Assessment of Building Performance Measurement Tanzania

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ABSTRACT

Purpose: Provision of an understanding of the complexes and implications associated with building performance measurement in relation to supporting the organizational objectives by Tanzania facility managers.

Methodology: The study involved the use of questionnaire sent to both public and private organization and literature reviews in Tanzania with the aim of developing the process associated with the assessment of building performance and the way to improve its operational processes.

Findings: The study observed that BPM practices are affected by managers’ control over the buildings facilities because there are no specific procedures that guide the formation of BPM process due to lack of Government attention to this growing industry. The other major finding of the study is that managers’ concentrate mostly on the financial performance instead of the operational performance of the building, which was contrary to the expectation of this study.
ACKNOWLEDGEMENT

This thesis is dedicated to the people who helped me a lot from the start to the completion of my research and my Master degree. May the Almighty Allah bless you for your support

My supervisor Henry Muyingo,

My Mother Ashura Kingi and My father Hussein Nassor,

My siblings, Kassam, Fatma, Zakia, Nassor and Amina

To all my friends
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1. INTRODUCTION

The concept of building performance that is applied on building problems and solutions arose during the period of industrial evolution where buildings were designed to reflect people’s everyday life, changing society, use of environment and increase technology. On the other hand, Building owners wanted to ensure their building remain competitive in the market by ensuring that building facilities are cost effective and support organizations to achieve business objectives. These reasons led to adoption of different approaches and techniques for measuring building performances depending on the building being evaluated.

1.1 Background

The working environment is related to building facilities that contribute to achieving the intended use of the business future functions (Williams, 1993). Designing and planning working environment has become a crucial issue to organizations because they are value imbued and therefore represent the largest part of organization assets (Elmualim et al, 2010). Organizations have become more aware that when facilities are not well managed they tend to generate cost associated with economic, environmental and social impacts to existing business (Sha and Chen, 2001). Explosion of new economies and technological energy in the nineteenth century lead to innovations in business creation, planning and designing of physical working environment that are significant to business success (Duffy, 2000).

In the current business world, organizations give more attention to the working environment, by trying to reduce costs and improve design flexibility that supports in both organizational long- and short-term core businesses (Amaratungs and Baldry, 1998; Alexander, 2003). Williams (1993) provided for development of approaches that evaluate and assess building performance to effectively achieve long-term use of organizational building. Amaratungs and Baldry (1998) stated that, application of building performance approaches help to optimize life-cycle costs and management of people and process related space, asset, and efficient supply of resources.

Facility management industry is comprised with increasing numbers of professionals who follow ethical standards, however many conflicts arise due to uncertainty and conflicting practices making it difficult to know if they are able to bring benefits by reducing costs, improve flexibility that supports the effective building performance as argue by Alexander,
As shown on the study of Davis (2006), the design and orientation of built environment is anchored to reflect people’s everyday life as a result different regions and nations have different types of building. Evaluation of such buildings with different settings requires establishment of performance indicators with appropriate techniques depending on building being evaluated (Preiser and Schramm, 2002).

1.2 Tanzania construction and real estate industry

Tanzania is located in the Eastern Africa covering total area of about 947,300km². The country is dependent on the agricultural sector which accounts for more that 40% of the GDP as provided in the World’s Fact Book. The construction and real estate industry is among other industries that are evolving and are in their stage of growth as shown by recent developments in transportation, housing and mining sectors. Tanzania Construction Sector Report of 2008 presented the growth rate rose from 10.8% to 11.9% from 2004/05 to 2005/06 and contributed about 5.6% to the total GDP in 2005/6. This caught the government’s attention and lead to the formation of construction policies that were aimed to ensure efficient and cost-effective performance in the construction industry.

It has been difficult for professionals in industry to cope with both the set policies and procedures and the rate of changing technology in the global world. Hence the country now depend mostly on foreign companies to design, construct, develop and manage large scale building projects in order to solve the problem of due to inadequate number of professionals and low technology that the country experience. Since the demand for buildings is very high, investors are just developing building without considering the set quality standards causing Tanzania to continuously face an increasing number of poor maintained and disrepair building resulting buildings collapsing and death as commented in Maery, (2011). Despite the growing of real estate industry, building performance measurement is still not routinely applied to mainstream building performance because its methods are costly to implement and hard to manages. Komu (2008) argued that, lack of knowledge and policies neglecting on provision of quality building in the industry has led to this problem. Moreover the understanding of the concept of building performance measurement in Tanzania is still limited as people confuse it with facility management.
1.3 Research objectives

The main objective of this study was to investigate the current practice and attitudes towards building performance measurement in Tanzania since its practice involve the adoption of practical thinking in terms of goal rather than means. The following are subsequent objectives that are covered in this study with the aim of finding out how facility managers ensure that their building stocks support organizational objectives.

- To analyses the process and procedures that are taken into account by organizations in order to ensure high building performance.
- To identify the challenges and provide solution on for the problems encountered by facility managers during the assessment.
- To suggest areas for further studies relating to the covered in this study.

1.4 Research question

Though the building industry is comprised of professional property and facility managers, many conflicts still arise due to poor measurement and uncertainty brought by building performance. This study attempt to answer the question below

- What are the procedures involved in the stages of building performance measurement in Tanzania and what are the challenges associated with the assessment process?

1.5 Scope of the study

As in Kironde (2002), Dar es Salaam was selected to be a study area for this research as it is considered to be an area with rich information, whatever happens in the city of Dar es salaam has an impact on the whole direction of country. Given the exploratory nature of this study, the data was obtained from various facility managers from top ten real estate firms, and three large governmental institutions i.e. National Housing Corporation (NHC), Parastatal Pension Fund (PPF) and Tanzania Building Agency (TBA) in Dar es Salaam who have large share of properties in the building market. In the course of carrying out data collection, fifty questionnaires were sent to government institutions and twenty questionnaires to private real estate firms making a total of seventy respondents who were used as a study sample.

1.6 Disposition

This chapter has presented the background and the objective of this study concerning to building performance measurement in Tanzania. Chapter two includes methods adopted in the
study while Chapter three presents literature explaining the concepts related to building performance for the purpose of establishing the basis of the study. Data analysis and presentation are discussed in Chapter four. Chapter five provide major finding, conclusion and recommendations of this study.
2. RESEARCH METHOD

2.1 Theoretical basis

The concept of building performance arose during the period of industrial evolution where buildings were designed to reflect people’s everyday life, changing society, use of environment and increase technology. Consequently as provided by Hartkoft (et al, 1986), these factors have influenced building industry to adopt new strategies to facilitate building performance support their business objectives. The theoretical basis for this paper is performance measurement, building performance measurement as well as facility management.

