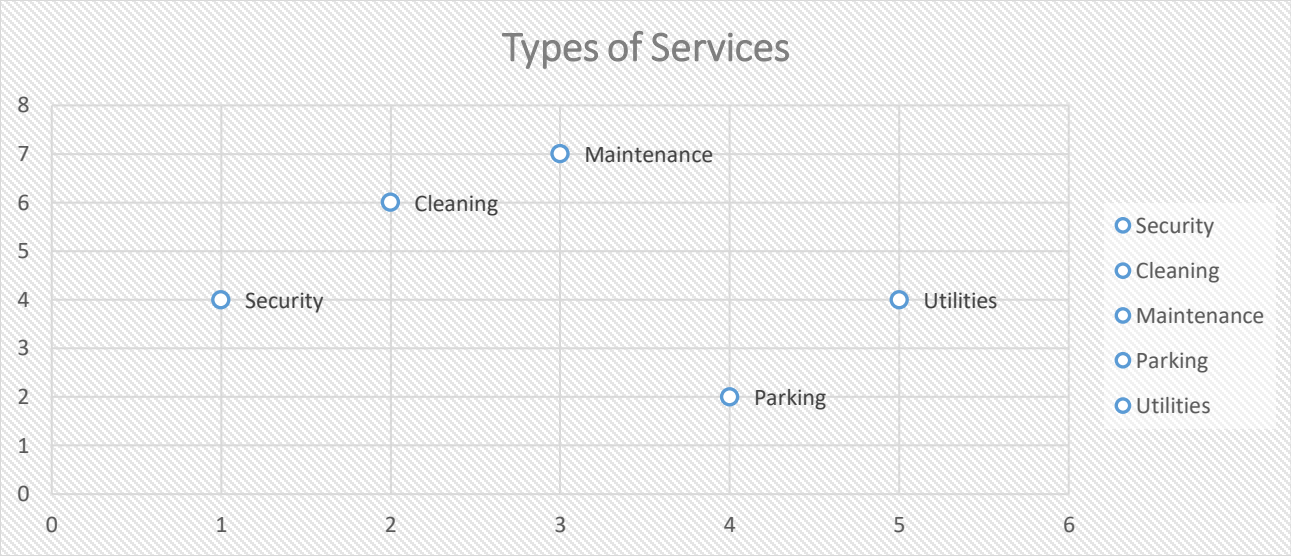

Figure 4.2 Types of Services

4.3.2 Ways of giving services

This section aims at identifying if the services described above are given by in-house professional or outsourced to specialized service givers. There are different specialized companies giving a single or more services of facility management and companies that offer the whole services by themselves. Fig 4.3 shows the finding comparisons of these two.

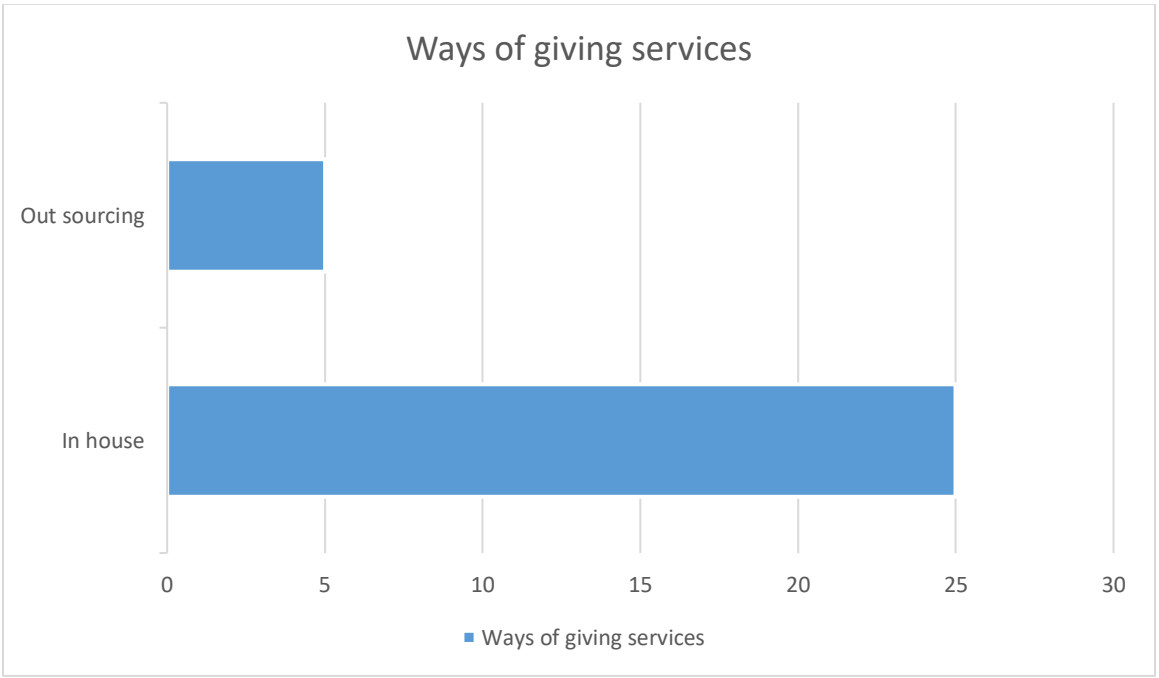

Figure 4.3 Ways of giving services

4.3.3 Maintenance Services

This section shows how the facilities' maintenance services are being executed. The first point this section discusses is that whether the facility managers have maintenance plans which stand before defects arise or not. Based on the data collected, 27 building facilities did not have any maintenance plan while only 3 building facilities had maintenance plan. The rest 27 building facilities were only maintaining after defects occurred with no plan. Fig. 4.4 shows the findings of our survey of facilities with maintenance plans.

