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COURSE GUIDE DESCRIPTION

You must read this *Course Guide* carefully from the beginning to the end. It tells you briefly what the course is about and how you can work your way through the course material. It also suggests the amount of time you are likely to spend in order to complete the course successfully. Please keep on referring to the *Course Guide* as you go through the course material as it will help you to clarify important study components or points that you might miss or overlook.

INTRODUCTION

**EBFM4103 Strategic Facilities Management** is one of the courses offered by the Faculty of Science and Technology at Open University Malaysia (OUM). This course is worth 3 credit hours and should be covered over 8 to 15 weeks.

COURSE AUDIENCE

This course is offered to all learners taking the Bachelor of Science in Project and Facility Management with Honours. This module aims to impart knowledge on the understanding of facilities management system, the structure in order to meet the current business needs. The course will also prepare learners in IT, financial, value management as well as building quality assessment and property maintenance.

As an open and distance learner, you should be able to learn independently and optimise the learning modes and environment available to you. Before you begin this course, please ensure that you have the right course materials, understand the course requirements, as well as know how the course is conducted.

STUDY SCHEDULE

It is a standard OUM practice that learners accumulate 40 study hours for every credit hour. As such, for a three-credit hour course, you are expected to spend 120 study hours. Table 1 gives an estimation of how the 120 study hours could be accumulated.
Table 1: Estimation of Time Accumulation of Study Hours

<table>
<thead>
<tr>
<th>Study Activities</th>
<th>Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Briefly go through the course content and participate in initial discussions</td>
<td>5</td>
</tr>
<tr>
<td>Study the module</td>
<td>60</td>
</tr>
<tr>
<td>Attend 4 tutorial sessions</td>
<td>8</td>
</tr>
<tr>
<td>Online participation</td>
<td>12</td>
</tr>
<tr>
<td>Revision</td>
<td>15</td>
</tr>
<tr>
<td>Assignment(s) and Examination(s)</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL STUDY HOURS ACCUMULATED</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

COURSE OUTCOMES

By the end of this course, you should be able to:

1. Explain the significance of facilities management and strategic facilities management;

2. Describe the elements of facilities management system;

3. Demonstrate the application of info management and computer based information system in the practice of facilities management;

4. Employ the concept of both financial and value management in the overall approach of strategic facilities management;

5. Identify the imperative components in assessing building quality and maintaining property; and

6. Apply the functional plans strategies in delivering facilities management.
COURSE SYNOPSIS

This course is divided into 10 topics. The synopsis for each topic is listed as follows:

**Topic 1** gives an overview on the evolution of facilities management (FM). The evolution of FM is discussed starting from the 1970s until the 2000s. FM is also about organisation effectiveness, and this is measured based on the mission, goals and objectives, and the influence of the stakeholders.

**Topic 2** defines FM in the context of organisational structure and from three levels, namely, strategic, tactical and operational. Emphasis is also given to the FM scope and models. There are seven main components in the FM structure namely, operation and maintenance, strategic facility planning, sustainable environment, finance and business management, human resource management, quality assurance, and health and safety. This topic also discusses how FM can be tailored to meet the core business needs and goals and the external influences and barriers in achieving the strategic targets.

**Topic 3** highlights that strategic planning of FM is important to ensure the growth and development of the practice, especially by looking at the overall performance planning and controlling mechanism. Key Performance Indicators (KPIs) and benchmarking are introduced as among the most effective tools in measuring service performance. This topic also discusses the recognition of FM role in enhancing organisation’s business performance has improved in recent years.

**Topic 4** explains the importance of effective communication in FM. Good communication skills have been identified as the most important skill a facilities manager must possess. This topic also discusses the three strategies for effective communication as well as building management systems.

**Topic 5** describes the importance of effective management in FM. This topic also identifies the elements and functionalities of computer-based information system, which is an organised integration of hardware and software technologies and human elements designed to produce timely, integrated, accurate and useful information for decision-making purposes. It is an information system that relies mostly on computers.
Topic 6 focuses on financial management and how it is essential to manage and control the finances and budgets effectively. This topic examines financial planning mechanisms namely life cycle costing, cost benefit planning and building cost and value. It also emphasises financial management as an organised method to control the financial resources of the work activities. Budgets must be allocated and justified accordingly to ensure that sufficient resources are provided for the FM delivery and optimum utilisation of fund is achieved.

Topic 7 explains that value management (VM) is an organised analysis of a project aiming to provide necessary functions at lowest cost, whilst not compromising the product quality. Other elements explained in this topic are building in value criteria and cost-effectiveness concept. Project viability is also covered to recognise its importance in assessing a project’s viability status, growth as well as its long-term benefits.

Topic 8 covers the basis of building construction quality assessment where a general overview of the two construction quality assessments standards currently in use in Malaysia is highlighted. This topic also discusses the Qlassic assessment criteria that defines the assessment approach, the elements of building that are covered in the building construction quality assessment, the weightage allocation to the different categories of buildings and the assessment process.

Topic 9 focuses on the need and nature of maintenance works. It is a continuous process once a building is constructed and its life cycle revolves around it. The nature of maintenance works includes servicing or day-to-day maintenance, rectification, replacement, and refurbishment or renovation. This topic also explains the approaches to maintenance.

Topic 10 emphasises on functional plans The elements covered are the space planning, need analysis and FM value map. This shows that quality of spaces has been associated and does contribute to the social sector, comfort, satisfaction as well as productivity level. Learners are also introduced to needs analysis to maximise the optimum value delivery of space planning approach.
TEXT ARRANGEMENT GUIDE

Before you go through this module, it is important that you note the text arrangement. Understanding the text arrangement will help you to organise your study of this course in a more objective and effective way. Generally, the text arrangement for each topic is as follows:

Learning Outcomes: This section refers to what you should achieve after you have completely covered a topic. As you go through each topic, you should frequently refer to these learning outcomes. By doing this, you can continuously gauge your understanding of the topic.

Self-Check: This component of the module is inserted at strategic locations throughout the module. It may be inserted after one sub-section or a few sub-sections. It usually comes in the form of a question. When you come across this component, try to reflect on what you have already learnt thus far. By attempting to answer the question, you should be able to gauge how well you have understood the sub-section(s). Most of the time, the answers to the questions can be found directly from the module itself.

Activity: Like Self-Check, the Activity component is also placed at various locations or junctures throughout the module. This component may require you to solve questions, explore short case studies, or conduct an observation or research. It may even require you to evaluate a given scenario. When you come across an Activity, you should try to reflect on what you have gathered from the module and apply it to real situations. You should, at the same time, engage yourself in higher order thinking where you might be required to analyse, synthesise and evaluate instead of only having to recall and define.

Summary: You will find this component at the end of each topic. This component helps you to recap the whole topic. By going through the summary, you should be able to gauge your knowledge retention level. Should you find points in the summary that you do not fully understand, it would be a good idea for you to revisit the details in the module.

Key Terms: This component can be found at the end of each topic. You should go through this component to remind yourself of important terms or jargon used throughout the module. Should you find terms here that you are not able to explain, you should look for the terms in the module.
**References**: The References section is where a list of relevant and useful textbooks, journals, articles, electronic contents or sources can be found. The list can appear in a few locations such as in the Course Guide (at the References section), at the end of every topic or at the back of the module. You are encouraged to read or refer to the suggested sources to obtain the additional information needed and to enhance your overall understanding of the course.

**PRIOR KNOWLEDGE**

This is an introductory course. There is no prior knowledge needed.

**ASSESSMENT METHOD**

Please refer to myVLE.

**REFERENCES**


TAN SRI DR ABDULLAH SANUSI (TSDAS) DIGITAL LIBRARY

The TSDAS Digital Library has a wide range of print and online resources for the use of its learners. This comprehensive digital library, which is accessible through the OUM portal, provides access to more than 30 online databases comprising e-journals, e-theses, e-books and more. Examples of databases available are EBSCOhost, ProQuest, SpringerLink, Books24x7, InfoSci Books, Emerald Management Plus and Ebrary Electronic Books. As an OUM learner, you are encouraged to make full use of the resources available through this library.
Topic 1 ➤ Introduction to Strategic Facilities Management

LEARNING OUTCOMES

By the end of this topic, you should be able to:
1. Explain the evolution of Facilities Management (FM);
2. Describe the scope and strategic functions of FM in ensuring organisational effectiveness; and
3. Discuss the various FM delivery options currently practiced.

INTRODUCTION

Facilities Management (FM) is still an evolving profession but one which is rapidly developing. Over the years, FM has transformed from a basic operational level service provision to assuming a strategic link between businesses and their support infrastructure. FM is traced to beginning in the United States in the 1970s, leading to the establishment of the International Facility Management Association (IFMA) in 1980 with a number of organisations seeking to cut costs, as well as train and manage staff involved at the interface between workplace, staff and processes. Following IFMA was the setting up of Euro FM in 1990 and the British Institute of Facilities Management (BIFM) in 1993. At present, attempts are focused on defining the real essence and scope of FM services. Facilities management is responsible for providing a wide range of services to organisations categorised under two major scopes namely: hard services and soft services. Hard services are the services which involve the use of technical abilities while soft services are the services which involve the use of intuition.
According to the Royal Institution of Chartered Surveyors (2014), there are numerous responsibilities today capable of falling within the remit of the FM profession. Such duties range from the development of a facilities management strategy, all through management and review of that strategy, to an implementation and actual delivery of a wide range of core and non-core services. The subsequent sections of this paper would look at the general overview of FM through definition and service delivery options and the role FM plays in supporting business and organisations’ needs within a sustainable FM integration framework.

### 1.1 DEFINING FM

Over the years, the definition of FM has changed to incorporate new aspects as understanding the scope of FM services provision becomes clearer (see Table 1.1). FM was viewed earlier as an operational day-to-day level services provision and now has graduated to a strategic level of service delivery. FM nowadays is seen as the key link between organisation or business support services to core-business. FM offers a holistic and evolutionary approach in realising organisational optimisation and total business solutions in regards to other business tools available to business outlets and organisations (Mohd Nazali & Pitt, 2009). FM entails providing support services to the business or organisation’s core functions.

These services could either be performed in-house or outsourced to contractors. FM is defined and described widely to mean the following, according to Drion et al. and Kelly et al.

- A more or less coherent management function focusing on how to develop, maintain and improve the physical assets needed to support and add value to an organisation’s business processes and create and maintain a physical workplace that provides optimal support to the people and work of the organisation.

  (Drion et al., 2012)

- An integrated profession where the role of the facilities manager is to ensure that services are tailored to suit the core business they operate.

  (Kelly et al., 2005)
Table 1.1: Evolution of FM

<table>
<thead>
<tr>
<th>Period</th>
<th>Generation</th>
<th>Functions</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970s</td>
<td>1G</td>
<td>Managed services, outsourcing, total FM, CAFM</td>
<td>Operational</td>
</tr>
<tr>
<td>1980s</td>
<td>2G</td>
<td>Quality management, management agency, benchmarking, FM processes, FMIS</td>
<td>Tactical</td>
</tr>
<tr>
<td>1990s</td>
<td>3G</td>
<td>Partnering, re-engineering processes, knowledge management, product innovation, sustainable FM</td>
<td>Strategic</td>
</tr>
<tr>
<td>2000s</td>
<td>4G</td>
<td>Business processes, open innovation, usability, service excellence, transformational outsourcing</td>
<td>Transformational</td>
</tr>
</tbody>
</table>

Source: Alexander (2009)

The two most widely accepted definitions of FM so far have been provided by two of the leading FM bodies in the world – the International Facility Management Association (IFMA) and the British Institute of Facilities Management (BIFM).