2.2 Qualitative study

This is basically a qualitative research that employed various techniques of data collection, analysis and presentation for the purpose of clearly depicting what approaches facility managers adopt and how these approaches affect the measurement of organizational property performance in Tanzania. In the paper written by Robert Eccles (1991) stated, “Within the next five years, every company will have to redesign how it measures its business performance”. This statement shows that, building performance measurement are affected by the pre-existing situation of the time it is carried and the qualitative approach was chosen to present the reality socially constructed, behavior complex, and process of change associated in the building industry.

This research method was used so as to gather first hand data from respondents on how facilities managers in Tanzania manage the built environment in order to achieve their long-term objectives.

2.3 Data collection method

The research focuses on public and private institutions in Dar es Salaam and the chosen respondents were required to be working with the operational aspect of the building. The aim was to gather relevant data and information regarding the topic from broad range of professionals who interact with buildings in various ways. Apart from selection respondents and conducting literature review, government and institutional reports were reviewed to gain
the overview of the theory and concept about the topic in order to support the argument behind the researcher's study thesis.

The data were collected through the online survey questionnaires which were formulated into guiding respondents to provide specific and relevant data regarding the topic of the study. An interview was also conducted to one personnel who directly participate in building industry. The purpose was to gain further information on the field and the information was also used to structure the survey questionnaire which was the main method of data collection.

2.4 Data analysing and presentation

The data obtained from the study was compiled and analyzed using Microsoft Excel. The data are presented in descriptive and analytical form.
3 PERFORMANCE IN BUILDINGS AND FACILITY MANAGEMENT

3.1 Performance measurement

Performance measurement involves the process of quantifying the efficiency and effectiveness of building actions (Neely, 1998). The concept of performance measurement existed in early 1880s to 1980s where organization used traditional performance measurement to measure their performance (Banks and Wheelwright, 1979). This type of measure made organization to only focus on using financial costs and accounting systems to determine productivity and profits derived (Ghalayini and Noble, 1996) but they failed to provide ways on planning and controlling cycles that can cause organization to remain competitive in the market cycles as evidenced by Barnard (1962) and Chandler (1977).

Due to changes in market demand and supply factors in the industry after 1980s, managers and practitioners in the industry started to evaluate the limitations of their traditional measurement and the extent of how developed performance will affect the organizational business (Douglas, 1996; Ghalayini and Noble, 1996). More emphasis is now put in evaluation factors that are related to strategic, tactical, operational and informational aspects of the business that affect the organization. Organization need to follow certain stages that will enable them come up with a reasonable performance measurement framework.

3.2 Factors used in Building performance measurement

3.2.1 Planning what to measure:

It involves first determining what are the organizational goals and objectives towards the present and future performance of their building. Goals and objectives are then linked with strategies where facilities managers need focus on measuring critical factors in all categories of PM i.e. processes, financial and operational PM. Lack of clear focus and information may lead to measurement of facilities that do not need immediate attention and hence this may lead to poor performance of the building. Hence without a strategic plan, clear goals and objective, the measurement process won’t provide result that benefits the development of organizational building performance.

3.2.2 Choosing what to measure:

After determining the organizational objectives towards their building, facility managers then need to move in the state of determine how do building elements affect the management and
utilization of facilities towards the achievement of set objectives. This is done through measuring facilities progress by first checking if there are frequent problems associated with the building and whether they achieve additional added value during its operation. Carrying out this stage enables facility managers to identify what elements in the building need attention and time needed to execute the problem issue.

### 3.2.3 Determining how to measure:

In order for a building to accomplish its desired purpose, managers should identify critical success factors that are to be applied during measurement processes to determine whether buildings are performing as planned. The relevant measures are determined by the listed organizational objectives and strategic plan that were made in the first and second stage of this process. Facility managers can aim to focus on measuring building performance by process or output. **Process measures** involves the application of output into building elements in order to determine if operation and activities are used and executed as planned to see whether the building meets its objective. **Output measures** will capture whether building elements achieve the desired organizational short-term, intermediate and long-term goals, it involves seeing whether the operational changes that were applied to building bring affect as speculated.

### 3.2.4 Data utilization

Once the measures in the previous steps are completed and data are collected and analyzed, the following step is to present and interprets the results about the previous and current performance of the building. Here facility managers want to observe whether building performance is consistent with the set goals and objective. The finding should be stored formally e.g. data-base, excel files, loose reports so there is a record by which any employee in the organization can use to measure progress in the subsequent assessment. Additionally, reporting of data supports the consistent ongoing effort directed to properties and therefore reinforces the organization, safeguarding, and support behaviors necessary for a successful building performance.

### 3.2.5 Implementation of BPM information:

After the data are collected, usually facility managers compile the data into different set of reports and distribute them to real estate audiences depending on the requested type of
information that is related to a certain field, example architect, engineers, service provides, investors so on. Reports are also used as a way of providing feedback to team members who were involved in the measuring processing. The report result may influence members to increase their efforts in ensuring that the building performs according to standard and remain competitive in the market. If there are variations in the measured data then the manager can suggest a different way to execute problems or different way of measure that will improve the performance and bring added value to organization.

3.3 Building performance measurement (BPM)

In order for the organization to effectively achieve long-term use of organizational building in the competitive market, managers were argued to apply highly skilled measures in assessing building performance to effectively achieve long-term use of organizational building (Williams, 1993; Nutt, 1999).

According to Wong and Jan (2003),

“Building performance is a framework, through the comprehensive use of both objective and subjective field evaluations in all performance areas simultaneously, serve to understand the critical balance needed to simultaneously ensure all building performance mandates”.

The mandate refer to building performance approaches that help to optimize building life-cycle, management of people and process related space, asset, and efficient supply of resources (Amaratungs and Baldry, 1998; Preiser, 2005). As indicated by Kian (et al. 2001), taking into account the mandate during the process of building performance evaluation helps managers to ensure that at the end of the measurement process building does not bring any negative effect users. To come up with a building performance framework one must first identify different strategies and techniques that will be used in measuring building.

The aim of identifying these strategies is to help managers to avoid forgetting crucial building components that may result into poorly functioning building with high maintenance cost. Identified strategies and techniques are then to be linked with structural and non-structural building facilities in order to come up with a reliable building performance measurement decision.
The main structural and non-structural building performance as presented by Hackman and Scott (2008); Lavy (et. al, 2010) included the following

- **Physical performance**

  Physical performance addresses the tangible aspects of real property that ensure a sustainable asset base throughout its life cycle in support of program delivery. These physical aspects include the quality and durability of the land base, the buildings and infrastructure as provided by Canada guide to management of real estate property of 2009. Lavy (et. al, 2010), highlighted the physical aspect of the building to include; availability of building space to supports the desired function, quality of space (spatial, environmental and amenities), accessibility (site, location, and building design), and resource consumption (energy efficient, water, and material). The condition of mentioned building elements is affected by on the extent of continuous operation, maintenance and repairs that will help managers estimate the remaining physical life of facilities at which they will able to support organizational function.