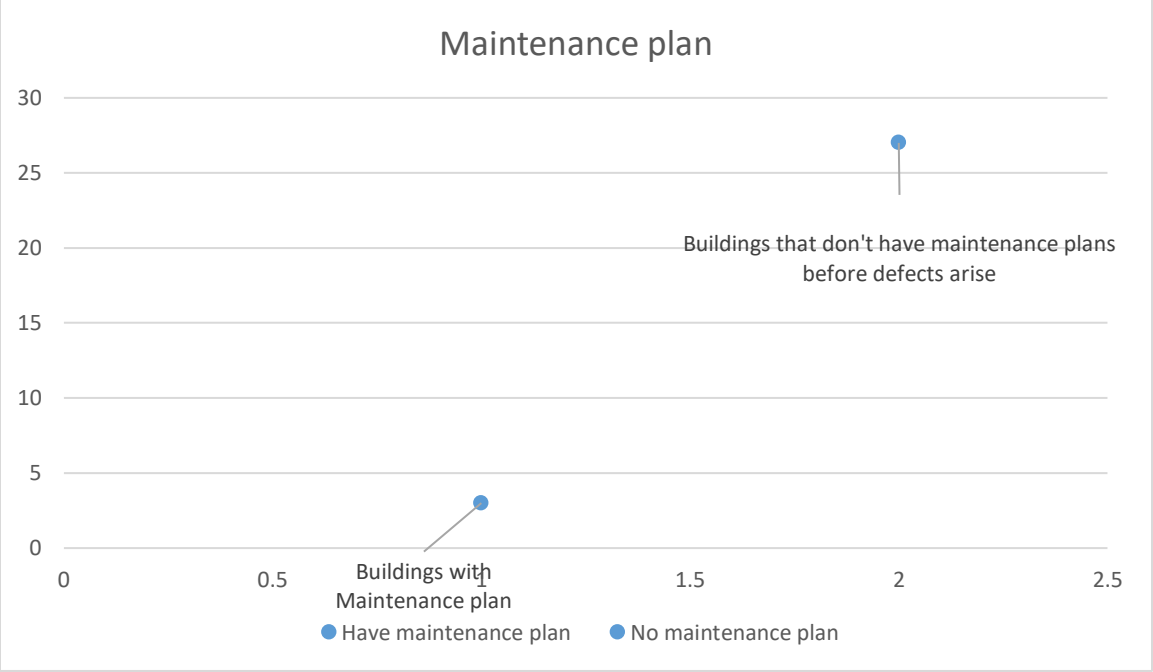

Figure 4.4 Buildings with maintenance plan

a) Defect Identification System

This section discusses about the way facility managers identify defects before maintaining them. Defects could be identified either by manual complain of occupants and end users or a system designed and applied by the facility managers to identify and maintain defects even before complain arises from the end users. Based on the reply gathered, Fig 4.5 shows the collected data on defect identification.

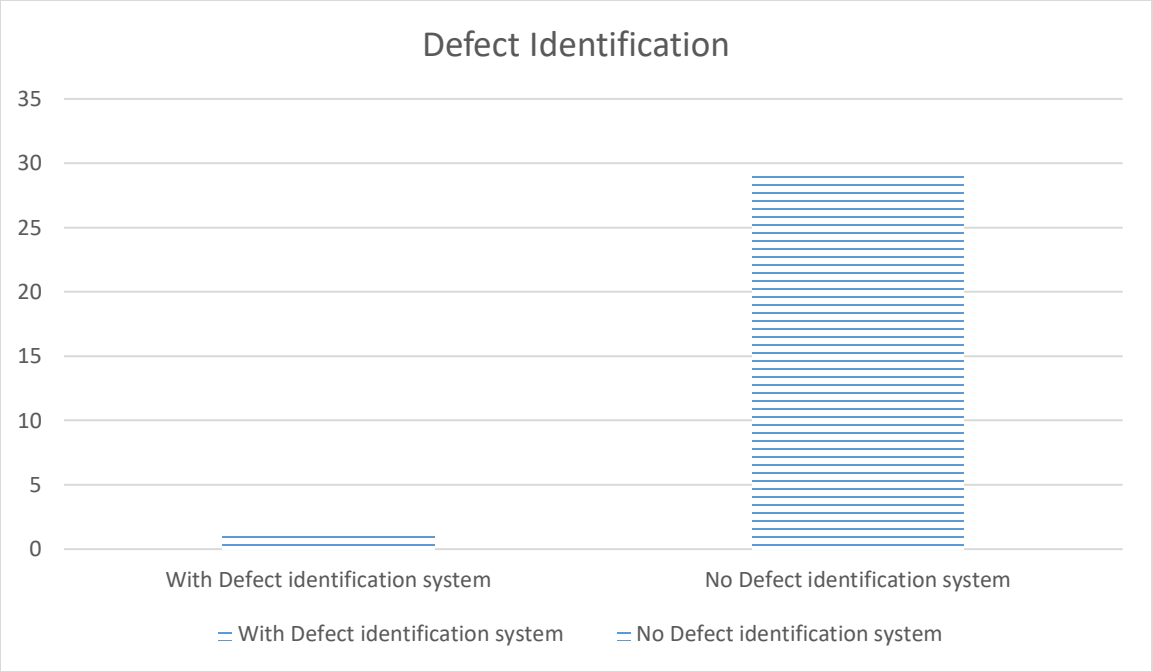

Figure 4.5 Defect Identification system

As shown in the figure 4.5 above, the majority of the buildings assessed use no system of defect identification. They rather use traditional way of defect identification in which end users or occupants complain for any defect they encounter while using the facility. The facility that uses defect identification system is also not advanced. They use daily checklist system for identification of defects even before occupants and end users encounter and complain for the defects. Typically, facility managers inspect selected parts of building like electricity, water supply, generator, lift, sanitary system and they identify defect by themselves and maintain the defects.

b) Types of Maintenance

As discussed in literature review, the main types of maintenances are preventive maintenance, corrective maintenance, immediate maintenance and routine maintenance. Based on the reply gathered on the types of maintenance implemented, Fig 4.6 shows the types of maintenances used among our sampled facilities. Among the types of maintenances, corrective maintenance is the most widely used type of maintenance in which 26 out of 30 building facilities were using. It involves maintaining a defect after it occurs and is identified by the manual or traditional way by occupants to facility managers and the facility managers respond to the request of the tenants and correcting the defect.