IFMA (2013) defines FM as follows:

A profession that encompasses multiple disciplines to ensure the functionality of the built environment by integrating people, place, process and technology”, while the BIFM (2014), sees FM as “the integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary objectives.

Facilities management could therefore be seen as the integration of people, process, place and technology to ensure functionality, improved services and effectiveness of an organisation’s primary objectives. Facilities management is responsible for all the support services that ensure the effective operation of the core objectives of any organisation or business.
FM service delivery may either be delivered through a packaged portfolio of services or organised across service areas such as the following (Shah, 2007):

(a) **Single Service Provision**
The single service provision route describes delivering a single FM service type such as catering, security, maintenance, etc. through a specialist provider.

(b) **Multiple or Packaged Service Provision**
The multiple FM services delivery route is when two or more FM services or functions are outsourced to a service provider. For instance, a security company could provide burglar alarm systems, manned guards, electronic entry systems as a single package.

(c) **Management Contracting**
This is a combination of management and delivery services where client organisations could employ management contractors, and later allowing the client company overall management control.

(d) **Integrated Facilities Management (IFM)**
Integrated facilities management is the bringing together of several support services into a single management structure. The client company relieves itself completely of the total support provision by delegating its entire facility requirements FM service providers. Such wide range of services could be delivered directly or through sub-contractors.

(e) **Infrastructure Management**
Involves the maintenance and management of bridges, railways, roads and utilities (gas, water and electricity).

(f) **Building Operations and Maintenance**
Involves buildings and content management, maintenance, plant and systems management, including maintenance and management of M&E services.

(g) **Business Support Services**
Providing administrative, finance, human resources management, procurement and risk management.

(h) **Property Management**
Entails asset management, acquisitions/disposal planning, space planning, project management and relocation management.
1.2 FM FRAMEWORK

Sustainability is the main issue of facilities management. A key component of sustainability adoption in any organisation involves change. An understanding of providing essential insights that allow all staffs at all levels of the organisation to grasp the need for and impact of the change is very important. In addition, it is crucial to convey an integrated approach. The Sustainable FM Integration Framework (as illustrated in Figure 1.1) is a useful tool to assist managers and facility staff in relating to the many levels of integration required to make successful changes toward a more sustainable facilities management.

Figure 1.1: Sustainable FM integration framework
Source: David, Roper and Payant (2009)
Each component in the framework exerts influence on the others, so that once an understanding of sustainable expectations reaches the desired level in some areas, the influence impacts other areas and exponentially expands the understanding and acceptance of sustainability. These people, processes, and the places are integrated and must work together to maintain momentum.

1.3 ORGANISATIONAL EFFECTIVENESS

Facilities management is first and foremost about organisation effectiveness. The effectiveness of organisations may be measured in different ways, depending on their mission, main goals and objectives, as well as the relative influence of the stakeholders – those groups with an interest in it:

(a) Customer – customer care/customer first;
(b) Employees – investing in people;
(c) Shareholders and creditors;
(d) Collaborators and suppliers;
(e) The community and society; and
(f) The government.

Stakeholder analysis is used by some firms to identify and classify their expectations. Organisational effectiveness may be described as: maintaining commitment amongst the members of the organisation, communication amongst operating units, projecting a positive and responsible image, enabling change and improving productivity. Facilities have the potential to contribute and it is important to identify (and measure) the extent that they support, or can be adapted to, the changing needs of organisations, and contribute to productivity, profitability, service and quality.

1.3.1 Organisational Dynamics

The characteristics of an organisation has a major influence on the needs of the facilities and support services of each organisation. Even within the same business sector, each organisation is likely to have different needs in facilities and FM functions. All the scope under FM could bring together for the benefit of the organisation and its employees as a whole. Hence, nowadays, the aim of FM is not to focus on optimising the running cost of building only, but also raising the efficiency and suitability of the management of space and other related asset management for people and processes. That is so that the mission and goals of
the organisation can be obtained in the best combination of efficiency, cost and quality.

For the organisation, FM entails the following (Alexander, 2003):

(a) Creating a facilities policy that conveys corporate values;
(b) Improving service quality through the facilities business unit;
(c) Developing facilities that meet business goals and objectives; and
(d) Recognising the added value of facilities to the business or organisation.

For the FM outfit, the strategic role entails the following (Alexander, 2003):

(a) To formulate and communicate a facilities policy;
(b) To plan and design for continuous improvement of service quality;
(c) To identify business needs and user requirements;
(d) To negotiate service level agreements;
(e) To establish effective purchasing and contract strategies;
(f) To create service partnerships; and
(g) Systematic service appraisal quality, value and risk.

Figure 1.2 represents the summary of the cause-responses-impact relationship that accounts for the justification of facilities management. Business pressures cause the organisation to change. To aid change management in an organisation, physical resource is required in different hard and soft services. Finally, the impact/performance of success of the organisation looks into three key variables, which are structure, processes and competencies:

(a) **Structure** – the organisational set-up for facilities services provision;
(b) **Processes** – the systems and procedures for the delivery and management of facilities support and operational assets; and
(c) **Competencies** – the essential skills and knowhow required for an efficient and effective delivery system.
Facilities management nowadays represents the link to support services and core business or primary organisational operations. This is regarded as providing strategic support and value to organisational core objectives by continuously improving quality to ensure added value. Major organisations worldwide are utilising FM functions as part of their strategy for restructuring to provide a competitive edge. FM could be seen as improving processes where workplaces could be better managed to achieve business or organisational effectiveness.
Excellent FM services delivery could provide the following benefits:

(a) Effective management of a business or organisation’s assets;
(b) Enable innovative working processes;
(c) Enhance a business or organisation’s image and identity;
(d) Help integration processes associated with change, acquisitions and mergers; and
(e) Ensure business continuity and workforce security.

SELF-CHECK 1.1

1. FM functions can be undertaken in-house or outsourced. Highlight the benefits of outsourcing FM services.

2. FM is viewed from the perspective of both the organisation and FM service provider. Highlight the role or functions of FM for the organisation and FM service provider in an outsourcing arrangement.

3. Explain briefly the various FM services delivery options currently available.

4. Identify and briefly discuss the strategic relevance of FM to organisations and businesses.

ACTIVITY 1.1

In your own words, define FM, briefly explaining the importance of the four elements of people, process, place and technology in FM service delivery.
SUMMARY

- FM entails providing support services to a business or organisation’s core functions.

- FM is nowadays a strategic link between business core objectives and support infrastructure and services.

- Organisations require FM as a fundamental aspect of their strategic business plan.

- Excellent FM services delivery can ensure effective assets management, enhance organisational image, deliver business continuity, enhance process and organisational effectiveness among several other benefits.

KEY TERMS

<table>
<thead>
<tr>
<th>Organisational dynamics</th>
<th>Strategic facilities management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational effectiveness</td>
<td>Support service</td>
</tr>
<tr>
<td>Organisational operations</td>
<td>Sustainability</td>
</tr>
</tbody>
</table>

REFERENCES


INTRODUCTION

After we have gone through Topic 1 on Facilities Management (FM), you should now have a clear definition of how FM is being defined in the context of organisational structure. In this topic, we will explain to you more on the structure of FM, FM scope and models, how they can be tailored to meet the core business needs and goals and also what are the external influences and barriers in achieving the strategic targets.

ACTIVITY 2.1

Define FM in your own words based on your understanding from Topic 1.
2.1 FM STRUCTURE

FM system acts at three main levels: strategic, tactical and operational.

(a) **Strategic level** is to achieve the objectives of the organisation on a corporate level in the long term through strategic approaches in the service delivery.

(b) **Tactical level** is the level of interaction whereby the strategic objectives on a business unit level is achieved by implementing the strategic objectives in the medium term.

(c) **Operational level** is the basic interaction level to create the needed environment to the end users on a day-to-day basis.

Table 2.1 lists the three levels of FM practice in more detail.

![Figure 2.1: Three Levels of FM Practice](image)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Level</td>
<td>• Defining FM strategies and policy making guidelines;</td>
</tr>
<tr>
<td></td>
<td>• Active correspondence and decision-making at a corporate level;</td>
</tr>
<tr>
<td></td>
<td>• Initiating and monitoring Key Performance Indicators (KPIs); and</td>
</tr>
<tr>
<td></td>
<td>• Analysing FM impacts on the primary activities, internal and external environment and community.</td>
</tr>
<tr>
<td>Tactical Level</td>
<td>• Implementing and monitoring guidelines to follow strategies;</td>
</tr>
<tr>
<td></td>
<td>• Translating business objectives to operational level;</td>
</tr>
<tr>
<td></td>
<td>• Defining and interpreting Key Performance Indicators (KPIs); and</td>
</tr>
<tr>
<td></td>
<td>• Communicating with internal and external service providers on a tactical level.</td>
</tr>
<tr>
<td>Operational Level</td>
<td>• Delivering services;</td>
</tr>
<tr>
<td></td>
<td>• Monitoring and checking the service providers and service delivery process;</td>
</tr>
<tr>
<td></td>
<td>• Defining and interpreting Key Performance Indicators (KPIs); and</td>
</tr>
<tr>
<td></td>
<td>• Communicating with internal and external service providers on a tactical level.</td>
</tr>
</tbody>
</table>
FM should be in close synchronisation with the mission and vision of the organisation and its objectives to succeed and deliver the required results. This can be achieved when the FM system is being conducted through any of the above levels.

**ACTIVITY 2.2**

1. In a group, brainstorm other activities in each of the FM levels.
2. Discuss with a coursemate the benefits of each approach to the organisation and its way forward.

**So what do we have under the FM umbrella?**

There are several fundamental components that comprise an organisation’s FM. These components have to be embedded in the overall service delivery or can also be addressed individually. The major components are as follows:

(a) **Operation and Maintenance (O&M)**
O&M focuses on the service delivery, in particular the daily operations which includes the preventive, scheduled and reactive maintenance plans. It typically includes the day-to-day activities necessary for the building and its systems and equipment to perform their intended functions. It is important to ensure a smooth operation and maintenance delivery to minimise any interruptions to the primary activities of the workplace. This includes but not limited to the building services and mechanical system, telephones and communications, fire safety system, maintenance, security, cleaning, waste disposal, pest control, landscaping, catering and support services.

(b) **Strategic Facility Planning (SFP)**
Generally, strategic planning concerns the overall planning of the FM. For example, formulation of FM policies and strategies, the policy and guidelines planning, space planning, asset registers, life cycle costing, system and software development. Overall, the scope of this strategic planning component highlights the cost control, systematic and efficiency of the FM delivery from both functional and technical aspects. At this stage, the setting up of all the policies and documentations must be worked out by the higher management. Strategic planning is not a daily task but a process that can lead to better, more proactive delivery of services from FM to the stakeholders and building end users (IFMA, 2014). A comparison of SFP with other planning exercises are as shown in Table 2.2.
Table 2.2: Comparison Table for SFP, Master Plan and Tactical Plan

<table>
<thead>
<tr>
<th>Strategic Facility Plan</th>
<th>Master Plan</th>
<th>Tactical Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing condition analysis</td>
<td>Site-specific physical plan for buildings</td>
<td>Maintenance schedules/ plans</td>
</tr>
<tr>
<td>Organisational needs statement (linking FM to strategy)</td>
<td>Infrastructure and systems within the site</td>
<td>Operational plans</td>
</tr>
<tr>
<td>Gap analysis</td>
<td>Aesthetics of buildings and ground</td>
<td>Building floor plans/ stacking plans</td>
</tr>
<tr>
<td>Recommendations for new spaces/buildings</td>
<td>Phasing plans for building</td>
<td>Architectural design/ configurations</td>
</tr>
<tr>
<td>Facility cost projections/ life cycle cost analysis</td>
<td>Construction estimates</td>
<td>Operating budget</td>
</tr>
<tr>
<td>Capacity analysis and use recommendations</td>
<td>Engineering assessments</td>
<td>Floor plans or occupancy charts</td>
</tr>
</tbody>
</table>

Source: IFMA (2014)

(c) **Sustainable Environment**
This component focuses on the principle of sustainability from the environment viewpoint. It supports the overall FM policies and strategies by incorporating the sustainability aspect in the service delivery specifically on the materials and system aspect. It strives to make the business or primary activities more diverse and economical by focusing on practices that be tailored with the usage of natural resources and environment such as air, water, climate and energy. The initiatives can cover the recycling system of resources, energy and waste in the aim of reducing cost, waste and pollution to the environment. Among the programmes that can be included are as follows:

(i) Design for the Environment (DfE);
(ii) Green Infrastructure;
(iii) Green Engineering;
(iv) Environmentally Preferable Purchasing (EPP);
(v) Sustainable Materials Management;
(vi) Risk Management Sustainable Technology; and
(vii) Sustainable Futures.