Most people spend more of their time in the offices, homes, schools and health institution. The service and environment aspects of the building tend to affect the physical activities of users by either creating a comfortable living and working environment or de-motivate people in using them. Zimring (et. al, 2005) mentioned that relationship between building physical aspect and users behavior vary depending on the types of building, hence managers should ensure there is a strong integration of all building components and users needs. This integration results to occupants’ satisfaction that is brought by healthier working environment and potential for enhanced worker productivity.

- **Functional performance**

  This category involves measuring building functional aspects that are linked to spatial needs and requirements, system performance as well as durability and efficient maintenance of building physical elements throughout anticipated life (Kyle, 2001). Managers should ensure that building operate at satisfactory standard that enhances occupants with physical and psychological comfort through efficient provision of building elements such as air distribution, lighting, heating, cooling, workspaces, systems, and technology. Incase the building operates below goal, its cost of management can be extremely high because of the
failures in determining the needs requirements of systems, materials and technology that are used to running the building.

The significance of carrying out functional performance is to evaluate how the building supports organizational activities and whether the building dilapidating causing it not to meet specific performance standards of building operations. When root causes of the building problem are identified, managers are able to measure appropriate option before any alterations, maintenances or design development (Hendriks and Hens, 2000). The reason for rational measurement is to avoid making rush decision that will result to destructing or damaging other building element during the process making the building sustainable design diluted. Therefore functional performance improves building durability, flexibility and enhances the surroundings aesthetically by meeting its performance objectives.

- **Financial performance**

Lavy (et. al, 2010) related this type of building performance to costs and expenditures of the facility related to buildings systems and components. Real estate owners regard building as investment as they provide returns and benefits through cash flows that are paid by users. On the other hand, users usually react to changes in the organizational needs causing changes in the operation and design characteristic of the buildings that eventually affect the functional returns and benefits derived from the usage of building (Varcoe, 1992; Leaman, 1993). These changes are therefore forcing facility and property manager to manage operational property strategically by integrating the core business activities into the management of the building competency.

With the development of technological and service market in real estate industry, managers are required to establish adequate appraisal metrics for assessing building performance (Canada guide to management of real estate property of 2009). The financial metrics should be able to measure the actual and estimated life-cycle costs that are related to productivity and risks associated physical building components and facilities. The importance of carrying out financial performance is to help managers to identify building problems associated with depreciation; space utilization and productivity in order achieve long term organizational goals (Lavy, et. al, 2010).
Survey-based performance

Measurement of building performance is done through collecting users’ response on environmental and psychological satisfaction that is brought by the quality of services necessary for the operations of building facilities and assets as provided by Lavy (et. al, 2010). Supported by Preiser and Vischer (2005), measuring this type of performance will help managers to see whether the non-financial impact related to building facilities on users do support the core business objectives and user’s expectations.

The concept behind this performance is to identify on one hand if the building meet the requirement of users, on the hand is how the building will have to perform in order to meet the requirement of the users. In the study of Ang (et. al, 2005), there is a need to use solution concept to set up technical materialization that satisfies and fulfill the needs and objectives of the users. This can be done by asking users some questions related to building facilities operations that are linked to their organizational needs (Lavy, et. al, 2010). This process will help to translate users’ needs and intended building use into required performance (Spekkink 2005)

Building performance aspects are common to all the mentioned literature; however it is difficult to entail which measurable metrics are to be used to indicate and show the performance of buildings. This study is concentrating on measuring the physical (operational) aspects of the building performance as the metrics are easy to identify and to avoid complexity resulted by limited resources and time constraints.

3.4 Facility Management (FM)

The history of facility management evolved during the explosion of office administration over the last twenty years due to high technological and economic innovation in the building industry (Amaratungs and Baldry, 1998; Weller, 1995). During its evolution facility management was done in a traditional way involving supervision and direction of built environment to ensure they produce optimum return (Thorncroft, 1965). Changing of workplace and resources use that affect buildings influenced different disciplines in building industry such as engineering, architecture and other to come up with FM concept that will better manage organizational facilities and building infrastructures (Lucian, 2007).
According to Barrett and Baldry (2003), facility management (FM) refer to

“An integrating approach to maintain, improving and adapting the buildings of an organization in order to create an environment that strongly supports the primary objectives of that organization”.

Moreover, Lai and Yik (2010) argue for highly qualified facilities managers to successfully manage facilities and building infrastructures for organization to stay competitive. Many researchers have written different concept that explain the FM practice, which is influenced by the following factors as presented in the studies of Barrett (1995); Williams (1993); Krumm *et al* (1998) respectively

- Organization structure to support core business objectives
- Skilled approaches adopted due to stakeholders cultures and market contextual issues
- Location, size and scope of organization facilities and how they influence stakeholders

Consideration of the above three factors then determines whether the organisation use in-house or out-sourced services depending on the added value that is brought by the cost-value relationship that existing between facility management requirements. The services provided in the facility management sector include property management, financial management, change management, human resources management, healthy and safety, building maintenance, domestic services and utilities supplies depending as provided by Atkins and Brooks (2009). Hence, organisations procure certain facility management services depending on their requirements that support the core business of the organisation.

### 3.5 Summary

Building performance has gained much attention in the FM field because buildings represent a substantial amount of investments and at the same time achieving a range of objectives for organisation with greater efficiency and effectiveness than that of their competitors (Atkins and Brooks, 2009). For this case, facility management helps to relate buildings and their settings to users’ by monitoring progress, evaluate action plans of the actual and expected performance basing on the post-occupancy evaluation process model as was provided in the study of Preiser and Vischer (2005).
4. RESULTS OF THE SURVEY

In order to determine the issues associated with the stages of building performance measurement in Tanzania and the challenges associated with the assessment process, a total of 70 respondents from both public and private organization in the building industry were asked to participate in the survey. The criteria for their selection was that they should be employees of their corresponding real estate organizations for the purpose of assuring that participants understand the concept of building management as this would make the survey to easy achieve its objective. The questionnaire was used as a main source of data collection method for this study (See Appendix 1).

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned questionnaire</td>
<td>43</td>
<td>61.4%</td>
</tr>
<tr>
<td>Not returned questionnaire</td>
<td>27</td>
<td>38.6%</td>
</tr>
<tr>
<td><strong>Sent questionnaire</strong></td>
<td>70</td>
<td>100%</td>
</tr>
</tbody>
</table>

Out of 70 questionnaires that were distributed 43 questionnaires representing a rate of 61% presented in the above Table 1 were returned between April 2011 and July 2011. The questionnaire was divided into three sections and below is the presentation based on the 43 responses that were received:

4.1 Respondents background information

This section contained questions that identify the background information of the respondents in terms of gender, age, and education level, the description of their form of job employment as well as their assigned job titles. The objective of gathering this type of data was to observe whether background information have impact on building performance measurement practice. The other parts of the questionnaire cover the functional and operational part of building performance together with how organizations conduct assessment of their building performance measurement.