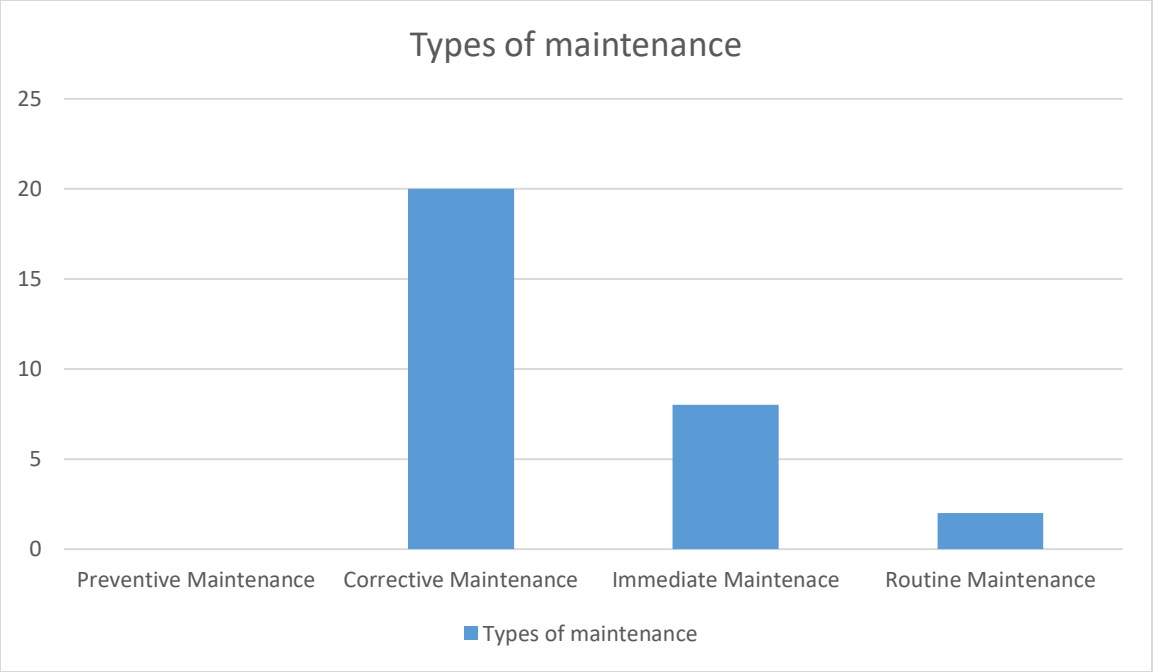

Figure 4.6 Types of maintenances

4.3.4 IT support

As discussed in the literature review part, IT support in managing a facility is becoming the future and modernized way of doing things easy, precise and proactively. If Information Technology integrated with the facility management practices, it can save a lot of energy and cost with the actualization of a perfect way of managing the facilities which in return maximize the productivity of the tenants and also the operational life of our building facilities. According to the data gathered 25 out of 30 building facilities were not using even a simple IT system to help the facility management practice. Figure 4.7 shows the comparison of findings between an IT supported and unsupported facilities.

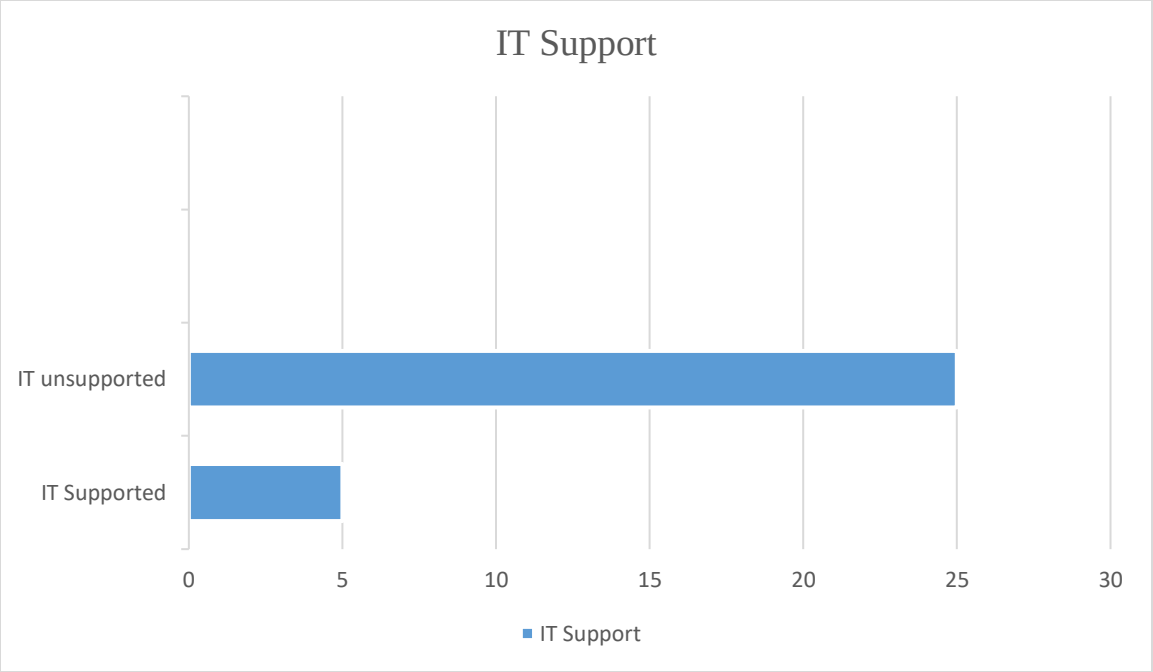

Figure 4.7 IT support on facility management

4.4 Assessment of the need for facility Managers in the Construction Industry

4.4.1 Need for a well-established facility management service

This section shows the existing need for a well-established facility management firms. In the data collecting procedure, the assessed building owners have responded about their appetite and willingness to hire if a well-established facility management firm exists. From the thirty (30) different both private and government building facility owners, twenty eight (28) of them have shown an interest in handing their facilities over to a well-established facility management firms depending on the quality of administration of the FM firms, cost of facility management services and the services included in the facility management. Fig 4.8 shows this collected data in analyzed figure.

Figure 4.8 Need for facility management services

4.4.2 Willingness to pay for facility management services

This section shows the willingness to pay for facility management services and the amount of money the building owners are comfortable of paying. In this section, the data collection has been divided to two categories, namely government owners and private owners. The government owner's data analysis shows government owned facilities are willing to pay of payments in ranging from 500,000 to 4,000,000 birr per month due to the size and complexity of the facilities. Private owners' data analysis shows the private owned facilities are willing to pay of payments ranging between 80,000 up to 200,000 birr per month. Fig 4.9 shows this collected data in analyzed figure.