The impact of these efforts are essential in improving the sustainability of both new and existing buildings.

(d) **Finance and Business Management**
Finance and business management is the core element in FM that supports the financial and corporate aspects in relation to service delivery of the organisation. It refines the finance section by looking at the budget and cost of the functional and technical operations. A strategic FM practice needs to incorporate the cost-cutting initiatives in its mission to provide quality services in the most supportive and cost-effective manner. This involves streamlining the financial cost and budget with the FM strategies specifically by looking at the needs and requirement of each FM service.

Although the aim is to reduce the cost and save on the budget, it is important to note that the quality and efficiency of services should not at anytime be compromised. Strategic approaches must be proposed to improve performance while reducing cost in a more meaningful way, – enhance the mission value, finance and business growth of the organisation. It is important to enhance the mission value by scrutinising each aspect of FM practice and embed other related components such as sustainability to control the economical and balance of the whole delivery aspect.

A mission value is defined as follows:

\[
\text{Mission Value} = \frac{\text{Quality} \times \text{Service}}{\text{Cost} \times \text{Time}}
\]

(i) **Mission** value refers to the outcome benefits in terms of quality of service in relation to the cost and money spent;

(ii) **Quality** is about refunds/payments, and getting the right commodity to the right place at the right time;

(iii) **Service** could mean organisations that can regard you as an individual across transactions over time, that anticipate your questions and provide service channels that are convenient and accessible;

(iv) **Cost** could mean cost per transaction for government, cost per citizen, reduced operations and maintenance (O&M) costs; and
(v) **Time** could mean shorter elapsed or active time processing applications, or a decrease in wait time.

Adjusting any of these components will improve the value provided to citizens, leaders, and other stakeholders in the organisation. This will help to streamline the finance and business aspect with the organisation mission, vision and goals.

(e) **Human Resource Management**

Human resource management focuses on the strategic planning and organisation of the human resource element. According to BIFM (2012), this includes the following:

(i) Planning FM workforce in regards with the organisational plans and objectives;

(ii) Understand the factors that impact workforce planning and the benefits of a diverse workforce;

(iii) Evaluate the employment policies and practices within an organisation in terms of their impact on the capacity and capability of the FM function;

(iv) Synchronise the appointment policies and regulations of appointing service policies with the organisational policies and approach;

(v) Guide on ways to manage human resource management issues by promoting a transparent disciplinary and systematic procedures including monitoring the performance of service providers;

(vi) Evaluate the different ways in which diversity workforce requirements can be met, their advantages and disadvantages, costs and benefits;

(vii) Analyse potential risks associated with the current or predicted workforce capacity and the capability or performance of an organisation;

(viii) Ensure that appropriate and effective contingency arrangements are in place to deal with sudden changes in workforce capacity or workforce performance;

(ix) Evaluate the transparency of the processes and procedures for managing the performance of the workforce; and
(x) Critically review the human resource legislation which has the most impact on the FM function.

(f) **Quality Assurance**

Quality always comes first. In the aim to provide a continuous excellence to the service delivered to the customers or end users, one of the essential basics is quality assurance. Quality has always been emphasised in all industries, particularly the service industry, where the drive is always to deliver success. Quality assurance defines and improves quality related processes and procedures to ensure quality. Quality assurance focuses on the processes including the selection of materials, machineries or items used for each service.

In FM, quality assurance is the means to provide quality services that meets the needs of customers and building end users that conform with legal and statutory regulations, prevailing codes of practice and generally accepted standards of workmanship or finishes.

In order to make sure that service objectives are achieved, a thorough evaluation of all service processes can be based on the following four main themes:

(i) Process identification;
(ii) Process evaluation;
(iii) Process implementation; and
(iv) Process assessment.

Another aspect that normally follows through Quality Assurance is Quality Control, which evaluates the quality and estimates if it meets customers’ expectations.

(g) **Health and Safety**

Health and Safety (H&S) is the responsibility of owners and occupiers of buildings. The FM manager has a direct responsibility for maintenance, equipment, activity flow of premises and the general occupancy standards, all of which have to satisfy H&S requirements. However, it is not the FM manager’s role to be a safety officer. Awareness needs to be raised on understanding the necessary precaution actions, relevant legislation acts as well as the potential effects on the use of premise. The understanding of H&S measures under the regulations will take precedence over all other operational considerations, and failure to do so incurs penalties.
Among the main concerns of FM scope in safeguarding the organisation’s H&S are as follows:

(i) Safe and proper functioning of the premise and equipment;
(ii) Logging and interrogating databases – includes data registers for risk analyses;
(iii) Flagging danger areas and operating restricted access measures;
(iv) Control the programme of internal safety audits;
(v) Achieving the most appropriate allocation of space to particular departments/activities;
(vi) Supporting members of staff in their efforts to ensure a safe and healthy working environment, advises on training requirements and liaises with other departments and external stakeholders;
(vii) Addresses statutory compliance obligations in particular and close collaboration with Health & Safety obligations to minimise the risk of failure;
(viii) Oversee H&S management and risk assessment aspect; and
(ix) Database controlling issue, storage, testing and maintenance of work equipment and safety equipment.

**ACTIVITY 2.3**

With your coursemate, work together and choose one FM service and draft the Quality Assurance activities or procedures using the following keywords:

- STANDARDISE
- MONITOR
- ANALYSE
- REPORT
- VERIFY
- VERIFY
- TRACK
- AUDIT
- TRAIN

E.g.:

**FM Service:** Security Services
**Quality Assurance Activities:**
1. **Standardise** the key performance indicators for all security guards.
2.2 **AN INTEGRATED FM SERVICE**

An integrated FM service is how all of the management of facilities and services are coordinated as a whole. Integrated FM simplifies the structure of FM services to connect each of the interrelated FM components. It is a method for a large scope project or management specifically for long-term and complex FM structures, which normally involves multi-service providers.

An integrated FM service is an ideal solution towards maximising the building lifecycle by ensuring continuous peak performance of the facilities and buildings driven by predictive, preventive and reactive maintenance regimes and provision of soft facilities management services. The essence of the integrated FM principle is to match the service delivery specification and requirements according to clients preference and needs. This is critical to meet the desired performance in improving the whole service delivery. An integrated FM also emphasises on the synchronisation of service delivery with the client’s requirements and missions.

**SELF-CHECK 2.1**

1. Explain the three levels of FM implementation.
2. Describe the role of FM in supporting business or organisational objectives.

2.3 **MEETING CURRENT CORE BUSINESS NEEDS**

The strategic role of FM function is crucial in contributing to business success. The evaluation or assessment of FM’s contribution to the business success can be focused upon these elements:

(a) Objectives of an organisation and to business success;
(b) Support to business strategy and operations;
(c) Contribution to improving productivity of the business;
(d) Management of the assets of an organisation’s property portfolio;
(e) Impact on facility operating costs;
(f) Effectiveness of facility policies and procedures;
(g) Quality of the working environment;
(h) Delivery and quality of out-sourced, part-sourced and in-sourced services;
(i) Provision of support to the employees and end users; and
(j) Quality of services as received by the customers or consumers.

The following are the aspects in which FM can contribute to excellent organisational performance:

(a) Survival strategy;
(b) Delivering sustainable growth;
(c) Increasing prosperity;
(d) Improving competitiveness;
(e) Enhancing reputation; and
(f) Maximising market valuation.

How is FM seen as a business enabler? This can be seen through its three strategic roles: asset strategy, management and collaboration and total asset management plan (see Figure 2.1).

![Figure 2.1: Three strategic roles of FM as a business enabler](image)

Another means that FM can contribute to the overall business success is by providing the relevant information so the business can formulate their business strategy.

The positive impact that can be seen derived from the FM information are as follows:

(a) Facilitate the formulation of business strategy;
(b) Plan and control organisational activities;
(c) Facilitate decision-making;
(d) Use limited resources efficiently and effectively;
(e) Improve business performance and enhance shareholder value;
(f) Safeguard business assets (tangible and intangible);
(g) Effect internal control; and
(h) Ensure corporate compliance.

In a business context, FM also helps to align the organisational objectives and missions so they can be achieved successfully. Interestingly, this will then draw the benefits of good organisational missions or objectives as follows:

(a) Provides a focus for consistent strategic planning decisions;
(b) Establishes an ethics framework;
(c) Communicates the nature of the organisation to stakeholders;
(d) Enables purpose and direction to be assessed and controlled through resultant objectives; and
(e) Empirically proven that strong corporate values positively correlate to higher profitability.

**ACTIVITY 2.4**

In a group, discuss the contributions of FM to the business and organisations based on the present scenarios in Malaysia.

### 2.4 FM MODELS

The organisational structure of FM can be categorised according to different settings; namely how FM practices are structured into different models. Three setting examples as reckoned by Barret and Baldy (2003) that can be looked upon are the single sites, localised sites and multiple sites.
2.4.1 Single Sites

The model refers to an organisation in one location but big enough to create a separate unit responsible for the management of its physical assets. The organisation may use a combination of in-house and contracted services in the execution of the FM functions. Some good examples are a manufacturing plant, independent school and independent retail outlet. The FM service is run from a dedicated FM office at the site with no linkage with other FM offices. Most often, it is considered as a small-scale operation, although the size of the FM hierarchy may not necessarily be small.

2.4.2 Localised Sites

This model focuses on a central management approach. It is suitable for organisations that have facilities in different locations but operate central management control of their core functions from one site-headquarters. This model is suitable for universities or other educational institutions with multi-campuses, banks, hospitality industry, etc. This model encourages partial decentralisation of operations that allows a certain level of decision to be made at each site level, with major policy taking place at the central management level. In this setting, the leading FM manager is placed at the central office overseeing the strategic viewpoint of the practice including the policies, management and total FM system. The FM assistant managers stationed at the local branches handle the daily operations of the premise and are also responsible for on-site activities and decisions. Effective communication is essential in this approach to streamline the objectives and approaches. This could be done by formalising the communication channels among the FM managers and staff from both FM offices.