An interview made to a facility manager in one of the public institution stated that, the practice is different between age group as it affected by the experience, education level and attitude towards organizational changes involved industry. People who have long term
experience are usually reluctant to the changes that are made towards building performance standards associated with new building technologies because they want to secure tenure of their jobs. On the other hand, people who have higher level of education tend to engage and develop activities that tend to enhance building performance because of their willingness to accept changes in the industry.

The results from the interview were utilized in formulating the factors presented in Table 2 below:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number</th>
<th>Distribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned questionnaires</td>
<td>43</td>
<td>100.0%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>29</td>
<td>67.44%</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>32.56%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.0%</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>below 26 years</td>
<td>4</td>
<td>9.30%</td>
</tr>
<tr>
<td>26-35 years</td>
<td>21</td>
<td>48.84%</td>
</tr>
<tr>
<td>36-45 years</td>
<td>9</td>
<td>20.93%</td>
</tr>
<tr>
<td>46-55 years</td>
<td>7</td>
<td>16.28%</td>
</tr>
<tr>
<td>56-55 years</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>over 65 years</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00%</td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>6</td>
<td>13.95%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>30</td>
<td>69.77%</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>6</td>
<td>13.95%</td>
</tr>
<tr>
<td>Higher degree</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00%</td>
</tr>
<tr>
<td>Form of employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private sector</td>
<td>13</td>
<td>30.23%</td>
</tr>
<tr>
<td>Government sector</td>
<td>30</td>
<td>69.77%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00%</td>
</tr>
<tr>
<td>Job title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing director</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Property Manager</td>
<td>21</td>
<td>48.84%</td>
</tr>
<tr>
<td>Facility manager</td>
<td>6</td>
<td>13.95%</td>
</tr>
<tr>
<td>Building caretaker</td>
<td>15</td>
<td>34.88%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
- Number of females is less than that of men by approximately 2 times less as indicated by the responses received from the study sample.
- The largest age-group of the respondents is that of 26-35 years which consisted of 48.8% of survey response whilst 2.3% was for age group of 46-55 years and above 65 years respectively.
- 69.8% of respondents have achieved the bachelor degree, followed by master degree and secondary education at 13.9% respectively, and 1 person with higher education.
- The survey showed that, 69.8% of respondents are employed with the government sector where the remaining 30.2% works in private sector with different forms of employments including employment with consulting firm, property company and self-employed.
- The majority of respondents are property managers represented by 48.8%, followed by building caretakers at 34.9%, and facility managers at 13.9%.

On average, the above information shows that half of the respondents have acquired their real estate knowledge at the bachelor degree level, indicating that the respondents qualify for our sample and have necessary experience in management of property and facilities in the built environment. This information is used in the discussion section to help analyze if experience and education level affect managers in the assessment and evaluation roles of building performance to enable organizational achieve long-term objective.

### 4.2 Functional and operational building performance

The questions in this section were set in a way that the responses are connected to how building facilities are related to the actual building performance. Out of 43 responses received, one respondent skipped answering the questions in this section, which may be caused by either lack of interest or the respondent, is not directly involved with the functional and operational part of the building. Therefore, the analysis in this section is reduced to answers provided by 42 respondents.

The survey presented that 33 respondents are working in the organization that manages more than two buildings and 8 respondents’ work with organization that manages less than 2 buildings. Moreover the survey indicated that, 21 respondents have worked with buildings for 2-3 years, 13 respondents have worked more than 3 years while the remaining 8 respondents
have less than one year in the real estate industry. The results of the first question in this section suggested that, respondents have necessary knowledge and skills needed in the building management as they are involved with large number of building. However their practice and experience in the field is limited as they have short time experience in working with buildings in the industry.

34 managers revealed that they spend more than five hours of their working time in the building while the remaining manager spend less than two hours in the buildings that they manage. Poor or ineffective building facilities tend to bring harm to users and hence a manager is required to spend more time in the building to identify, assess, and find solution to serious problems that are brought by poor building systems and vice versa. On the other hand, time spent on the building can be affected by control managers have on different building factors that include physical layout, design, services, security, safety and utilities that exist in the building. This study covered managers’ position in controlling most important building features including building layout, services and safety in the building management processes, which are presented and analyzed as follows;
Charts 1: Satisfaction on building features

In response to the question regarding satisfaction on building layout, about 15 managers are satisfied with design and layout of the buildings they manage while oppositely 17 respondents consisted of managers who are of no opinion and completely not satisfied with the building layout as shown in Chart1. However the managers are happy with the way their building are designed and meet the intended requirement, they are not certain on their safety. As shown on Chart1, the bar graph on fully agree dropped because respondents are not happy and are lacking faith with the safety feature of their buildings. Again Chart1 shows that, at least 16 managers are happy with how building elements and systems support users’ objectives and activities.

The reason for those who are not satisfied with building layout may either be due to limited experience in the industry or they are not familiar with the way the building are design as presented earlier in this section. Additionally, the reason managers who are happy with the building layout are explained by how buildings facilities meet users’ needs. Buildings meet their objectives when their individual facilities and systems work together to perform a building function such as office, residential or commercial purposes. This situation may be resulted by how much control managers have over different building facilities and elements. Facilities and property managers are usually expected to have full management control over the building facilities as this enhances the building quality through overseeing maintenance issues arise within the buildings and by making sure that the problems are taken care off so
they don’t arise in the future. If managers lack control over building facilities they tend to lose motivation of retaining the building to its optimum level. If managers are not in control of the building they tend to lose faith as revealed on Chart1, this is due to the fact that they don’t want to be responsible for the impacts associated with the building failure and uncertainties.

The last question in this section on how much control does managers have on the building physical aspect is captured in the Chart2.

**Chart 2: Manager's control over the building**

Chart2 shows that, more than 21 of 42 respondents have control over artificial light, cleanliness, waste disposal, daylight and sanitation. Energy use is viewed to be the most expense of building, as it covers about 70% of all building services linked to electricity e.g. artificial lighting, day lighting, heating and ventilation as presented in the chart. Apart from that at least 8 respondents are not happy with their control water consumption and noise.
The choice of their answers may be influenced by the satisfaction derived by the design and the layouts of the building they manage, as seen from the Chart2 that only 4 respondents have control over the building design. Poor design result to building sick syndrome diseases cause by in adequate ventilation and hence affecting level of comfort, sense of security and the potential workers’ performance. For this case, owners now require architect and engineers to design buildings that take full advantage of natural ventilation and day light as this provide comfortable environment for users and also save the cost of energy consumption. Recently studies have identified that building user, manager and owners look for different ways to reduce and manage cost related to energy consumption, contrary this survey has confirmed otherwise by indicating that managers have little control over energy consumption, heating and ventilation.