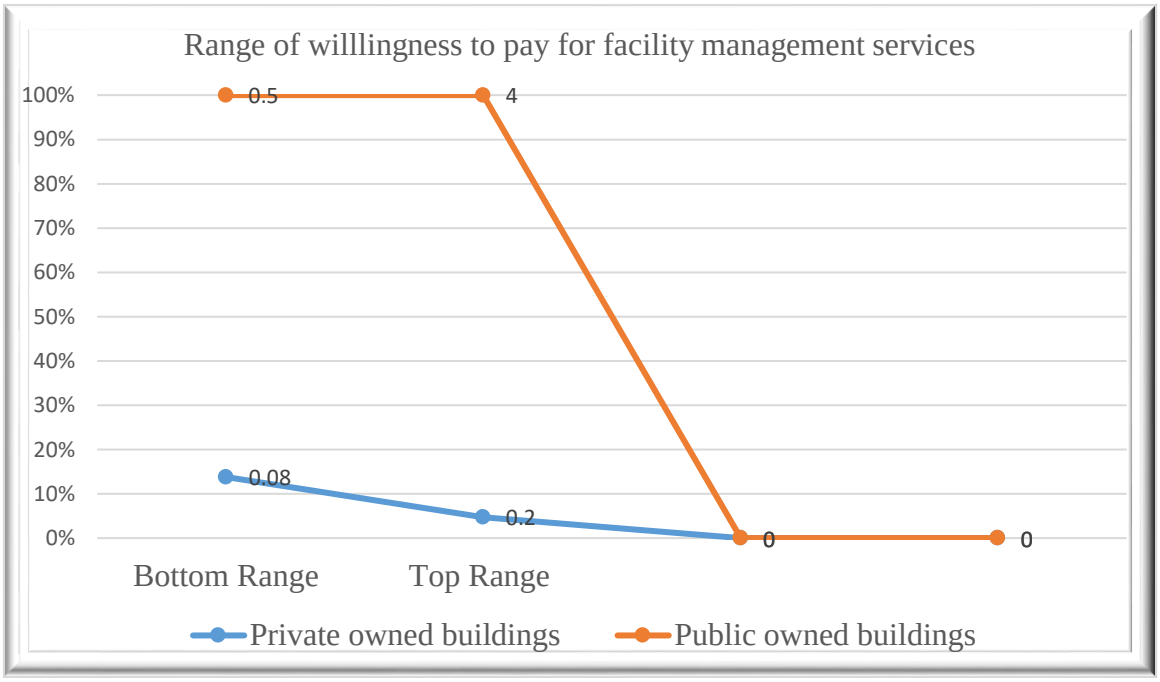

Figure 4.9 Willingness to pay for facility management services

4.5 Case Studies

After collecting data through questionnaire and interviews, to make the research meet its objectives, in the methodology part its stated that case studies on three facility management firms are conducted. Thus, three facility management firms from different ownerships were targeted for the case study. The firms are Commercial Nominees, Baladera Property Management and Consultancy Services, and National Asset Management (Roc spaces). This section will elaborate the findings of each facility management case respectively.

4.5.1 Commercial Nominees

Commercial Nominees P.L.C (CN) is a state owned company established in 1965 by the then Commercial Bank of Ethiopia. It provides different kinds of services to its customers like local private employment and management service, national distribution of Ethio-Telecom products, real estate /property/administration, western union money transfer service, salary payment service, CBE birr agent banking service, share dealing activities, provident and employees benefits funds administration, effecting different payments and disbursements, buying and selling flat and story buildings, collection of varieties of bills and revenues and undertaking other outsourced business services on behalf of its customers. (Anon., n.d.)

Even though the company has been active for more than fifty (50) years, the real estate/property/ administration service department has been established and registered by the Ethiopian government to operate in the facility management sector starting from 2005 and has an experience of managing and administrating building properties. As described above, the real estate /property/ administration department manages real estate buildings and villas owned by individuals, NGO's, government organizations, business organizations, cooperatives, etc.

As described by the manager for non-financial services of Commercial Nominees, the company has about sixteen (16) permanent staffs at the head office level coordinating the on-site administration activities of their crew, which is highly dynamic on the changing atmosphere of their clients' business. The company's professional workforce comprises of mainly accounting, economics and management backgrounded professionals with only one resident engineer at the

head office which schedules, monitors and controls the maintenance, and small modification construction works on sites.

Commercial Nominees as a real estate /property/ management company that requires an average payment of 6-25% of the general income depending on the complexity of the facility and in return gives the following basic services for its customers.

A. Services rendered by Commercial Nominees

a) Rental Services

The Company undertakes all rental issues of a property. It seeks tenants for any free space in a building and prepares a rental agreement, it accounts every rental and related payments from tenants and deposits the money on the owners' bank account and also prepares accounting summaries and reports for the owners of the property. To make sure the buildings are being rented on a fair price, Commercial Nominees does a price survey annually on renting prices for its buildings and then makes adjustments on rental prices if necessary depending on the result found on the price survey.

b) Maintenance Services

Commercial Nominees gives maintenance services for the buildings under its management. The maintenance type depends on the clients' choice and the budget allocated for maintenance in their agreement. But as a company Commercial Nominees has a standard for scheduled defect identification system which is led by the resident engineer of the company. The scheduled defect identification system is implemented by deploying an assessment committee in a scheduled time manner to investigate the status of every part of the building to list out the items that need maintenance even before complaint was filed by tenants.

c) Security Services

Like most of the facility management companies in our country, Commercial Nominees has trained security guards which are commissioned to keep the security of the buildings under the company. The company recruits, trains and commissions its own security forces on its site. As it is known by most of our society, the building properties of the biggest bank; Commercial Bank of

Ethiopia are managed by Commercial Nominees. For this, the security services of the Commercial Nominees are very strong and up to the best standards because they not only give security services to the buildings but for the financial asset in the banks as well.

d) Cleaning Services

Cleaning services are also parts of the services being rendered by the Commercial Nominees. They give both internal and external cleaning of the buildings under their management. The internal cleaning is the mostly seen cleaning of the rooms, walls, stairs, elevators, corridors, windows, doors, and handrails. But the external cleanings are the cleaning services of the façade, external windows and Aluminum panels.

e) Tax payment Services

When Commercial Nominees undertakes the facility management work of a building it takes full responsibility of the property which includes announcing and paying of any government related taxations. The company presents the financial statements of the buildings revenue to the government and makes payments for any tax receivable by the government including VAT, pension, and the like.

f) Legal Services

One of the services Commercial Nominees renders to its customers is legal services. If any kind of legal issues arise to the customer regarding the facility being managed by Commercial Nominees, they also take the legal process up to litigation.

During an interview held with the manager for non-financial services of Commercial Nominees, the following points are the key points raised regarding the demand and challenges of the facility management industry in Ethiopia.

B. Demand for facility management services

As described by the manager for non-financial services of commercial nominees the demand for facility management services is increasing significantly. For the growth of the demand for facility

management services the following are key points as described the manager for non-financial services of Commercial Nominees.

a. Reliability

It is described that a very large demand especially around the diaspora community as they live abroad and feel very comfortable with trusting commercial nominees since it's a state owned company. For the growth of the industry, facility owners should find a very comfortable situation in which they can trust and rely with handing over their facilities in which they build in years and with high financial cost.