2.4.3 Multiple Sites

Multiple sites FM model refers to the large-scale operational. Similar to the localised sites model, the multiple site setting is suitable for large organisations that operate across widely separated geographic locations, but perform identical functions in each site. Each site accommodates a functional FM office, while the activities are coordinated at strategic levels for effective management. It usually applies to larger properties or premises. Some examples are health service institutions, military barracks, parks and historic sites. The model operates a structured coordination from national through to local levels. Due to its expansive size, the adoption of strategic FM is normally practiced including an enhanced FM approach emphasising on innovations, cost cutting opportunities and efficiency gains.
These organisational structures demonstrate the dynamics of FM settings and how the practice can be further expanded to meet the organisation needs. The key in managing FM regardless of the different FM models are to make sure that the system is in place and the FM teams are well aware of their responsibilities and required actions.

**ACTIVITY 2.5**

Conduct a case study of a public or private hospital in your neighbourhood and compare the settings of the FM models with other case studies from the rest of the class.

### 2.5 FM AND EXTERNAL INFLUENCES

There are various factors that can affect or influence the drive and growth of FM in general. According to Hassanien and Dale (2013), the external factors influencing FM are as follows:

(a) Globalisation;
(b) Business continuity;
(c) Workforce protection;
(d) Security improvement;
(e) Development of information and communication technologies;
(f) Changes in legislation and government policy;
(g) Development of information and communication technologies;
(h) Increasingly mature and competitive markets;
(i) Fluctuating land and property prices; and
(j) Changing consumer demands and expectations.

**ACTIVITY 2.6**

In a group of three to four persons, brainstorm how external factors influence the FM service, with appropriate real scenarios and examples.
Summary

- FM systems can be applied at three different levels: operational, tactical and strategic.

- There are seven main components in the FM structure: Operation and Maintenance, Strategic Facility Planning, Sustainable Environment, Finance and Business Management, Human Resource Management, Quality Assurance and Health and Safety.

- FM role is crucial in meeting the business core needs and requirements.

- There are three settings of FM Models: single sites, localised sites and multiple sites.

Key Terms

<table>
<thead>
<tr>
<th>Core business needs</th>
<th>Integrated FM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities management</td>
<td>Organisational performance</td>
</tr>
<tr>
<td>Facilities management structure</td>
<td>Strategic facility planning</td>
</tr>
</tbody>
</table>

References


INTRODUCTION

You have been introduced to Facilities Management (FM) in the previous topics and you should now have a good understanding of FM structure and practice. This topic will expand into a more strategic viewpoint of FM which is Strategic FM.

LEARNING OUTCOMES

By the end of this topic, you should be able to:

1. Explain the principles of Strategic FM;
2. Describe the relationship between Strategic FM and performance;
3. Identify the performance principles; and
4. Examine the barriers of a successful performance measurement of FM.

ACTIVITY 3.1

Refresh your understanding on FM. What constitutes an FM in general?
3.1 STRATEGIC FACILITIES MANAGEMENT

Strategic FM is when FM is being implemented strategically. Strategic in this context refers to the inclusion of the added-value and efficiency elements into the FM practice, by looking at the practicality and performance aspects. So what is the difference between FM and strategic FM?

Strategic FM is when the management of facilities is to be seen at a strategic level of importance, and is therefore being given the task and opportunity to contribute to business success and to aid the delivery of competitive advantage.

At present, the range of services covered within the remit of FM has become more complex, as its scope and function have moved into the core operational functions of client organisations.

3.2 STRATEGIC PLANNING

Managing the built environment has become more complex each day with the increasing demand of high value and quality services in most developing countries around the world. The changing business transaction trends in the global and liberalised market require investors to adapt to the current, upcoming and future trends of operating business activities.

In FM strategic planning, the emphasis is given on the following but not limited to these essential components:

(a) Industry best practice;
(b) Business growth and development;
(c) Enhance productivity;
(d) Knowledge-based FM;
(e) Alignment between business drivers, services provided and asset dependency;
(f) Performance measurement and management;
(g) FM planning and controlling mechanism; and
(h) Intelligent FM.
In planning FM strategically, we can look at the critical aspects of FM operations as follows:

(a) Basic stance towards FM;
(b) Organisation;
(c) Choice of FM provision;
(d) Focus of improvement initiatives;
(e) Customer provider relationship;
(f) Staff welfare and development;
(g) Multi-skilling FM staff;
(h) Service level agreements and contracts;
(i) Helpdesk system;
(j) Space design; and
(k) Sustainable knowledge and practice.

Strategic plan is a statement of long-term goals with a definition of strategies and policies that will ensure achievement of these goals (BIFM, 2007). Strategic planning and management is concerned with deciding on strategies and planning how that strategy is best put into effect. It is based on three key elements such as strategic position and analysis, strategic choices and selection, and strategic implementation and performance.

Strategic management has been around for nearly a half century (Sherman, Rowley & Armandi, 2007). The practice of strategic management has become far more sophisticated since the advent of computer technology, the Internet and knowledge management systems. The management’s ability to gather and process information about the firm and its competitive environment has increased exponentially in the last decade, therefore providing FM managers far more accurate and reliable data in which to base their strategic decision-making.

### 3.3 RELATIONSHIP BETWEEN FM AND STRATEGIC PLANNING

For most organisations, FM supports activities without significant strategic importance. However, the knowledge and recognition of FM contribution have improved since recent years. There are identified attributes and success factors that mainly concern the teamwork effort from different organisational levels to
have mutually agreed goals to sustain a good performance and to incorporate all necessary involvements in the development and planning phase.

The approach of strategic management is to match the organisation’s distinctive competencies and resources with the market to create a perfect fit between the organisation and the external environment and therein develop a sustainable competitive advantage. Table 3.1 introduces the attributes and success factors of collaborative relationship in facility service context.

**Table 3.1: Attributes and Success Factors of Collaborative Relationship in Facility Services Context**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Success Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Commitment</td>
<td>• Ability to meet performance expectations</td>
</tr>
<tr>
<td>• Continuous development</td>
<td>• Clearly defined and mutually agreed goals</td>
</tr>
<tr>
<td>• Involvement of different organisational levels</td>
<td>• Joint-problem solving</td>
</tr>
<tr>
<td>• Mutual trust</td>
<td>• Mutual involvement in development and planning</td>
</tr>
<tr>
<td>• Openness</td>
<td>• Two-way information sharing</td>
</tr>
<tr>
<td>• Promise of mutual benefits</td>
<td>• Mutual agreement of the benefits and opportunities</td>
</tr>
<tr>
<td>• Flexibility</td>
<td>• Flexibility of working arrangement for the growth and development</td>
</tr>
</tbody>
</table>

### 3.4 FACILITIES STRATEGIES

Managing facilities efficiently and effectively requires that a robust strategy is developed within the context of the organisation’s business plan and space/accommodation strategy. These should involve the development of strategic objectives and a plan for the facilities management, with proper reference to the overall business plan and space/accommodation strategy within which it might be contained.

According to BIFM (2007), a strategy (or business plan) for facilities management should:

(a) Consider the needs of the organisation, differentiating between core and non-core business activities;
(b) Identify and establish effective and manageable processes for meeting those needs;

(c) Establish the appropriate resource needs for providing services, whether obtained internally or externally;

(d) Identify the source of the means to finance the strategy and its practical implications;

(e) Establish a budget covering short term needs and best value over the long term; and

(f) Recognise that management of information is key to providing a basis for effective control of facilities management.

The three main stages in the development and achievement of a workable strategy for facilities management are as follows:

(a) Analysing requirements – top level analysis;

(b) Developing solutions – finding the best option; and

(c) Implementing solutions – putting the plan to work.

### 3.5 MEASURING FM PERFORMANCE

One of the essential elements in implementing FM strategically is by emphasising on the performance of the service itself. This can be done by looking at both the performance measurement and management of FM.

In the nature of FM profession there is a wide range of built assets, different business cores, tangible versus intangible, subjective versus objectivity, reactive versus proactive and strategic versus tactical. Practitioners often struggled with finding the right measurement tools and/or units because of the very nature of FM profession. In the industry, we are more driven by what is (easily and readily) available rather than what is needed. There is also a challenge, whereby we tried very hard to quantify service, activities and operations that do not normally have a numerical outcome. But we need to measure to ensure things are done well and performance is improved.

There are six dimensions that can be used in evaluating performance as shown in Figure 3.1. The first four dimensions can all be categorised as "determinants" of future success, while the last two relate to "results".
(a) **Flexibility**
   (i) Service flexibility is the ability to: deliver at the right speed;
   (ii) Respond to precise customer specification; and
   (iii) Cope with demand fluctuations.

(b) **Innovation**
   Innovation is assessed in terms of:
   (i) Product innovation – the ability to meet the other five performance criteria; and
   (ii) Process innovation (e.g: working structures and styles).

(c) **Resource Utilisation**
   (i) This considers how efficiently resources are being utilised, and is shown by the formula:
      - Outputs; and
      - Inputs.
   (ii) In service industries, it is often difficult to trace service inputs to those outputs.
   (iii) A wide variety of input and output measures can be used to generate utilisation ratios; these will be used to ensure the business efficiency.
(d) **Excellence**
   
   (i) Concerns on quality of service and customer service aspects can be measured at various stages in the service delivery process.
   
   (ii) Excellent quality criteria include the following:
   
   - Reliability;
   - Courtesy;
   - Competency; and
   - Availability.

(e) **Financial Performance**

Financial performance concentrates on the following:

(i) Profitability;

(ii) Liquidity;

(iii) Capital structure; and

(iv) Market ratios.

(f) **Competitiveness**

The competitiveness as a result factor concentrates on:

(i) Sales growth; and

(ii) Market share.

**SELF-CHECK 3.1**

Explain why measuring performance is a strategic viewpoint of FM.

### 3.5.1 Performance Measurement and Performance Management

**Performance measurement** is a control procedure and aims to measure the actual performance and determine whether it is good or bad so that new actions or changes in existing actions can be planned. It is an ongoing process of ascertaining how well, or how poorly, a service is provided. Performance measurement involves the continuous collection of data on progress made
towards achieving the service objectives. According to Neely, Gregory and Platts (1995), performance measurement is the process of quantifying action, where measurement is the process of quantification and action correlates with performance. This is seconded by Bititci, Carrie and McDevitt (1997) where FM is being implemented strategically that is by conducting the process by which a company manages its performance and should be in line with the company’s corporate and functional strategies and objectives.

At present, there is a growing interest in performance measurement, derived from the following objectives:

(a) Desire for value-for-money working environment;
(b) Integrating people, processes and places to core business function;
(c) Aim to reduce costs and simultaneously add value from services; and
(d) Role of performance measurement in FM.

Performance measurement is also part of performance management that focuses on the process to measure the performance. It functions as an early-warning system where it gives an indication for problems and areas for continuous improvement; thus it has been given a prominent place in most organisations (Parida & Kumar, 2006).

The other important component of performance is performance management. It involves planning, control and decision-making to ensure continuous performance improvement. Performance management is also a broader term that includes not only performance measurement but also the determination of the appropriate level of performance, the reporting of performance information, and the use of that information to assess the actual level of performance against the desired level.

The combination and interface of both performance measurement and performance management is the enhanced service quality (see Figure 3.2). An enhancement of service delivery is a reflective of strategic FM practice. Planning and controlling measures of performance can ensure that the focused areas of service be further looked into and improved.
3.5.2 Strategic Role of Performance Measurement in Business

The strategic roles of performance measurement in business can be seen in providing a set of drivers or key performance indicators (KPIs), setting out the strategic goal-seeking (predetermined goals) and as a tool used to strategically assess and evidence continuing improvement of business objectives.
3.5.3 Performance Information

In the context of performance, there is a set of performance information that can be referred to when measuring performance.