4.3 Assessment of building performance measurement

The questions on this part of questionnaire were aimed to explore if there is a general acceptable understanding about BPM and its assessment in the Tanzania real estate industry. Since practitioners in the industry consider this concept to be very knew but of increasing interest, the questions were set to provide respondents with variety of options with the intension of evaluating the stages taken when conducting building performance assessment. Moreover the questions were divided to capture three general things: general knowledge about BPM, processing BPM framework, presenting and reporting BPM. The following is the result analysis from the 42 out 43 respondents because 1 respondent still opted out in this section of the questionnaire.

4.3.1 General knowledge about BPM

Question 13 wanted to depict respondents’ definition of BPM required respondents to select the meaning of BPM; out of 42 respondents 20 chose BPM refer to monitoring building by providing safe, healthy and productive environment for occupant. Respectively, the remaining 10 and 12 respondents chose integrating functional, efficient and workflow performance and managing building facilities to perform at lowest operational cost respectively. The choice of the remaining 10 respondent captures all the building elements.
Their choice is influenced by the control a manager has over the building elements as seen in result shown on Chart 2. Taking an example of the respondents who believes that BPM is about managing the building areas to provide good work flow space for users has control over building design and layout, while the ones who chose performing at lowest operational cost their concern is only about energy efficiency. All in all, at least all respondents’ idea about BPM is linked to the definition provided in Chapter 4, which is referred to optimizing building life-cycles, management of people and process related to space, assets and efficient supply of resources. However they are limited by the control they have on the building they manage.

**Chart 3: Experience with BPM**

About 17 respondents have been working with BPM for less than year while the remaining respondents are divided into the category of 1-3 years and more than 3 years experience respectively.

The study observed that, the scope of BPM tend to be affected by the practical experience that is derived from building performance assessing. This observation compliments with the point mentioned by the interviewed facility manager in public institution that people who have long-term experience are usually reluctant to changes because they want to secure job tenure and so they tend to be very thorough in checking all details related to BPM. In order to master the assessment of BPM, a person must first advance his practice in terms of familiarity with building facilities and in selecting parameters and factors associated with BPM which is
gained after years of practical experience. The 10 respondents’ working experience may influence their choice of the meaning of BPM that captured the entire building experience as shown on Chart 3 above.

**Chart 4: Buildings that BPM was conducted**

Chart 4 below presents that; BMP is carried once a year mostly on housing blocks and office buildings as provided by 23 and 18 respondents respectively where between about 30 respondents have never carried out performance measurements for special purpose and the number decreases for respondents in industrial blocks and of the remaining respondents were of mixed opinion regarding office buildings and housing as shown on Chart 4.

![Chart 4: Buildings that BPM was conducted](image)

The type of building people work with is another way that differentiates the scope of BPM among respondents. Different type buildings have different requirements, as users require different set of services that support their organizational needs.
Chart 5: Frequency of Conducting BPM

Chart 5 present answers for question 20 that wanted respondents to provide how often BPM is conducted in their organization complements with the information that conclude by stating that building types affect the managers’ knowledge and practice of BPM.

The chart present that, 2 respondents conduct BPM quarterly, followed by 7 respondents who conduct BPM after every 6 months. The chart also present that BPM is done annually by 20 respondents who are almost half of the total number of respondents whilst the remaining respondents fall under the categories in which BPM is conducted by more than 2 years and never.
4.3.2 Processing BPM framework

In the process of setting up and carrying BPM, managers are usually required to first determine the organizational goals and objectives towards the present and future performance of their building. Chart6 below shows that, 26 respondents are often and always know the reason for their organization when they schedule for performance measurement for the building they manage, however 6 respondents rarely and never understand the goals that are linked to BPM.

Chart 6: Awareness on organizational BPM objectives and Goals

![Chart showing awareness on organizational BPM objectives and Goals](chart)

This can be explained by the extent they have on the management of building and also the time they spend on building as explained before. When managers know the exactly goals and objectives that the organization wants to achieve, it becomes easily for them to select parameters depending on the building type the assessment is going to be performed on.
Chart 7: Parameters for BPM

Chart 7 presents the data on the parameters that facility managers usually focus on. At least 21 respondents pay more attention on the financial, business and informational part of the building and the average of 9 respondents rated other parameter to be somehow important to be considered in the performance measure.

Financial parameters has high votes because it is believed that financial budgeting control building efficiency and accommodate a range of all identified parameters in Chart 7 that have an impact on organizational goals and objectives except for statistical parameter, which is mainly used by contractors and engineers. For this case, it is easy for managers to select performance parameters when they know exactly goals and objective the organization is aiming to achieve during the assessment of BPM.

Contrarily, the study expected the functional and operational parameters to be the most important parameters to focused on because they enhance comfortability and productivity of users and in case the building function below standard they increase cost of operations and reduce returns.
After identifying the objectives and choosing the parameters that facility managers have to focus on, they then have to identify different factors that performance measurement will be referred to during assessment. Chart 8 presents the important factors managers look into when conducting BPM.

**Chart 8: Factors linked to BPM**

Chart 8 presents four important factors that are above the average as provided by the survey results, the factors are recommended to be looked at when conducting BPM and include: building meeting its intended uses and company requirement, added value and customers’ satisfaction. Less important factors are linked to building impacts on the general performances of the design options and building flexibility. The choices of these four factors are connected with the managers’ control over the building elements as presented on Chart 1.

Generally the survey data suggest that, the higher the control over the building the better choices and practice of BPM. Never the less during the BPM process managers are supposed to link these important factors and the organizational objectives to evaluate whether the desired goals have been achieved.
Managers usually monitor the success of BPM through examination of how well building indicators are supporting organizational business as presented in Chart 9.

**Chart 9: Indicators for high building performance**

There are three main indicators that are used every time by at least 15 respondents when measuring the successfulness of how building performance affect organisational business which are; repairs on cost savings, number of services to be executed and historical performance of the buildings. These indictors show managers how successful the buildings perform individually and not compared to the market after the measurement has been completed because benchmarking is rarely used as seen from Chart 9.

Surprisingly, factors related to monitoring improvements and building failures are occasionally used where these factors that determined the level of building performance are ignored. However the BPM result shows that buildings are poorly performing, different measures are then applied periodically to ensure that buildings achieve the required standards, operate at optimum and hence derive the expected added value in the future.
Chart 10: Measures for enhancing building performance

The quickest measure that is always used to remedy building facilities that perform under the required standard is minor repairs as provided by 27 respondents while 15 respondents tend to apply frequent schedule maintenance that is carried periodically. Other measures like renovation, major repairs and replacement are sometimes applied by at least 14 respondents whilst 20 respondents never use expansion and this may be due to high cost and long period of time involved in such activities.