Regarding reliability, Commercial Nominees had an advantage over other competitors in penetrating the market because people feel they are in good hands. As it is described, it's becoming a culture in which real estate developers and other business man of our time are collecting money and resources and vanishing in thin air. It's profound that people are having difficulties in trusting any institution these days. That's what is making the growth of facility management industry slow. So, reliability of facility management companies is a must to advance the industry.

b. Awareness creation

Commercial nominees as a facility management company observes that there is still a huge gap in awareness of facility management in our society. They feel that the majority of the society not only has less awareness about its benefits, the society has no awareness about the industry or even never heard of the name itself. This is a huge gap that should be filled rapidly, because for the industry to grow and advance people must know what it is and what its benefits are.

Commercial nominees is working to narrow the gap on awareness of facility management by going and advertising on different media and other awareness creation techniques.

c. Quality standards

Facility management is a service giving industry with varying quality standards in the country. Since there is no national standard with giving the service, CN observes that the companies are not competing and also striving for a common goal. This makes the companies go in different paths in return decelerating the growth of the industry.

A national set of standards and guidelines should be prepared and implemented with control from the government for the advancement of the industry. The current practice is that companies may or may not formulate their own standards which are very different from each other. This will kill the demand for facility management because facility owners get confused of what they demand and acquire.

C. Challenges of the facility management industry

As described by the manager for non-financial services of commercial nominees the challenges that company faces are of two kinds.

a. Unavailability of facility management professionals

Commercial nominees is having a hard time because there are no facility management professionals on the market produced locally. They feel like they are trying to manage facilities with different professionals with no background knowledge on managing facilities.

The majority of the professionals in commercial nominees are mainly accounting, economics and management backgrounded professionals with only one resident engineer at the head office in which none of them have knowledge background from the facility management perspective.

b. Lack of Computer aided facility management applications

Commercial nominees being a state owned company and also responsible for commercial bank of Ethiopia's facility managing company, feels all its operations are being handled manually which is affecting the company's productivity and efficiency. The manager for non-financial services of Commercial Nominees described that commercial nominees has evaluated not being backed up with computer aided facility management is one of its biggest challenges and also put a direction to bid and acquire a computer aided facility management system and is on a procurement process.

4.5.2 Baladera Property Management and Investment Consultancy

Baladera property management and investment consultancy was legally established in 2015 registering by the Ethiopian government to operate in the facility management industry. It has now of 150 staff members with 6 senior key management staff professionals. Baladera has built a reputation as a professional establishment consulting on property investment as well as ensuring their clients receive the best property management focusing on their competitiveness, efficient management and profitability.

Baladera property management and investment consultancy gives consultancy and property management services on commercial facilities like mixed use buildings, shopping malls, hotels, business centers, office towers, etc. and residential facilities like apartments, penthouse, residential houses, condominiums, etc. Baladera property management and investment consultancy gives the following services for its customers.

A. ORGANIZATIONAL STRUCTURE

Baladera property management and investment consultancy has its own organizational chart in which it manages different projects at hand. To manage these projects accordingly, the company uses different professionals on site and in the head office as the organizational structure seen on Fig. 4.10.

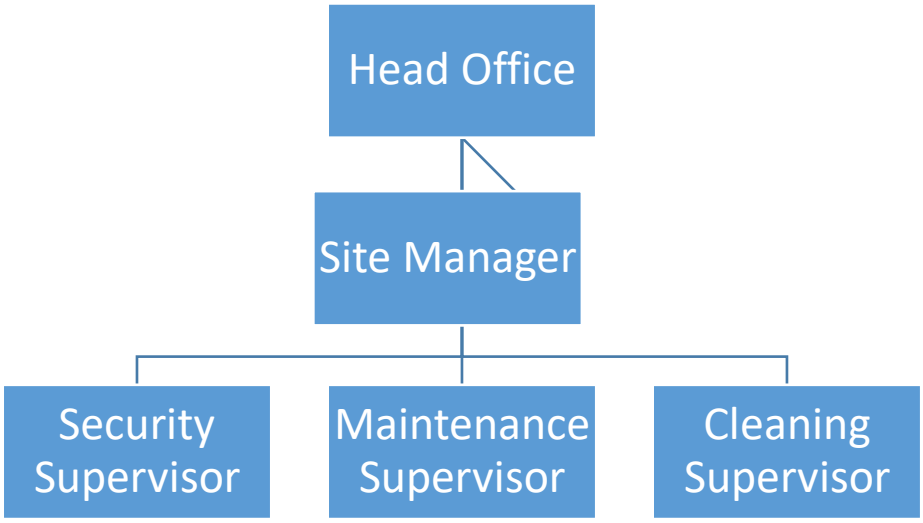

Figure 4.10 Organizational chart of Baladera Property and Property Investment Consultancy site management

B. Services rendered by Baladera property management and investment consultancy

a) Business Consultancy

Baladera property management and investment consultancy gives business consultancy services on facilities before and on the design phase even before construction. The business consultancy service provided by Baladera property management and investment consultancy also includes feasibility study, function of the facility, relevant location selection, design consultation regarding the functional use and operation of the facility on the conceptual and inception stage.

The other consultancy services rendered by Baladera property management and investment consultancy is after the completion of the construction of the facility and before its operational use. In this stage, Baladera property management and investment consultancy gives consultation services regarding the business mix of the building. In this stage they set up the amount of rooms per floor, which service should be placed on which floor, the number of restaurants, cafes, shops, offices, banks and etc. This consultancy service is called Business mix consultancy.

Baladera property management and investment consultancy gives this consultancy of the business mix alone if they are not awarded the contract of managing the whole property. If the client have a management team of its own, Baladera property management and investment consultancy gives

only the consultation services of the business mix and consult the management team on property management including training the management team, creating an organizational structure sufficient for managing the property, deciding the manpower requirement including their subjective liability and benefit of every man power deployed on the facility management team.

b) Property Management

Baladera property management and investment consultancy also undertakes the entire building facility management process. In this kind of services, the company gives renting services, collecting every payment from tenants, general services (security, cleaning, and maintenance services) depending on the contract entered by the company and its clients.

c) Parking Management Services

Baladera property management and investment consultancy also gives parking management services. If a building with a parking space requires a facility management firm which can properly administrate its parking space for effective and efficient use of its customers, Baladera property management and investment consultancy designs the parking system, way of management, system of payment collection and security of the parking space.

The company runs the parking management system by fully commissioning its own designed system for the maximization of profit for the facility owner, ensuring the increase of productivity of the tenants and boosting the comfort of the walk-in customers.