The information are inputs, activities, outputs, outcomes and impacts. It is also often easier to generate performance data on inputs and outputs than on outcomes and impacts. Table 3.2 shows the example of performance information that can be used in measuring performance and setting the indicators for the Government Employees’ Training Programme.

**Table 3.2: Performance Information in the Government Employees’ Training Programme**

<table>
<thead>
<tr>
<th>Information</th>
<th>Sample Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>The money spent</td>
</tr>
<tr>
<td>Activities</td>
<td>Developing training courses</td>
</tr>
<tr>
<td>Outputs</td>
<td>The number of public servants trained</td>
</tr>
<tr>
<td>Outcomes</td>
<td>The improved skills of employees</td>
</tr>
<tr>
<td>Impacts</td>
<td>Improved programme delivery</td>
</tr>
</tbody>
</table>

3.5.4 Performance Tools

There is a variety set of performance tools that can be used in measuring performance. Among the most common ones being practised and proved to be reliable of years of study and practice are key performance indicators (KPIs), benchmarking, balance score card and customer service survey.

Let us look at two of these performance tools namely KPIs and benchmarking.

(a) **Key Performance Indicators (KPIs)**

KPIs are measurable parameters used to determine attainment of a certain level of service. It is also a tool for performance monitoring against Service Level Agreements (SLAs).
They quantify and improve performance, financials, processes and quality delivery. Among the constraints in implementing KPI are cost, budget, location, layout, inherent conditions and environment.

Why do we need to measure?

(i) To get things done;
(ii) To know progress and status of work;
(iii) Reporting purpose;
(iv) To determine quality;
(v) To facilitate benchmarking; and
(vi) Analysis purposes.

So now, what can we measure? A few examples of the elements that we can measure are as follows:

(i) **Customer Input**
- Customer specified metrics;
- Non-standard and depends on the uniqueness of the facilities and service;
- Usually related to the customer processes; and
- The question: “What is important for me?”

(ii) **Key Success Factors**
- Measurement affecting the success of a facility;
- Usually of a high priority;
- Translate factors that are required for a working facility into KPI; and
- The question: “What is important to stakeholders?”

(iii) **Key Processes**
- Identify what process or activity that will occur in a facility;
- Examine what are the things that if not done well, will affect the activities and processes in FM; and
- The question: “Is safety important?”
(iv) **Policies**

- The procedures and usage of taxpayer money;
- Client charters;
- Organisation culture, principles and long term vision; and
- The question: “How does FM affect organisational image?”

(v) **Goals**

- Identify the goals of the whole performance objectives;
- Inspect if cost is a factor; and
- The question: “What about business factors such as deterioration and asset value?”

(b) **Benchmarking**

Beyond counting costs, we should measure performance and demonstrate value to an organisation and/or business. Benchmarking is an important tool to help deliver continuous improvement and spread innovation and best practices across companies and industry sectors. It is widely renowned and employed by many world class organisations, and championed by government and clients. Benchmarking is not merely a measurement and comparison technique, but a business-improvement tool. Among the main objectives of benchmarking are as follows:

(i) Positioning your FM performance against an industry benchmark or regulatory yardstick;

(ii) Learning from within your own organisation, leading to improvements (look at internal trends); and

(iii) Learning from others (including competitors), leading to improvements.

Benchmarking can be implemented according to its types and categories which are internal, competitive, industry leader and generic benchmarking as shown in Table 3.3.
Table 3.3: Types of Benchmarking as a Performance Tool

<table>
<thead>
<tr>
<th>Type of Benchmarking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Benchmarking</td>
<td>Company focuses purely on its internal benchmarking.</td>
</tr>
<tr>
<td>Competitive Benchmarking</td>
<td>Company compares its business practices with those one or more competitors in the same industry.</td>
</tr>
<tr>
<td>Industry Leader Benchmarking</td>
<td>Business practices of the industry leader in the same industry are used as the basis for comparison.</td>
</tr>
<tr>
<td>Generic Benchmarking</td>
<td>Business processes of an organisation in an unrelated industry are compared.</td>
</tr>
</tbody>
</table>

Samples of goals derived from benchmarking process is as follows:

(i) 50 per cent reduction in delivery time;
(ii) 50 per cent reduction in operations maintenance and energy costs;
(iii) 30 per cent increase in productivity and comfort;
(iv) 50 per cent fewer occupant-related illness and injuries;
(v) 50 per cent less waste and pollution;
(vi) 50 per cent more durability and flexibility; and
(vii) 50 per cent reduction in construction worker injuries and illness.

There are countless benefits of benchmarking practice to the organisation and business. The following are examples of these benefits:

(i) Reduced overheads and increased profitability (improving internal systems and processes, commonly can achieve 20 per cent cost savings);
(ii) Improved quality of service (quality and uniformity improves);
(iii) Improved delivery time (common 20 per cent to 30 per cent time savings);
(iv) Increased staff satisfaction (impacts staff turnover and bottom line performance); and
(v) Increased technology transfer (sharing best practices speeds the integration of new technology and technical expertise).
3.5.5 Performance Based Contracts

Performance based contracts is a method of contracting where the results are defined rather than the process which includes measurements and incentives.

It is a type of contracting with:

(a) A clear set of objectives and indicators;
(b) Systematic efforts to collect data on the progress of the selected indicators; and
(c) Consequences, either rewards or sanctions for the contractor, that are based on performance.

Let us look at this following example on the provision of waste collection service.

Example: Provision of Waste Collection Service

Frequency of waste collection refers to the agreed schedule when contracting out the waste collection service. The efficiency and performance of the service provider can be measured according to the compliance of the following criteria:

(a) Punctuality and adherence to the collection schedule; and
(b) Performance of the service can be graded according to the KPI set, for example on achieving the 100 per cent punctuality of the waste collection schedule.

Failure in performing to the agreed standard will result in degradation of contractual terms and price reduction during the contract review, or in some cases penalty can be imposed when evaluating the monthly contractual claim by the service providers.
Penalty and reward schemes is also known as pain/gain or bonus/punish scheme. It is a scheme that financially rewards and/or penalises service providers depending on the agreed measured performance. It is normally negotiated between parties and forms part of the overall tender agreement. The rationale of the implementation of this scheme is to incentivise good performance, peak performance and innovations and also to penalise sub-par delivery. It also aims to promote a sense of urgency and reliable services. It also promotes a win-win situation and a responsive exercise to the KPI implementation. The implementation of the reward and penalty schemes can be started by having a set of KPIs that are defined, realistic and measurable. A mechanism can also be devised to quantify and convert to the chosen pain/gain scheme. Overall, room for review and changes must be spared for the benefit of the service development.

**ACTIVITY 3.3**

With your coursemate, discuss other performance measurement tools and how they function differently in measuring FM performance.

### 3.6 BARRIERS TO SUCCESSFUL PERFORMANCE MEASUREMENT OF FM

There are four identified barriers in achieving successful performance measurement of FM such as the following:

(a) **Methodological Barriers**

The relationship between inputs and outputs is relatively easy to measure, but measuring the relationship between inputs and outcomes is more challenging. It is difficult to isolate the influence of the inputs from the many other factors that can affect the outcomes.

E.g: The improved skill-level of employees can result not only from training but also from other forms of learning.

(b) **Financial Barriers**

The operation of an effective PMS is costly in terms of employees’ time and the technology required. Government leaders have to decide whether the payoff from expenditures on performance measurement is worth the investment.
(c) **Government Barriers**
Measuring performance in government is, in general, more difficult than it is in the private sector. Many government programmes are very complex and have multiple and changing objectives, thereby making the development and application of performance indicators more challenging.

(d) **Political and Public Service Barriers**
Politicians will not support performance measurement if they anticipate negative results that could provide embarrassing ammunition for their opponents. Similarly, public servants are tempted to protect their own interests by implementing programmes in a way that will make the programmes look good in light of the established performance indicators. It is commonly argued that what gets measured gets done. The result is that sometimes what gets done is not what should be done.

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**SELF-CHECK 3.2**

Explain how can organisations and end users benefit from an enhanced FM service delivery.

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**SUMMARY**

- Strategic planning of FM is important to ensure the growth and development of the practice, especially by looking at the overall performance planning and controlling mechanism.

- Key Performance Indicators (KPIs) and benchmarking are among the most practised tools being used to measure service performance.

- The recognition of the FM role in enhancing the organisation’s performance has improved in recent years.

- There are four barriers hindering successful FM performance measurement namely methodological barrier, financial barrier, government barrier and political and public service barrier.
**KEY TERMS**

<table>
<thead>
<tr>
<th>Benchmarking</th>
<th>Performance measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM strategies</td>
<td>Strategic FM</td>
</tr>
<tr>
<td>Key Performance Indicators (KPI)</td>
<td>Strategic planning</td>
</tr>
</tbody>
</table>
Communication is essential in any setup. Control, monitoring, filtering and dissemination of information in any organisation is crucial to the continued success of that organisation. Businesses which inappropriately manage information flow and dissemination of information might be sending the wrong signals to its customers. Communication mediums are also essential as information channeled through the wrong apparatuses would end up affecting productivity and even the image of the organisation. In facilities management, facilities managers cover a wide range of activities under their scope. Having the right communication skills and the right channels for the flow of information is vital in the ultimate goal of enhancing increased productivity, costs reductions, increased organisation image and optimisation. In this topic, we will discuss the communication strategies essential to a facilities manager’s duties and information management systems in facilities management (FM).
COMMUNICATION STRATEGIES IN FM

Communication in general terms means the exchange of messages, ideas, thoughts, etc. through spoken, written, signal or behaviour mediums between people, machines, and animals. It is the act of transferring information from one point to another.

Business Dictionary defines communication as the following:

**Communication** is a two-way process of reaching mutual understanding, in which participants not only exchange (encode-decode) information, news, ideas and feelings but also create and shared meaning.

There are categories of communication in any setup. This could be grouped into the following:

(a) **Emergency**: Imminent or instant communication actions, in most cases prompted by alerts.

(b) **Short term**: Information and temporary signs, e.g., closure for cleaning, sidewalk closure, etc.

(c) **Mid-term**: Routine reports, progress and project reports, etc.

(d) **Long term and strategic**: Capital, infrastructure, etc.

(e) **Cultural**: Changes to the core values of an organisation, etc.

In making sure the support facilities of an organisation are continually performing effectively, the facilities manager or facilities management services providers represents a pivot upon which the support infrastructure of an organisation and its core primary objectives or core business is hinged. FM performs the balancing act of aligning support facilities with core business. One of the essential aspects of carrying out these duties is communication. **Good communication** has been identified to represent the most important skill a facilities manager must possess. He must get the message across from the top management to the workers at the lowest level.
Bert Gumeringer, director of facilities operations and security services at Texas Children’s Hospital echoed this point, saying, “If I don’t tell the story for my staff, who is going to tell it? If I don’t tell the story of the good work they do every day, who is going to tell the CEO? Who is going to tell the board? No one is.” Developing effective communication skills together with the right systems is therefore essential to getting the support facilities performing accordingly so organisations could concentrate on their primary objectives. Although FM is fast becoming a technology-centered practice, the ability to channel information through a wide variety of people is essential. It is to be noted therefore, that the key to any successful facilities manager’s duties lies with effective communication and communications systems.

Effective communication involves planning and resources to implement the plan. Factors such as timing, style, clarity, language, sensitivity and understanding makes effective communication a highly complex process. The facilities manager must take into consideration the six components of communication; namely sender, message, media, receiver, feedback and context. If any of this is missing, there is bound to be a problem. It might be difficult to outline a flat-out strategy for effective communication from a facilities manager’s perspective. However, some of the procedures identified below could serve as effective strategies:

(a) Good communication starts with understanding and meeting the needs of the targeted audience. One good way to think about delivering a message within the workplace is to think about how you get communications outside of the workplace. People are getting increasingly used to frequent and concise messaging with the rise of electronic media. According to John Finney, senior communication and change management consultant of Towers Watson, it is a matter of frequency, simple, clear content and really keeping people informed, engaged and current.