4.3.3 Presenting and reporting BPM data

The BPM data and information that is captured during the process is usually stored into formats that are easy to analyze and understood by the users. However there is increase in new computerized data storage systems that improve services and efficiency even if the government is slow in implementing the use of the systems unlike the private sectors that has switched to automatic data storages. Figure 1 shows the results of the question whereby the respondents were asked to choose a data storage system in which they store more that 75% of their BPM data and information regardless of incorporate other type of data storage systems.
Figur 1: BPM data and information storage

29 Out of 42 respondents record their data and information on manual storage system while the remaining 13 respondents record their data and information in automatic systems as shown in Figure1.

Figure1 indicates that, manual data storage involves recording data into three categories, which include reports, forms/cards, and notebooks as provided by 29 respondents. While the data maintained automatically is recorded into spreadsheets and database as presented in the same figure. After BPM data and information is recorded and complied into a report, managers usually submit or distribute them to the intended recipient who are interested to know how building portfolio perform.

Their reason may include; if users are satisfied with building services, are operation costs low, does the building add value and etc. Therefore the reporting of BPM is dependant on the important factors listed on Chart8 and the organizational goals towards present and future performance of the building.
**Chart 11: Readers of BPM report**

Managers and building investors are the main readers of the BPM reports as provided by 28 and 19 respondents respectively as presented on Chart 11. Their main interest is to analyze whether the building works as intended, additional value added by the building operations and benchmarking it to the market as shown on Chart 12. Occupiers, Architects and Service providers are the groups that were rated high on never read by more than 16 respondents each. The choice for engineers was mostly rated mostly on rarely and occasional report reading.

![Chart 11: Readers of BPM reports](image-url)
The engineer’s rare interest on the BPM report is related to evaluation of risk associated with building facilities (refer Chart8) with the intention of evaluating buildings capability in providing additional value to the portfolio as rated by 20 and 17 respondents in each case as presented on Chart12.

**Chart 12: Uses of BPM reports**

As explained in the previous chapters that BPM is new concepts in Tanzania and different facility managers have different way of conducting it because of their limited ability in controlling building facilities. For this case there are different challenges that face facility managers in this field, Chart13 present the challenges that are encountered by respondents when setting the BPM process for their organization.

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<th>Abbreviation</th>
<th>Meaning</th>
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<tr>
<td>EBO</td>
<td>Evaluation of likely and actual building outcomes</td>
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<tr>
<td>SIC</td>
<td>Strategic implication and consequences</td>
</tr>
<tr>
<td>BWI</td>
<td>The building works as intended</td>
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<tr>
<td>RFBPM</td>
<td>Recommendations for future BPM</td>
</tr>
<tr>
<td>RAB</td>
<td>Risk associated with building</td>
</tr>
<tr>
<td>AVAC</td>
<td>Additional value added capability</td>
</tr>
<tr>
<td>BBIM</td>
<td>Benchmark the building to other in the market</td>
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The four most challenging factors facing respondents when setting up BPM for their organization include; inadequate energy supply, insufficient funds set for building maintenance, in ability to procure sustainable building facilities and most managers lack relevant training on facilities. All these factors were rated by at least 18 respondents respectively. Power breakouts are severe in Tanzania resulting to high operational costs and destroying facilities like air conditioning, generators and other electrical facilities in the building. High operational cost tends to overlap the budget set for maintenance services. All this is cause by the failure of the government to provide or insisting on sustainable building with less complex and obsolete systems as rated by 17 respondents.
5: SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

The main objective of this study was to provide an understanding on the complexes and implication associated with stages adopted when carrying BPM by Tanzania facility managers to support organizational objectives. Previous chapter 5 concentrated on survey data analysis and presentation from the Tanzanian real estate industry that was obtained from the online distributed questionnaires. Firstly this section summarises the research findings from both the literature review and the survey results and then makes conclusion based on the findings. Lastly, it provides recommendations that will serve as guidelines to assist facility managers to prepare a BPM framework for their organisation in Tanzania.

5.1 Discussion of major findings

This study attempted to answer the question of: What are the procedures associated with the stages of building performance measurement in Tanzania and what are the challenges associated with the assessment process? The following summary of findings answers the research questions basing on the observation that were made from both the collected literature review and survey results.

➢ BPM theory Vs. practice

It is important that facilities managers follow each stage of BPM procedures because these stages have profound impact on the organizational building portfolio. The literature review on the theory of BPM has provided that each stage has resourceful inputs that help facility managers to achieve high level outcomes necessary to support strategy and continuous organizational improvement of their buildings. A good BPM framework involves five key stages, which are; planning objectives; choosing what to measure; identify measurement metrics; reporting BPM outcomes; and outcome implementation. Results from the survey show that there is a lack of correlation between the BPM theory and its application in Tanzania construction industry. There are no clear set procedures in Tanzania construction industry that guide the facility manager in developing organizational BPM actions. The study observed that, the ability of facilities managers to set up BPM is compromised by unclear organizational objectives and insufficient control buildings facilities. Most of the buildings in Tanzania are either dilapidated their systems are obsolete and some of them collapse due to lack of performance follow-ups. In addition, these factors have led to failure in attaining high performance buildings which provide effective, comfortable and productive environment.
Therefore, there is a need for more knowledge and training about benefits of BPM in order to create a momentum that will change the current Tanzania practice of building processes by putting more emphasis in recognizing the importance of quality in the built environment which people occupy.

- **Limited knowledge and training on BPM**

In order for an organization to succeed it needs to have qualified employees with professional skills and capabilities related to their job position. This study has observed that real estate professional confuses between the roles of facility managers and that of property managers which are differentiate with skills, capacities and judgment during their performance. Out of 9 respondents who answered survey questionnaire, 6 respondents were property managers indicating that property managers take over the duties of FM without knowing that their segment is just a fraction of FM and hence they end up making short term decisions to the building facilities instead of considering the present and future needs for facilities performance. This finding compliments the literature review that showed that FM and BPM are new concept in Tanzania real estate industry leading to misunderstand of the contextual framework between the two concepts. Therefore, the construction industry should introduce educational programs and trainings that provide necessary skills and ability to differentiate the fundamental and the theories BPM and FM concepts.