Baladera uses IT support in managing parking services in coordinating services and also making things in order. One of the Information technology integrated features is Spike which makes sure the parking spaces are provided for the intended person only and cannot be accessed by anyone else. The designated owner will open the spike's parking space with a remote control and also raises the spike barrier while leaving the parking space.

d) Maintenance Services

Baladera property management and investment consultancy mainly engages in corrective maintenance with unplanned schedules. The company is not experienced with electro mechanical maintenances (lift, generator, water pump). The company is providing maintenance services of

small scale like plumb maintenance, changing light bulbs and switches, toilet line maintenance and lift emergency calls if people are caught inside.

Regarding maintenance services, the company deploys maintenance professionals for electrical maintenance, sanitary system maintenance and lift maintenance professionals. The professionals may be deployed on the facility for 12 hours of 24 hours depending on the function of the facility. If the facility is of a small size, Baladera property management and investment consultancy may deploy a single maintenance person which is called general maintenance. If the defect arising is out of the capacity of the in-house deployed maintenance professionals team, the facility managing company reaches out to other service providing companies which may be in contract with the facility owners or with the facility managing company.

e) Security Services

Like most of the facility management companies in our country, Baladera property management and investment consultancy uses in- house trained security guards which are commissioned to keep the security of the buildings under the management of the company. The company recruits, trains and commissions its own security forces on its site which are commissioned by the name of the company.

Baladera property management and investment consultancy uses technology for large and wide facilities in addition to foot patrol. The size of the facility may make it difficult for foot patrol security professionals to control any movement in and around the premises. In these cases, IT supported laser systems which provokes alarm system and also send a notification on the smart phone of the security officers is implemented.

f) Cleaning Services

Cleaning services are also parts of the services being rendered by the Baladera property management and investment consultancy. They give both internal and external cleaning of the buildings under their management. Baladera property management and investment consultancy has developed its own standards on how to clean a lift, stairs, bathrooms, lobbies, and parking with defined guidelines and trainings for its employees.

The company also has a defined type of chemicals and equipment to be used for cleaning services under its management. This includes any health and safety protection equipment which makes the safety of their workers certain. The health and safety manual is also part of the standard manuals because the company also cares about its employees.

C. Challenges of the facility management industry

During an interview held with the owner and general manager of Baladera property management and investment consultancy, the company has its own challenges and also seen a demand for the facility management industry. The current challenges of the facility management industry are:

a) Lack of awareness

Baladera property management and investment consultancy's CEO, observes that there is a huge gap in awareness of the facility management industry with building facility owners. He observes that facility building developers invest in hundreds of millions in constructing the buildings but are not that much aware of the damages that could occur on the buildings if they are not managed properly which in return make the building not stay competitive with other buildings functionally. Not only knowing the effect of poor management, there is also a huge gap with awareness of what the facility management profession is all about and it's benefits that the building developers and owners could get.

This lack of awareness among building owners and the society in general, is being a major challenge for its advancement. He describes that no profession can advance with poor or lack of awareness in the society. If the society is not aware of the benefits that could be found with the facility management industry, the industry will not get enough experience to grow and advance.

b) Unavailability of qualified and trained workforce

In order to stay competitive in the market Baladera is being challenged by the fact that it's not acquiring qualified and trained workforce on the market which is inhibiting the integration of the works. The CEO explained that producing qualified and trained workforce not only helps the facility management service providing companies but also creates a huge job opportunities for the unemployed section of the country.

Other than creating job opportunities, producing qualified and trained workforce also makes the management of building facilities more advanced which will enhance the operational life of the buildings which has a huge effect on the country's economy by saving maintaining and demolition of buildings which have not finished their operational life time.

Besides qualified and trained workforce, Baladera is also facing a challenge in acquiring trainers for its employees to enhance the service quality. The founder and CEO of the company has a 25 years of experience in this field abroad but still feels the gap because some technical trainings could not be provided by himself and is being challenged to find trainers for his company.

4.5.3 ROC Spaces

ROC Spaces is a professional property management and brokerage service rendering company by National Asset Management PLC and registered to operate in Ethiopia by the federal government. ROC Spaces is established in 2017 and exclusively oversees and manages Residential, Office and Commercial properties developed by Noah Real Estate PLC.

Being a sister company of NOAH Real Estate Plc, ROC spaces is an asset management company which spends all its energy in keeping the facilities of Noah Real Estate Plc in an optimum condition and creating a very modernized and well integrated facility management services for its customers. ROC spaces has around 160 employees to meet its objectives stated above. ROC spaces gives the following services to its customers.

A. Services rendered by ROC Spaces

a) Customer Service

ROC Spaces gives customer services to its clients which are end users of Noah Real Estate facilities. The customer services in the facilities managed by ROC spaces is implemented by reception professionals which are located in the reception desk of the facilities under its management. These reception professionals gives customer services which are mainly of the following nature.

b) Rental Services

Rental Services mean the reception professionals try to attract new customers to buy, lease, or rent the available rooms, floors, display sides of the buildings. After attracting new customers they also provide short term agreements which is updated regularly until a final contract is signed by the company and the newly attracted customer. This services is mainly of limiting the vacant spaces and maximizing the income of the facility.

c) Collection of Rental Payments

The receptions professionals not only attract new customers, but they also manage the timely collection of payments from the tenants. This include giving notifications, collecting the money and depositing the cash if necessary, and giving notices for the unsettled bills.

d) Information giving

Besides the above stated services, the receptionists are located in a central location which makes them easily visible and accessible for anyone inside the buildings. Being accessible gives them the ability to help anyone with any information they may require regarding the facility, the tenants or any other question that may arise in the mind of the user.

e) Maintenance Services

Like many other facility management companies, ROC spaces gives maintenance services for the facilities under its management. ROC spaces has developed a daily maintenance checklist which helps to monitor the defect status on its facilities. The maintenance services focus on four aspects. Which are

- **Electrical Maintenance**

  ROC spaces maintains electrical defects which may arise during its operational phase. The electrical maintenance work comprises of defects from light bulbs, sockets, breaker boards, internet data network cables, TV signal cables, etc.

- **Sanitary Maintenance**

  Sanitary maintenance incudes maintaining defects arising from water supply system, sewage disposal system, toilets, etc.

- **Generator Maintenance**

  Generators are installed on buildings to keep up with power interruption and loss during the operational time of the building. ROC spaces provides maintaining defects on the generators. Maintaining also includes checking the fuel content, oil content, water content and service time of the generators and making sure the generator is always ready when needed.