(b) Continual reiteration and repetition of the information until results are obtained. According to Finney, an average person gets about 300 messages at the workplace and several others outside the workplace. Getting a message to register with an audience might take as many as 12 repetitions.

(c) Every individual assimilates information differently and facilities managers must be aware of these individual differences. Cindy Stevens, associate professor, facilities planning and management program, Wentworth Institute of Technology reiterates this point thus, “You’re never really going to know what other people need, so you have to learn how to write conceptually and you have to learn how to write procedurally because some people are visually oriented, needing pictures and graphs, and other individuals need step-by-step exact directions with textual directions or
flow charts. You have to learn to write for both audiences. It can’t be separated because you never know who is looking at your information.”

### 4.2 BUILDING MANAGEMENT SYSTEMS

Next we will continue our learning with building management systems (BMS). Table 4.1 shows the parties involved in BMS.

<table>
<thead>
<tr>
<th>Tenant/Occupier</th>
<th>Owner</th>
<th>Facilities/Property Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenant- occupant-demand control (individual room control)</td>
<td>Central or remote control and monitoring of building</td>
<td>Quick and early detection of problems</td>
</tr>
<tr>
<td>Precise control of internal comfort conditions</td>
<td>Flexibility on change of building use</td>
<td>Effective use of maintenance staff</td>
</tr>
<tr>
<td>Increased employee productivity</td>
<td>Individual tenant billing</td>
<td>Computerised maintenance scheduling</td>
</tr>
<tr>
<td>Effective monitoring and distribution of energy consumption</td>
<td>Higher rental value</td>
<td>Effective use of maintenance staff</td>
</tr>
<tr>
<td>Improved facilities reliability and life-expectancy</td>
<td>Individual and precise tenant billing for services and utilities consumption</td>
<td>Individually and precise tenant billing for services and utilities consumption</td>
</tr>
<tr>
<td>Timely response to complaints regarding fixtures and HVAC installations, etc.</td>
<td>Remote monitoring of the installations, i.e., AHU’s, plumbing pumps, electrical, gray water treatment, fire control systems, etc.)</td>
<td>Computerised maintenance scheduling</td>
</tr>
<tr>
<td>Save time and money during the maintenance.</td>
<td>Reduced maintenance costs</td>
<td>Easily available information for quick decision making</td>
</tr>
</tbody>
</table>
Figure 4.1 shows the layout for building management systems.

![Figure 4.1: BMS layout](image)

### 4.3 FACILITIES INFORMATION MANAGEMENT SYSTEMS (FIMS)

Facilities Information Systems (FIS) mission is to proficiently develop, promote, secure and facilitate the use of technology and the flow of information throughout facilities management services department and the organisational community. Facility information management systems (FIMS) are thus databases with or without building graphics. The objective is to maintain a register of the current and future state of users, systems, elements and components. Figure 4.2 shows a typical FIMS showing an integration of computerised systems for various purposes.
Figure 4.2: A typical FIMS showing an integration of computerised systems for various purposes

FIMS has strategic relevance and the functionality to deliver the following:

(a) Effective and responsive services; enable changes in the use of space in the future;
(b) Make assets highly cost effective; and
(c) Offer competitive advantage for the core business of the organisation; and, ultimately, enhance the organisation’s culture, image and core values.

CAD Databases

Computer-aided design (CAD) is the use of computer systems to create, modify, analyse or optimise designs. A database can be seen generally as an electronic data storage and management system. It is a collection of information in an organised form in a way that supports the use for such information and such that it can be retrieved easily for further use. A CAD database is therefore a document management system for CAD drawings, designs, models, prototypes, etc. CAD databases have gained relevance in FM with the rise in the use of computer-aided facilities management. Computer-aided facilities management (CAFM) generally is the utilisation of Information Technology (IT)-based systems in the
built environment with specific abilities for facilities management functions. A typical CAFM system is a combination of CAD and other related software databases with FM functionalities. FM operations deal with a variety of information. This information comes in various forms ranging from building designs, floor plans to models to simply plain text. It is a combination of text- and graphics-rich information.

**SUMMARY**

- The FM department’s ability to effectively channel information remains the most important skill to master. Without effective communication, nothing would be done.

- Technology has gradually taken center stage to help the facilities manager’s job. FM functions have become significantly technology-centred.

- Building management systems are providing more efficient ways of monitoring and controlling installations and services in facilities.

- Facilities management information systems represent an integration of various computerised systems with various capabilities to provide the facilities manager a single management information systems.

- When choosing an FMIS system however, the organisation must be specific to what systems best suits its functions.

**KEY TERMS**

<table>
<thead>
<tr>
<th>Building Management Systems (BMS)</th>
<th>Facilities Information Systems (FIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAD database</td>
<td>Facilities Management Information Systems (FMIS)</td>
</tr>
<tr>
<td>Communication strategies in FM</td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


The expanding scope of the facilities manager’s job means he would have to deal with a myriad of information on a daily basis. Some of this information would have to be processed remotely. Concepts such as e-maintenance are being advanced. How to process and manage this load and variety of information would be a nightmare to the facilities manager without the aid of computer-based information systems. Computer-based solutions in FM have become integral to a point FM is becoming completely reliant on technology to effectively...
and efficiently dispose of its functions. In the remainder of this paper, we would look at information, computer-based information systems and its application in FM functions.

5.1 WHAT IS INFORMATION?

Information is data that has been processed and presented in an understandable form. Raw data goes through a process in which the outcome becomes information. For information to be valuable, it should have the following characteristics:

(a) **Accurate** – It should be accurate, meaning it must not contain errors;

(b) **Complete** – It should be whole, containing all the facts needed to convey knowledge or perform a task;

(c) **Relevance** – It should be relevant to the task or what it is needed for;

(d) **Timely** – It should be delivered at the right time, the time when it is needed;

(e) **Simple** – Valuable information should not be ambiguous or incomprehensible. It should be easy to understand; and

(f) **Reliable** – It should come from a trustworthy source.

5.2 WHAT IS A SYSTEM?

A system is a generally a collection of interacting or interdependent elements known as components working toward a goal or an objective. It could also be seen as an integration of other independent related elements. A system could therefore, be a **stand-alone** or an **integration** of other independent related functions.

5.2.1 Elements of a System

The elements of a system include the following:

(a) **Purpose** – Mission or goal to accomplish;

(b) **Components** – Elements known as subsystem;

(c) **Border/Boundary** – Separates the internal components from external units;
(d) **Interface** – The medium that allows communication between user and the system;

(e) **Input** – Whatever goes into the system, e.g., commands, data, etc;

(f) **Output** – Product of the system’s activity;

(g) **Data** – Text, graphics, images, numbers yet to be processes;

(h) **Information** – Data that has been processed, sorted, manipulated, etc. and is ready for a particular use; and

(i) **Environment** – This is the overall setting within which the system operates. It is the source of external influences on the system.

### 5.3 WHAT IS A COMPUTER-BASED INFORMATION SYSTEM?

A computer-based information system (CBIS) is an organised integration of hardware and software technologies and human elements designed to produce timely, integrated, accurate and useful information for decision making purposes. It is an information system that rely mostly on computers.

### 5.3.1 Elements of a CBIS

The elements of CBIS include the following:

(a) **Hardware**

   This refers to the computer device and its peripherals. Computer hardware include the central processing unit (CPU), which is the computer itself and all its support devices and peripherals. These are classified as input, output devices and storage devices.

(b) **Software**

   These are programmes and applications on the hardware devices to enable them to function.

(c) **Data**

   These are numbers, sounds, text, graphics, images in electronic and other formats that is fed into the computer. It is information that is fed into the computer for either processing or storage.
(d) **Procedures**
Procedures govern the operation of a computer system. It outlines the instructions and processes to follow in performing tasks or using the systems.

(e) **People**
These are those involved with or using the systems. A CBIS system cannot be useful without people. Computers need people to set them up and tell them what to do. Without information and data, the computer system is referred to as just an electronic dummy. People provide information and work processes to the CBIS.

### 5.3.2 Functions of a CBIS

Let us now take a look at the functions of CBIS. They are as follows:

(a) **Input** – Takes in raw data either from within the organisation or outside the organisation for processing or storage;

(b) **Processing** – Transforms raw data into useful information;

(c) **Storage** – Stores data and information;

(d) **Output** – Produces information in either hardcopy or softcopy forms for decision making; and

(e) **Control** – Controls the working of the entire information system.

### 5.3.3 Categories of a CBIS

Watson and Kroeber developed a hierarchical model, identifying four categories of computer based information systems (see Figure 5.1).
Figure 5.1: Hierarchical representation
Let us take a look at the systems from Figure 5.1 in more detail.

(a) **Decision Support System (DSS)**
This system offers the sort of information that is not predictable, often information that is needed once. The DSS does not produce regularly scheduled management reports. Instead, they are designed to respond to a wide range of requests. Decision support systems help decision making where managers have to make decisions that are usually referred to as unstructured or semi-structured decisions due to the non-recurring nature of decisions in an organisation. A decision is considered unstructured if there are no clear procedures for making the decision and some factors to be considered in the decision can be readily identified in advance. DSS is meant to support the decision making process but does not replace the sense of judgment of the manager.

(b) **Management Information System (MIS)**
Nowadays, increasing attention is being channeled to computer applications providing information for policy making, management planning and control purposes. MIS is more concerned with management functions. MIS can be described as an information system that can provide all levels of management support with information critical to the effective running of a business or organisation.

(c) **Transaction Processing System (TPS)**
A transaction processing system captures, classifies, stores, maintains, updates and retrieves transaction data. TPS is aimed at improving the routine transactions of a business or organisation. Transactions vary from one type of organisation to another. Billing customers, placing orders, depositing checks, etc. are some typical routine transactions.

(d) **Office Automation System (OAS)**
OAS is one of the most rapidly expanding computer based information systems. The expectation is that OAS will increase the efficiency and productivity of employees such as secretaries, typists, administrative assistants, managers, etc. An office automation system can be described as a multi-function, integrated computer based system that allows many office activities to be performed electronically. Basic OAS could involve the use of word processing devices to facilitate the typing, storing, revising, printing, etc.
5.3.4 Development of CBIS

The development of CBIS consists of the following phases:

(a) **Planning**
Planning is the first and most crucial stage of the CBIS life cycle. At this stage, the organisational objectives form the basis for choosing a CBIS, and essentially it is the top management’s responsibility to provide the statement of organisational goals that defines the functionalities of what CBIS option is required. At this stage, costs and benefits of the CBIS are analysed to understand the life cycle cost of acquiring and implementing the system.

(b) **Analysis**
The analysis phase involves a comprehensive analysis of the proposed system, identifying alternative approaches of meeting organisational objectives, cost and benefit analysis of each alternative approach. The essence of the analysis stage is to solidify the proposed CBIS as well as determine the most suitable alternative.

(c) **Design**
The design stage involves transferring the proposed system requirements to the physical hardware of a computer system.

(d) **Implementation**
The implementation phase involves programme development, testing of individual programme modules, spotting and correcting errors in the programming, getting users’ acceptance, user training, and preparing user manuals and documentations.

(e) **Use**
Following a successful implementation of a CBIS, the use phase involves utilising, maintenance and review of the CBIS. The system should be user friendly and flexible to incorporate future needs, modifications, etc. to suit users’ requirements.