- **Lack of formal procedures/policies for setting up BPM framework.**

There are no formal procedures that allow facility managers to setup BPM framework for their building portfolios. The study had reveled that; respondents only set up the BPM in relation to the control over the building and to the organization goals and objectives. BPM require first setting up goals that aim at improving the building performance over its entire life cycles. Therefore the settings should go through all the stages listed in chapter three, and the most important of all is to start checking the design of the building facilities which determines energy usage, operations and maintenance that are required by the building. However this is not the case for the Tanzania real estate as 35 respondents think the design stage is of slight importance and hence they conducting BPM from when the building is running. Failure to take design stage into account lead to failure or collapse of building facilities, this is evidence with reports and news on collapsing building in Tanzania resulted by poor design of building facilities.
➢ Inadequate use of technology:
This study observed that, BPM data and information is mostly stored manual systems and the information stored automatically is mainly on excel and spreadsheet and few in database. The manual system tend to decrease staff productivity as employees spend more time going through the pile of files, spending more time going through each building facility hence increasing work load, increasing chance of leaving out important details and finally leading to high management cost. Deployment of computer-aided facilities management will help facilities management companies to easily transform data into information that will improve facilities performance at lower costs. This is achieved through integrating building performance data related to among other things building designs, performance objective, optimize resources, energy savings and solutions for potential facility problems. This study concludes that, the real estate industry does not efficiently utilize computer-aided facilities to enhance efficient decision-making regarding sustainable building performance.

➢ Emphasis is on short-term and not long-term goals
The main objective of conducting BPM is to ensure that managers are able to optimize building through out its life cycle as seen the literature review. However this seem not to be the practice in Tanzanian real estate industry as practitioners seems to concentrate on solving problems at the time the problem has occurred without considering the performance in the future. Managers find themselves always performing minor repairs instead of major repairs, replacement or renovation, which could be a best solution for building facilities. If the building is neglected in the long run they end up being dilapidated, obsolete and old as seen on most of Tanzanian buildings. Low allocation of budget for maintenances is argued to be the main reasons for managers to concentrate on short term goals because most of the budget goes to paying for energy and hence the cost overlap the budget. Hence the best solution is to provide more training on how managers can link long-term goals into the organizational BPM framework

➢ Lack of government recognition and follow-ups
Results from the survey indicate that, the government is not putting much emphasis in provision of quality building. This finding confirms with Komu (2008) argument that practitioner’s neglect following policies of quality building because the government does not make follow-ups on building operations and performance of facilities. It’s the duty of the government to ensure that buildings are constructed to fulfill the current and future needs of
the users; hence this can be done through provision of favorable conditions that enables the
real estate industry to procure sustainable buildings that are not to complex and energy saving
as argued by managers. Since the industry is still growing and most of their concepts are
knew, it is easy for the government to now introduce and incorporate sustainable building
rating systems into the industry. The rating tools will benefit the real estate industry and the
country at large by enhancing efficient planning and management of buildings facilities.

5.2 Conclusion remarks

This study observed that BPM is an efficient instrument used to ensure that different facilities
in the building perform at optimum at cost effective. There are five stages that managers need
to identify strategies and techniques that are linked with structural and non-structural building
facilities in order to come up with a reliable BPM framework and decision. In contrast to the
literature review this study has found out that, Tanzanian real estate industry does not have
specific procedures that they follow when conducting BPM for organization. Moreover,
control over building facilities is a major determinant that influences managers to measure the
extent of their building performance with major emphasis on informational and financial
aspects. Concentration is more done on informational and financial aspects of the building
and not the building operational aspects because of difficulties in identifying metrics or
benchmarking tools for measuring which was the main objective of this study. Hence more
buildings become obsolete and too complex to manage.

The real estate industry is in its stage of growth, it is now the best time for the government to
intervene by developing policies that guide practitioners into better practice. Through
provision of significant BPM policies and procedure the government will able to shape the
industry into developing and constructing sustainable buildings that will benefit the country
tremendously. On the otherhand organization should provide training and education to its
employees regarding BPM, how to link the framework with organizational objectives with the
aim of achieving both their long-term and short-term goals. These transformation strategies
will the discipline go forward.

Therefore, the above mentioned strategies can easily achieve in eliminating complexes and
implication associated with measuring building performance in Tanzania when organization
integrate computer-aided facilities management systems. These technological systems will
help facility management easily customize building performance problems as these systems
integrate people, process and spaces over the management time and hence increase employees’ productivity and reducing cost for setting up BPM. The tasks for effectively bringing BPM practice are very challenging but are nevertheless possible to accomplish if practitioners and governments make rigorous efforts to coordinate in order to achieve high performing building in the industry.

The study collected its survey data through the online-questionnaire sent to private and public sectors and after more than four months constant reminders and personal follow-ups the study was able to received 61.4% response from both sectors. The reason for this response rate is due to bureaucratic systems that are involved in the sectors and also technological constraints i.e. most of the respondents have e-mails but they have don’t frequent access to the internet because of high power outage that are facing the country now. Nevertheless, the data received from the respondents can be generalised to the population because the researcher has not spotted any changes in the construction industry or the country general that would have made the non-respondents to have answered differently from the respondents.

5.3 Recommendations for further studies

To the best of the author knowledge, further studies are needed to be done on building performance measurement in Tanzania by first improving this study by taking considerable large number of data which was the main problem faced by researcher due to time constraints. It would be more interesting to review and analyze the study with large context of data to see whether the current situation and findings of BPM practice can be improved and finding more solution for the problems and concerns that have been raised by this study.

Moreover researches can be done to examine the effects of integrating computer-aided facilities management systems into Tanzania facility management practice. Computer-aided facilities management systems are seen to have benefit in developed countries as has been explored by numerous researchers however there are no previous researches that have been on this subject connected to the practice in Tanzania. Hence a survey into effects of computer-aided facilities management on BPM implementation may be a good opportunity for researching.

Lastly, a comparative study on BPM can be either made between different types of buildings or between public and private sector practices. As noted earlier in the study that different organization and users have different expectations and requirements for the buildings they use. It would be beneficial for additional research to be conducted in such set of groups.
6. REFERENCES AND ATTACHMENTS

BOOKS


ARTICLES


REPORTS


INTERNET


Attachment 1: Interview questions

Before the questionnaire was formulated an interview was carried out with a facility manager in one of the government institutions in order to gain information that was useful in structuring the survey which was the main method of data collection.

Questions

1. What is Building performance measurement?

2. What would you say are the major technical skills needed for BPM?

4. What are the building facilities that you pay more attention to and which performance indicators do you use to monitor successfulness of building performance?

5. How often does your organization change, improve or modify BPM framework?

6. Who are the user of BPM data and reports?

7. What are the challenges organization faces when setting up BPM framework?
Attachment 2: Questionnaire

The purpose of this questionnaire is to get information about Building Performance Measurement and how it is done in Tanzania. The aim is to collect data for a Masters thesis being conducted by Johari Hussein, MBS student at The Royal Institute of Technology in Sweden. The focus is on what facility managers do and how company policies are affected by the BPM report.

The questionnaire is estimated to take 10-15 minutes of your time to answer and we are grateful for your participation.

All answers will be treated confidentially and no single answer will be identified to you.