- **Lift Maintenance**

  Lifts are parts of buildings of these days and their operation is mandatory for users of the buildings. ROC spaces maintains defects which can stop or slow down operations of the lifts. Besides giving immediate maintenances for the lifts, ROC spaces also deploy lift operators on each lift to make sure the lifts are being handled properly and with trained professionals. They believe this will enhance the durability of the lifts.

f) Security Services

Security services are one of the services provided by ROC spaces. Of the 160 employees of the company, 108 of them are engaged in security services. The security service providing professionals are employed by the company after being given a special training formulated by the company itself and also by guests of other security companies. After being properly and sufficiently trained, the company puts these security professionals on different buildings under its management.

Another part of the security services of ROC spaces is the reporting system. The security team of ROC spaces are expected to prepare and submit a daily report for the head office coordinators. The daily security report includes theft incident, danger, unlocked doors and windows, broken building parts, suspicious movements in and around the facility, neighborhood conditions and etc.

g) Cleaning services

Cleaning services are also parts of the services being provided by ROC spaces. The cleaning service giving professionals are also given different trainings before and during they are assigned to a building. The trainings are provided by in-house senior cleaning professionals and also invited trainers.

B. Challenges of ROC spaces

ROC spaces has faced different challenges in the times of operation since its establishment. As described by the Senior project coordinator the main challenge of ROC spaces is lack of awareness in the society which has limited the company to only manage the properties of its sister company; Noah Real Estate.

Even though ROC spaces is established to manage any facility, the lack of awareness in the society has limited the company from getting other contracts because of lack of awareness in the society regarding the industry they are engaging.

4.6 Case Study Findings

This Section aims at analyzing the data gathered through the case studies.

Table 4.2 Case Study findings

Findings	**Commercial Nominees**	**Baladera property management and investment consultancy**	**ROC Spaces**
Types of Services being given to customers	- Rental services - Maintenance services - Security services - Cleaning services - Tax payment services - Legal services	- Business consultancy - Property management - Parking management - Maintenance service - Security service - Cleaning service	- Customer service - Rental service - Collection of payment service - Information giving services - Maintenance services - Security services - Cleaning services
Defect Identification system	None	None	Daily Checklist which identifies any arising defect
Use of IT support	On the process of acquiring	For security services only	For advertisement and rental services only
Background of Professionals used for facility management	- Management - Accounting - One resident engineer in head office	- Management and - Accounting	- Finance - Accounting - Customer relations - Reception
Need for FM services	- Very High	- Very High	- Very High

As seen in Table 4.2, the differences between Commercial Nominees, Baladera property management and investment consultancy and ROC spaces regarding the following points is shown clearly.

- Types of Services being given to customers

Regarding the types of services being given customers, the three companies have a slight difference but have numerous common service types like security, maintenance, cleaning and rental services. But they also have different services depending on their organization set up and background experience.

- Defect Identification system

Commercial Nominees and Baladera property management and investment consultancy have no system of defect identification. They use the manual customer complaint as a defect identification except for ROC spaces who use the daily checklist of facilities. The daily checklist identification system of ROC spaces is still a traditional and not IT support backed up.

- Use of IT support

Regarding IT support in facility management, Commercial Nominees is in the process of acquiring an IT integrated system with none up to date. Baladera property management and investment consultancy uses IT support only for security services which have a huge size and couldn't be covered with manual foot patrol of their security officers. ROC spaces only uses IT support for for advertisement and rental services only since it's a sister company of NOAH real estate and needs advertisement to sell its houses.

- Background of Professionals used for facility management

Regarding the background of the professionals working under these three companies, the result is almost similar. The majority of the professionals working in these companies are of social studies field background like accounting, management, finance, customer relations and reception. Commercial Nominees only have a single resident engineer at corporate level.

- Need for FM services

Regarding the need for FM services, all the three companies have observed a very high need of facility management services in the society. They all have an increasing rate of customer attraction in the society and have an increasing market.

Commercial Nominees have both government owned and private owned facilities to manage. The company has seen a significant facility management demand around the government owned offices and the company is expanding its structure to enable its self to take these facilities to its hands. Despite the increasing demand around the government side, Commercial Nominees has also numerous private customers with the majority are of the diaspora community. Since, the company by its self is owned by the government the Diasporas and the local private market tend to have a better reliability favor in the eyes of the clients.

Baladera property management and investment consultancy has also an increasing demand of its services around the society. Baladera observes a demand around the hotels, mixed use buildings and apartments which are mainly of private ownership.

ROC spaces has been working exclusively for the facilities of NOAH real estate but they are also making themselves ready for an open market service giving. They have also seen a huge market opportunity in the country and are organizing themselves for the adventure.

5 CONCLUSIONS AND RECOMMENDATIONS

This chapter of the research deals with the conclusion and recommendation part of the research. The conclusion part of the research elaborates the major conclusions found from the data collected and analyzed in the previous chapter. The recommendation section of the research describes the possible recommendation in which the researcher found and believes could capitalize on the research subject.

5.1 Conclusions

Based on the findings of the research, the following conclusions are made:

1. The types of services being expected and fulfilled by facility managers in the city are in the infant stage of facility management. The services being given are property management services like security, cleaning, maintenance, etc. which has not advanced to full grown facility management. The maturity of the industry is at its evolving stage but there is a possible high demand of the facility management services and practices is coming in the future.
2. The facility management industry is not being backed up and expedited by IT support. Even though the rest of the developed world is doing facility management via computer aid, computer aided facility management is not seen in the country's facility management industry rather the traditional and manual ways of operations are being implemented in the industry. In relation to this, even the defect identification system observed mainly depends on complaint of the end users and occupants with no system of defect identification deployed by facility managers.
3. The need for facility management services is growing through the market. The growth of the need of the market is on its initial phase but expected to boom in the coming decades. In relation to this since there is no platform that interrelates facility management firms' to acceptable common standards.
4. The current facility management industry is being operated by few (professionals who studied facility management abroad) or no facility management professionals in the

market. The stake holders in the facility management industry are unable to find professionals with facility management knowledge and experience backup.

5. Another thing observed in the process of the research, is the lack of common standards of services given by facility management firms. This has its own effect in the growth of the industry. It's observed that the companies may formulate their own guidelines of operations, training their employees and execute accordingly. It's also observed some facilities have no operating standards and guidelines.

5.2 Recommendations

In light of the research findings, and conclusions, the following recommendations are made in order to improve the facility management practices.