Figure 5.2 shows the cycle of this development.
5.3.5 Benefits of CBIS

Before CBIS, non-computerised systems meant data and information was processed manually through a tedious routine that consumed a lot of time, and was stored in large filing cabinets, which consumed large areas of space. CBIS has eliminated much of these problems. Computer based information systems offer more reliability, more efficiency, super fast information processing, multitasking, ease of data and information retrieval, and big storage capacity without consuming large areas of space.

5.4 INFORMATION SYSTEM IN FM

An information system is a collection of related components with interaction between them and the capability to receive, process and produce useful output. The primary function of an information system is to process information. Information systems must have input, processing, storage and output functionalities. Information systems in FM could include some or all of the following:
(a) IT infrastructure (Internet access and related hardware);
(b) A computer assisted design (CAD) system or an electronic document management system (EDMS);
(c) A computerised maintenance management system (CMMS);
(d) A computer aided facility management (CAFM);
(e) Specialised applications such as key management, cable management, fleet management, custodial and project management systems;
(f) A capital planning and management system (CPMS) for tracking capital renewal and deferred maintenance requirements;
(g) Interface to the core business systems of the organisation; and
(h) Website for the organisation and linked web page for the FM department.

5.4.1 Evolution of Technology in FM

Facility managers or the FM department often face a variety of constraints. Such constraints include inadequate resources, decreasing maintenance budgets, unfunded mandates, distributed data and data disparities, political priorities and stovepiping. The challenge for facility managers is to overcome these obstacles by utilising the resources available and convincing leadership that efficiencies and cost savings can be achieved with investments in technology.

Eric Tiecholz, President of Graphics Systems identified five generations of technology in FM.

(a) **Generation 1 and 2**
This was the period of large mainframe computers. It was expensive and centralised with cohesive databases. Changes occurred significantly with the advent of personal computers and decentralised computing. FM “islands of automation” brought about widespread use of FM computing for the first time.

(b) **Generation 3**
Integration of applications running off a common database either on a desktop (CAFM-computer-aided facilities management) or, using client-server databases, throughout the organisation (CIFM-computer integrated facilities management). For the first time, it was possible to integrate and share common data between applications.
(c) **Generation 4**
FM vendors initially only used the Internet to publish reports. But gradually, entire applications moved onto the Internet. Another aspect of the Internet is infrastructure management. It is a centralising force that manages all FM, real estate, HR, IT and financial data from a common technology infrastructure.

(d) **Generation 5**
High speed Internet, wireless communication, cloud computing and “smart” assets (intelligent buildings and components, etc.).

### 5.4.2 Product Case Study

Archibus/FM is a cloud-based support system developed with functionalities for FM solutions. The developers of Archibus/FM, Archibus®, says, “With Archibus/FM, organisations can use a single, comprehensive, integrated solution to make informed strategic decisions that optimise return-on-investment, lower asset lifecycle costs, increase enterprise-wide productivity – reducing their infrastructure and facilities related costs by as much as 34 per cent”.

(a) **Capabilities of Archibus/FM**

(i) Strategic Space Planning;

(ii) Capital Budgeting;

(iii) Maintenance Management (Preventive and Reactive, Repair Operations);

(iv) Property and Lease Management;

(v) Emergency Preparedness;

(vi) Capital Budgeting;

(vii) Furniture and Equipment Management;

(viii) Help Desk and Work Order Management;

(ix) Communications and Cable Management;

(x) Moves, Adds and Changes;

(xi) Space Usage and Chargeback;

(xii) Risk Mitigation and Management;

(xiii) Environmental and Sustainability;
(xiv) Fleet Management; and
(xv) Regulatory Compliance.

(b) **Application Modules**

(i) Real Estate Portfolio Management;
(ii) Capital Project Management;
(iii) Space Planning and Management;
(iv) Move Management;
(v) Asset Management;
(vi) Environmental and Risk Management;
(vii) Building Operations; and
(viii) Workplace Services.

These application modules could function in integration. Based on the requirements of an organisation, it could as well choose to make use of only one module to suit its specific functions. For instance, a project management outfit would be more interested in the Capital Project Management module, while an assets management outfit could combine the functionalities of the Asset Management and Space Planning and Management modules. In any case, any of these solutions for any organisation should be in alignment with the organisation’s or business’ core business.

### SELF-CHECK 5.1

1. Highlight the importance of effective information management in FM.
2. Identify and briefly elaborate on two product cases of computer-based information management solutions in FM.

### ACTIVITY 5.1

A computer-based information system must have certain elements and functionalities. Discuss in groups and highlight the required elements and functionalities of a CBIS and briefly discuss the different categories of a CBIS.
• How well information is processed and management remains at the heart of any efficient and effective discharge of FM functions.

• Computer-based information systems are now an integral part of FM. But for a CBIS to be effective and efficient, it has to be organisation specific.

• FM functions are meant to support the core business of organisations and businesses.

• To achieve these requirements using computer-based solutions, the primary functions of an organisation should be the basis of choosing, planning and implementing any CBIS.

**KEY TERMS**

Computer-based information systems  Information management

Information

**REFERENCES**


In Topic 6, you will be introduced to the essential elements of financial management including feasibility studies, budgetary control and also other related financial aspects; namely life cycle costings, cost benefit planning and building cost and value.

WHAT IS FINANCIAL MANAGEMENT?

Financial management (FM) relates to an efficient way of managing money in budget controlling. It deals with a systematic way of administering and disbursing a certain amount of cost of the operation.
Financial management is always about how the money or budget is managed. Budget is a predetermined component that must be embedded in an organisation’s policy. It elaborates on the financial arrangement and resources to plan for future expenditure.

In terms of budget preparation from the FM perspective, budgets must be synced and integrated with the overall comprehensive plan. In most cases, the justification for FM budget is also undermined. This will then depend on the profile of the FM team and also the skills presented by the FM manager. The budgeting or financial management must be exercised in a way where the rationales of both functional and management components are fair and economy-efficient and effective.

Generally, the preparation of budget or financial arrangement must comprise the statement of policies, objectives, breakdown of proposed expenditure, discretionary items, cash flow, supervisory and clerical staff and also labour force. Variance reporting must also be included, in the case if overrunning budget or if it is under expenditure.

In managing finance, one of the key thing is to measure the performance. This is to ensure the effectiveness of the overall planning and improved working methods. This would include the elimination of time and money lost throughout the service period.

### 6.2 FEASIBILITY STUDIES

Feasibility studies is a study conducted based on analysis and evaluation of a facility development project. This is mainly to evaluate on its feasibility from various perspectives.

Feasibility studies is part of a facilities planning and design studies to form an analysis of the viability of a proposed facility development project. It aims to study on the opportunities and constraints of the project as well as evaluating the design criteria and issues related.

In general, feasibility studies will put forward a comprehensive studies of the limits and potentials of the projects. This is to foresee the viability of the project and total effectiveness of the plan. Most of the item, the report acts as a supporting document for potential funding and financial planning. It will be used as a reference tool for a collaborative effort among the key parties involved. There are six elements that must be considered in conducting feasibility studies namely concept, market, managerial, financial, technical and legal as shown in Figure 6.1.
An elaborative definition of each element is as follows:

(a) **Concept**
   
   (i) Study the demand and behaviours of potential customers;
   
   (ii) Analyse demand for facility development; and

   (iii) Evaluate typology profile factors: strategic, market, physical, service and activities.

(b) **Market**

   (i) Appraisal of macro- and micro-environments;

   (ii) Determine viability of the proposed facility development project; and

   (iii) Target segmentation: demographic, geographic psychographic and behavioural.
(c) **Managerial**
   (i) Determine management methods: in-house or outsource;
   (ii) Define management and operation standards; and
   (iii) Align to strategic business vision.

(d) **Financial**
   (i) Minimise financial risk of investment;
   (ii) Determine financial viability and development cost;
   (iii) Identify potential funding sources; and
   (iv) Financial indicators to measure performance.

(e) **Technical**
   (i) Set design factors: features and uniqueness;
   (ii) Sync maintenance factors with materials, techniques and technologies applied; and
   (iii) Location factors: strategic and appropriateness.

(f) **Legal**
   (i) Determine ownership status of the premise/land;
   (ii) Conform to the Health & Safety (HSE) Standards; and
   (iii) Comply to service license (mashineries, etc).

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**ACTIVITY 6.2**

In a group, discuss and present one case study of feasibility studies.

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### 6.3 BUDGETARY CONTROL

In **budgetary control**, there are a few issues that are being addressed. They are as follows:

(a) **Challenges in Building a Capital Budget**
   (i) Projecting an accurate cost estimate for budgeting purposes especially when the design is still in process;
(ii) Very high deferred maintenance number and limited state funding; and
(iii) Wrong priorities set on budget planning and controlling.

(b) Challenges of Operating Budget
   (i) Reductions in maintenance budget allocation;
   (ii) Responses to facility budget and solutions;
   (iii) Budget constraints produce lower and different standard; and
   (iv) Priorities of emergency works.

(c) Economic Conditions Affecting Budget Planning and Decisions
   (i) Recession: budget allocation decreased and resetting of new priorities;
   (ii) Funding issues: resources and budget forecasting; and
   (iii) Importance of having a contingency plan.

ACTIVITY 6.3
Pick one of the challenges mentioned and explain the real situation happening in the local industry that can be related to it.

6.4 RELATED FINANCIAL ASPECTS
There are also other financial aspects that need to be considered in projecting new projects or running an operation. When planning the acquisition of a major asset, organisations spend considerable time and effort in making an economic evaluation of the initial (capital) cost. This evaluation typically considers the following:

(a) Capacity: required size or capacity of the item;
(b) Requirements: operating performance requirements;
(c) Image: physical appearance or image projected;
(d) Capital: the capital cost; and
(e) Options: alternative product options.
Future costs are less visible, often being overlooked within general operating expenses, but they can have a significant impact on the future viability of an organisation. These future costs will arise from operational, consumables, maintenance and minor repairs, upgrade and renewals as well as disposal.

(a) **Operational**  
This operational includes labour, equipment, insurances and overhead charges. Major plants with complex operational processes will require expert personnel and significant supporting infrastructure.

(b) **Consumables**  
Consumable items include power, fuel, water, toner and ink.

(c) **Maintenance and Minor Repairs**  
The scope covers labour, parts, materials and overhead charges to maintain the asset at the desired condition and performance level. These maintenance costs may arise through in-house resources or by the engagement of external contractors.

(d) **Upgrade and Renewal**  
Jobs pertaining major repairs, refurbishment, renewals and overhauls to extend the life of the asset or equipment.

(e) **Disposal**  
Costs associated with selling, demolishing and safely disposing the remnants of the asset.

The scale of these costs depends on the level and frequency of usage of the asset.

Another essential element is the asset. **Assets** are formed from a series of actions. There are usually a series of upgrades and renewal process required during the life of an asset that become necessary as components of the asset reach the end of their useful life during the life span of the total asset.

The life of an asset will be influenced by both the failure of its key components and by its ability to continue to provide a required service. Many assets reach the end of their useful life before they become unserviceable. Technological developments and changes in user requirements are key factors impacting the effective life of an asset.
6.4.1 Life Cycle Costs

Life cycle costs (LCC) are also one aspect that looks into the financial aspect of a property. From FM point of view, life cycle costing is a technique to ascertain a suitable balance between capital expenditure on initial provision, and costs incurred as a consequence of use throughout the building operation.