BACKGROUND INFORMATION

1. Please fill in your sex
   - Male
   - Female

2. Please choose your age group
   - Below 26 years
   - 26-35 years
   - 36-45 years
   - 46-55 years
   - 56-65 years
   - Over 65 years

3. Please indicate the highest education level you have achieved of the ones below
   - No formal education
   - Secondary School
   - Bachelors Degree
   - Masters Degree
   - Higher Degree

4. Please indicate your form of employment. (You can choose more than 1 box for example if you have a regular paid employment and are also self-employed)
   - I am self employed with my own company
   - I am employed by the property company I work for
   - I am employed by a consultancy firm
   - I work with a governmental institution
   - Other, PLEASE specify in the space below.

5. Please indicate your job title
   - Managing director
   - Property manager
   - Facility manager
   - Building caretaker
BUILDING PROCESS, FUNCTIONAL AND OPERATIONAL PERFORMANCE
The answers in this section will be of help in analyzing factors like how building facilities are related to the actual building performance.

6. How many buildings does the company you work for manage?
   - Building
   - 2 buildings
   - More than 2 buildings

7. How long have you worked with the building?
   - Less than 1 year
   - 1 year
   - 2-3 years
   - More than 3 years

8. How long do you spend in the building during the day?
   - Less than 1 hour
   - About 2 hours
   - About 5 hours
   - About 8 hours
   - More than 8 hours

9. The building's layout is satisfactory to me
   - I fully disagree
   - I partly disagree
   - No opinion
   - I partly agree
   - I fully agree

10. Overall the building meets its intended needs
    - I fully disagree
    - I partly disagree
    - No opinion
    - I partly agree
    - I fully agree

11. I feel safe in this building
    - I fully disagree
    - I partly disagree
    - No opinion
    - I partly agree
    - I fully disagree
12. I have good control in this building over:

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<th>Fully disagree</th>
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<th>No opinion</th>
<th>Partly agree</th>
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**ABOUT ASSESSMENT OF BUILDING PERFORMANCE STAGES**

13. Building Performance Measurement refer to
   - Integrating functional, efficient and workflow performance
   - Monitor building to provide safe, healthy and productive environment for occupant
   - Managing building facilities to perform at lowest operational cost
   - Other (please specify)

14. How long have you worked with Building Performance Measurement?
   - Less than 1 year
   - 1-3 years
   - More than 3 years

15. The building(s) in which I have carried out Building Performance Measurement was

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<tr>
<th></th>
<th>Never</th>
<th>Once a year</th>
<th>Every 3 month</th>
<th>Once a month</th>
<th>Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td></td>
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<tr>
<td>Daylight</td>
<td></td>
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<tr>
<td>Artificial light</td>
<td></td>
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<tr>
<td>Noise</td>
<td></td>
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</tbody>
</table>
16. I am aware of our organization’s goals and objectives towards the present and future performance of our buildings
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

17. When forming building performance measurement the parameters I focus most highly on are:

<table>
<thead>
<tr>
<th></th>
<th>Fully disagree</th>
<th>Partly disagree</th>
<th>No opinion</th>
<th>Partly agree</th>
<th>Fully agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td></td>
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</tr>
<tr>
<td>Statistical</td>
<td></td>
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<tr>
<td>Operational</td>
<td></td>
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<tr>
<td>Tactical</td>
<td></td>
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<tr>
<td>Informational</td>
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<tr>
<td>Functional</td>
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<tr>
<td>Financial</td>
<td></td>
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<tr>
<td>Technical</td>
<td></td>
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<tr>
<td>Business</td>
<td></td>
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</tr>
</tbody>
</table>

18. We have formal procedures for defining ways on how to measure building performance
   - I fully disagree
   - I partly disagree
   - No opinion
   - I partly agree
   - I fully agree

19. What are the important factors you would look when conducting building performance measurement? *

<table>
<thead>
<tr>
<th></th>
<th>Low Importance</th>
<th>Slightly Important</th>
<th>Neutral</th>
<th>Moderately Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting company requirement</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Building meet its intended use</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Buildings added value</td>
<td></td>
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<tr>
<td>Customer’s view of quality &amp; value</td>
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<tr>
<td>Design option</td>
<td></td>
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<tr>
<td>Building Impacts on performance</td>
<td></td>
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</tr>
</tbody>
</table>
20. Building performance measurement is usually done
   - Quarterly
   - Every six-month
   - Yearly
   - Two to three years
   - More than 3 years
   - Never

21. Within a portfolio of buildings, the following are key indicators of how well a building is performing for your business

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Almost never</th>
<th>Every-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of building failures</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Track and reports on cost savings</td>
<td></td>
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<tr>
<td>Benchmarking the building to market</td>
<td></td>
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<tr>
<td>Monitoring design improvements</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Client evaluation of services</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Historical performance records</td>
<td></td>
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</tbody>
</table>

22. In order to ensure performance measurement add value to organization we conduct the following duties

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Infrequent</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Major repair</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Minor repair</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Replacement</td>
<td></td>
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<tr>
<td>Renovation</td>
<td></td>
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<tr>
<td>Expansion</td>
<td></td>
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</tbody>
</table>

23. After the BPM information is captured and analyzed, we usually store them as followed
   - Manually
   - Automatically
     - If manual go to Qn.24, and if Automatic go to QN.25

24. The data and information collected, stored & maintained manually, is recorded using
   - Forms and cards
   - Reports
   - Notebooks
   - Journals
25. The data and information collected, stored & maintained automatically, is recorded using
   ○ Spreadsheet
   ○ Database

26. The main reader of BPM report in my organization is

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investors</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Managers</td>
<td></td>
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<tr>
<td>Architects</td>
<td></td>
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<tr>
<td>Engineers</td>
<td></td>
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<tr>
<td>Service providers</td>
<td></td>
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</tbody>
</table>

27. The building performance report is used to

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Almost every time</th>
<th>Frequent use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of likely and actual building outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Strategic implication and consequences</td>
<td></td>
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<tr>
<td>The building work as intended</td>
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<tr>
<td>Recommendations for future BPM</td>
<td></td>
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<tr>
<td>Risk associated with building</td>
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<tr>
<td>Benchmarking the building to other in the market</td>
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<tr>
<td>Additional value added capability</td>
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</tbody>
</table>
28. Challenges facing the organization on setting up BPM are

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Fully disagree</th>
<th>Party disagree</th>
<th>No opinion</th>
<th>Party agree</th>
<th>Fully agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor recognition and support from government</td>
<td></td>
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<tr>
<td>Insufficient Energy supply</td>
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<tr>
<td>Procuring and building sustainable facilities</td>
<td></td>
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<tr>
<td>Measuring performance tools are unclear</td>
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<tr>
<td>Lack of relevant training on facilities management</td>
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<tr>
<td>Insufficient budget/funding for maintenance</td>
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<tr>
<td>Building too old and systems have become obsolete</td>
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<tr>
<td>Building and systems complexity</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>