1. Proper preparations and nurturing environment creation for the upcoming growth and need of the facility management industry should be made by all stakeholders including government, private investors and also current and upcoming facility management firms.
2. In order to help advance the facility management industry, IT support is very much helpful. IT professionals who better understand the current facility management industry of Ethiopia should contribute their role by preparing different IT support instruments, applications, gadgets and etc. that help the entire facility management process and also different segments of the industry like defect identification systems, security aiding systems, facility planning software and the like.
3. Facility management professionals should be educated and trained locally since the market is in need of the professionals but are having challenges to acquire.
4. Since there are no professionals leading and participating the industry, extra research on how to transform the current property management to a proper full grown facility management should be done.
5. The existing facility management firms should create a platform or a professional union in which they learn from the experiences of one another and also share their worth in the economy to the general public.
6. An acceptable and shared minimum standard and guideline of operation should be drafted by the government to put the facility management service providing companies at least to a nearly similar status which in return creates a clear awareness in the society which in returns creates appetite for the need for the facility management industry.
7. Further research should be done on these areas
    - Willingness of student to pursue a carrier of facility management.
    - Detailed assessment of the existing services in facility management practices.
    - Requirements and statutory certification of facility management licensing.

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APPENDIX

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ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

Questionnaire for Thesis In

ASSESSMENT OF FACILITY MANAGEMENT PRACTICES IN ETHIOPIA

Advisor: Abraham Assefa (PhD)

Prepared By: Abel Tsegaye

January, 2020

Dear Sir,

I am a graduate student at Addis Ababa University. I am now preparing a master thesis in the Construction Technology and Management program. The title of the thesis is:

"**Assessment of Facility Management Practices in Ethiopia**"

The purpose of the study is to:

- To assess the practice of Facility Management and its maturity level.
- To assess the activities or tasks of a Facility or Property Manager that could be applicable in Ethiopian context.
- To assess the need for facility Managers in the construction Industry.

The results of the study will be of great help to the industry and offering valuable results for all. As you are one of the large organizations working in this field in Addis Ababa, we are kindly inviting you to participate in filling this questionnaire with the required data which is an important element in this study.

The information provided by you will be analyzed as whole, and we ensure you that this information will be held in strict confidence and used for the scientific research purpose only.

We realize that there are numerous demands on your time. However your involvement is a vital requisite for this study. We appreciate your anticipated cooperation in answering this questionnaire.

Thank you for your anticipated cooperation.

Best regards.

Advisor: Abraham Assefa (*Phd.*) Researcher: Abel Tsegaye

Part 1: Questions for Building's Owners

1. Building(s) Name: _____
2. Building(s) Location: _____
3. Owner of Building: ☐ Government ☐ Private
4. Use of Building(s): _____
5. Building(s) Age: _____
6. Total Number of Occupants (End users): _____
7. Do the building(s) have facility management system?

   ☐ Yes ☐ No

8. Are you performing your facility management system by yourself or did you hire facility management firm?

   _____

   _____

9. If you have, what types of activities are being held by your facility managers?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

10. How do you manage the key services of your building like Elevator, Generator, Pump and the likes?

    _____

    _____

    _____

    _____

    _____

    _____

    _____

11. Do you manage services like security and cleaning in house or do you out-source? And how much does it cost you?

_____

_____

_____

_____

12. If your answer is yes to question no. 7, how do you assess the maturity level of the service you are acquiring? Please explain

_____

_____

_____

_____

_____

_____

_____

_____

13. If your answer is No to question no. 7, what kind of system are you using to manage your building(s)?

_____

_____

_____

_____

14. Do you have Maintenance plan?

☐ Yes ☐ No

15. What type of maintenance has been carried out in the building(s) in the past five years?

☐ Preventive Maintenance ☐ Corrective Maintenance

☐ Immediate Maintenance ☐ Routine Maintenance

16. Do you feel that facility management can change the productivity of your building(s)?

☐ Yes ☐ No

17. Do you have an annual maintenance budget for your building(s)?

☐ Yes ☐ No

If yes, how much do you budget per year? _____

18. How much in ETB are you willing to pay if you find a well-established facility management firm?

_____

_____

19. Do you have any IT support in managing your facility?

☐ Yes ☐ No

If yes, please explain in detail about the IT support employed in your building?

_____

_____

_____

_____

_____

20. Do you think IT support can modernize and make productive building management?

☐ Yes ☐ No

If yes, please explain what you think is expected:

_____

_____

_____

_____

_____

21. If your answer to question no. 16 is No, what's the reason you don't have IT support yet?

_____

_____

_____

_____

_____

22. What strengths and gaps do you see in the building facility management trend in the city?

Part 2: Questions for Building's Facility Managers

1. Building(s) Name: _____
2. Building(s) Location: _____
3. Facility Management Firm's Name:_____
4. Are you registered by the government to operate in Ethiopia?

   ☐ Yes ☐ No

5. What services are you providing for you clients?

   _____

   _____

   _____

   _____

   _____

   _____

6. What are the benefits you provide for your clients than managing by themselves?

   _____

   _____

   _____

   _____

   _____

   _____

7. Do you have facility management and maintenance plans which stand even before defects arise? If you do, list what the plan consists of?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

8. How can your facility management maximize the operational life of the building facility?

_____

_____

_____

_____

_____

9. How can your facility management maximize the profit of the building facility?

_____

_____

_____

_____

_____

10. How do you increase the productivity of the end users of the building?

_____

_____

_____

_____

_____

_____

11. How do you assess defects and maintenance schedules?

_____

_____

_____

_____

_____

12. How much in ETB is fair for you to receive from the building owners to provide well-established and effective facility management services from a single building?

_____

_____

_____

_____

13. Do you use IT support in your facility management system?

☐ Yes ☐ No

14. What benefits can be achieved in integrating IT with facility management system?

_____

_____

_____

_____

_____

15. Is there any institute in Ethiopia which trains facility management professionals?

☐ Yes ☐ No

16. What kind of professionals are you using in your facility management system?

_____

_____

_____

_____

_____

17. How do you assess the awareness and need among building owners on facility management?

_____

_____

_____

_____

_____

18. What are the gaps you see on the facility management industry?

Part 3: Questions for Building's Occupants

1. Building(s) Name: _____
2. Building(s) Location: _____
3. Occupant's Name:_____
4. Use of the Occupant:_____
5. Do you know whether the building has facility management or not?

   ☐ Yes ☐ No

6. What kind of services are you acquiring from your building facility management?

   _____

   _____

   _____

   _____

   _____

   _____

7. How do you assess the service provision of your building facility management team?

   _____

   _____

   _____

   _____

   _____

8. Does your building have defect identification system before you complain? If yes, what kind of defect identification system have you seen?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

9. How do you assess the building maintenance system?

10. Does the facility management system help you improve your productivity?

11. What gaps do you see regarding the facility management system in your building?