The overall concept of LCC is shown in Figure 6.2. In general, LCC is divided into two main components: capital and revenue. The weightage and percentage divided into each component depends on the decision processes as well as the control procedure of an organisation. The decision made on each allocation or projected costs must be backed with good knowledge and operation targets and objectives.

**Figure 6.2: LCC concept**

**SELF-CHECK 6.1**

Relate the overall concept of LCC with financial planning and management.
6.4.2 Cost Benefit Planning

The best opportunities to achieve significant cost benefits occur during the early concept development and design phase of any project. At this time, significant changes can be made for the least cost. At the later stages of the project many costs would have become locked in.

To achieve the maximum benefit available during this stage of the project, it is important to consider and explore the following factors as shown in Figure 6.3.

![Figure 6.3: Factors of cost benefit planning](image)

**Activity 6.4**

List five advantages of cost benefit planning to the corporate and FM department respectively.
6.4.3 Building Costs and Value

According to Wordsworth (2001), building users need to understand the cost and building benefits or value to users (see Figure 6.4).

Cost to building users can be rooted from both acquisition and occupancy costs. Acquisition cost for example, is related with the purchase or renting price, relocation cost or fitting out or adaptation costs. Whereas occupancy costs concerns direct operational maintenance costs including energy, security and cleaning costs, and also costs resulting from upgrading works.

Benefits or values that will be delivered to building users can be in the form of utility and residual. Utility value is reflected in the suitability of building and flexibility for future requirements. Utility is imperative in ascertaining the viability of the building. Residual value, on the other hand targets on the market value of the property at disposal (suitability for future use/adaptation) and also the value of the site.
Financial management is an organised method to control the financial resources of the work activities.

Budget must be allocated and justified accordingly to ensure that sufficient resources are provided for the FM delivery and optimum utilisation of fund is achieved.

Decisions made in regards with the expenditure and values to the buildings and building users must be emphasised at higher management level.

**KEY TERMS**

- Budgetary control
- Cost benefit planning
- Feasibility studies
- Financial management
- Life cycle costs

**REFERENCES**

INTRODUCTION

In this topic, you will be introduced to the concept of value management. There will be a further elaboration on value management, details of the needs and how it can be conducted. This topic will also discuss building in value criteria, project viability, cost effectiveness concept, building in values, focuses on materials and the types of criteria that can be looked at in selecting building materials.

7.1 VALUE MANAGEMENT

Value Management (VM) is a service which maximises the functional value of a project by managing its evolution and development from concept to completion, through the comparison of audit of all decisions against a value system determined by the client or customer (Kelly & Male, 1993).

It is also an organised approach to provide the necessary functions at lowest cost, whilst not affecting the quality of the product. VM is also a structured analysis of a project by an independent consultant or person to determine the required functions of the building or projects and to consider alternative design project solutions to eliminate unnecessary cost. The search for (and elimination of)
unnecessary cost being that cost which provides neither use, life, quality, appearance, nor customer features.

Most often, VM is often misunderstood with Value Engineering (VE). The difference among them is that VM is mostly favoured in the United Kingdom (UK). Meanwhile, VE is used extensively in the United States (US), with applications to manufacturing industry.

**ACTIVITY 7.1**
Discuss the evolution of VM practice in our local industries with your coursemate.

### 7.2 THE NEEDS TO CONDUCT VM STUDIES

There is a list of advantages in conducting VM studies and now we want to look at the reasons project clients want to conduct VM studies.

**Why do clients commission Value Management (VM) studies?**

Clients have become increasingly concerned with the achievements of value for money in their construction project.

The reasons for this concern are as follows:

(a) Client’s concern at the escalation of estimated costs;

(b) Client’s concern at tenders received in excess of budget;

(c) Client losing confidence in the design team and/or project, arising from such factors as planning delays, external factors or lack of competence;

(d) Client requires an independent audit or appraisal of the project before it is submitted for sanction;

(e) Client seeks to minimise capital and/or operational costs and maximise profit;

(f) Client must achieve capital/or operational savings to make profit;

(g) Client wishes genuinely to seek an innovative/better solution to his project;
(h) Client wishes to experiment with a new technique that he has discovered; and

(i) A consultant recommends a new technique to the client (what a client wants).

The Conduct of VM
VM is operated within an organised schedule of procedures. It enables the functional requirements and alternative solutions, with their associated costs, to be identified and developed to a strict timetable. It is often undertaken in the form of an intensive workshop conducted by an independent team of experienced design team professionals. A comprehensive report will be produced with recommendations for review and assessment by the client and his project design team at the end of the study.

The VM team, operating in a complementary role, acts as a positive catalyst for savings and improved efficiency. The approach to VM can vary for each project, but it is customary to provide a job plan to establish the format to be adopted. A job plan should comprise a recognisable set of processes which includes six phases of planning a VM strategy of a project. The six phases of planning a VM of a project are as follows:

(a) **Phase 1** – The Information Stage;

(b) **Phase 2** – The Creativity/Speculation Stage;

(c) **Phase 3** – The Evaluation/Analysis Stage;

(d) **Phase 4** – The Development Stage;

(e) **Phase 5** – The Presentation/Proposal Stage; and

(f) **Phase 6** – The Implementation/Feedback Stage.

Figure 7.1 shows an elaborate concept of the six phases of VM project.
**PHASE 1: THE INFORMATION STAGE**

- Cover the assembly of all relevant information appertaining the project under review and the assimilation and analysis of this information.

**PHASE 2: THE CREATIVITY/ SPECULATION STAGE**

- Comprises the generation of suggestions as to how the required functions can be performed or improved.

**PHASE 3: THE EVALUATION/ANALYSIS STAGE**

- Consists of the evaluation of ideas generated in the creativity phase, for example by collective or individual rating systems.

**PHASE 4: THE DEVELOPMENT STAGE**

- Ideas are considered at the evaluation stage to have merit are examined and potential savings are costed, with consideration being given to both capital cost and the effect of operational and maintenance costs (life cycle costing).

**PHASE 5: THE PRESENTATION/ PROPOSAL STAGE**

- The presentation of the refined ideas considered to be worth implementing, supported by drawings, calculations and costs.

**PHASE 6: THE IMPLEMENTATION/ FEEDBACK STAGE**

- Ideas agreed to be worthwhile are then implemented.

**Figure 7.1:** Six phases of VM Conduct
Let us now take a look at this VM study case.

**Project:**
A bus maintenance and storage project (estimated to cost USD24M) in New York for the City Office of Management and Budget.

A specialist VM consultancy firm was engaged to conduct an independent 40 hour workshop following the normal job plan guidelines, and was carried out at 10 per cent design stage to give the greatest potential for savings at the earliest stages of design.

**Result:**
32 recommendations were accepted, 23 rejected and further five underwent further study.

The implemented recommendations produced savings of about 15 per cent. The recommendations include the better selection of materials, time frame, workforce as well as quality of the products for both short- and long-term.

The key themes here are function, value and cost.

### 7.3 PROJECT VIABILITY

The rationale for the project is set out in the business case which will be expressed in terms of a set of benefits which contribute towards strategic goal(s).

The project framework and planning should be written to ensure that achievement of those benefits is maximised. It is the project sponsor's duty to continually assess project viability and if necessary to kill an unviable project.

#### 7.3.1 Factors that Affect Project Viability

There are many factors that affect project viability, for example, cost overruns, time overruns, changes to specifications and scope, quality problems and business environment changes.

(a) **Cost Overruns**
If the project is based on a rate of return on capital invested, then an increase in project costs can eliminate this.
(b) **Time Overruns**
Some projects have to be delivered within a certain time frame to deliver benefits. Extending time may completely eliminate the benefits.

(c) **Changes to Specifications and Scope**
Changes to the plan or even the scope will inevitably be requested as the projects progress. These need to be carefully assessed against the continued ability to deliver the benefits.

(d) **Quality Problems**
It may become clear during the project life cycle that the original quality expectations cannot be met. This can have an impact on the acceptability and hence the usability of the project's output by the end user. Changes to quality must be assessed against the benefits.

(e) **Change in the Business Environment**
Sometimes organisations have to take a different strategic path, making the need for the project obsolete. There is little point carrying on committing resources to a project for which there is no longer a need.

### ACTIVITY 7.2

1. Find a case study that implemented VM studies and relate it with the factors that affect the whole project viability factor in VM.

2. Suggest how those factors can be prevented or what are the solutions to problems that resulted from those factors.

#### 7.3.2 Cost Effectiveness Concept

VM is also an approach for the cost-effectiveness concept. This is because it focuses on the function, value and cost to improve the project. It is concerned with the planning and management of a project.

The rationale of cost-effectiveness concept in promoting the construction industry growth are as follows:

(a) Construction is important to the economy as a whole and therefore, to everybody. It affects costs, prices and our international competitiveness both in our own and foreign markets;

(b) Construction budgets are not being used effectively;
(c) Declining cost effectiveness is not the fault of any group. Owners, managers, contractors, unions, workers, suppliers and governments all share the responsibility; and

(d) Cost-effectiveness in construction can be improved to the advantage of all without inequity to any group if we recognise it as a national problem and seek cooperative instead of adversarial solutions.

### 7.4 BUILDING IN VALUE

In implementing building in value, we need to look at the opportunities and initiatives to enhance the value of properties by utilising high-value materials. This also means that the practice needs to adopt a sustainable approach.

There are three phases of **building materials**, which are pre-building phase, building phase and post-building phase (Kim, 1998) as shown in Table 7.1.

**Table 7.1: Phases of Building Materials Selection**

<table>
<thead>
<tr>
<th>Phases</th>
<th>Description</th>
</tr>
</thead>
</table>
| Pre-Building Phase    | • Production and delivery process of a material up to, but not including, the point of installation; and  
                         • This phase has the potential for causing environmental damage. Good knowledge and awareness of building materials will lead to a good selection of building materials. |
| Building Phase        | • Focuses on the building material’s useful life where the materials will go through the assembly and installation process, maintenance and repair and extends to the life of the material as part of the building life cycle. |
| Post-Building Phase   | • Upon the expiry of the building materials’ usefulness and functions, decisions must be carefully made on whether to recycle or discard. |

At the present, it can be seen that there is a shift of perception on sustainability and a lot of countries are taking strong initiatives to focus on using high-value materials in the buildings, taking into account the whole economic value throughout its life-cycle (Chegut, Eichholtz & Kok, 2013) indicate that the attention and awareness on sustainability and related building element that is closely related with building materials, namely energy efficiency has increased rapidly during the past decade.
In the United Kingdom (UK) for example, there is an environmental certification for green buildings. Attention and initiatives are taken by the government to emphasise on environmental care to accommodate the human capacity and requirements in the buildings.

The use of green building materials and products represent one important strategy in the design of a building. Green building materials offer specific benefits to the building owner and building occupants such as the following:

(a) Reduced maintenance/replacement costs over the life of the building;
(b) Energy conservation;
(c) Improved occupant health and productivity;
(d) Lower costs associated with changing space configurations; and
(e) Greater design flexibility.

In general, the building materials are selected based on the following criteria:

(a) Resource efficiency;
(b) Indoor air quality;
(c) Energy efficiency;
(d) Water conservation; and
(e) Affordability.

Sustainable building materials can be defined as materials with overall superior performance in terms of specified criteria that are suggested as follows:

(a) Locally produced and sourced materials;
(b) Transport costs and environmental impact;
(c) Thermal efficiency;
(d) Occupant needs and health considerations;
(e) Financial viability;
(f) Recyclability of building materials and the demolished building;
(g) Waste and pollution generated in the manufacturing process;
(h) Energy required in the manufacturing process;
(i) Use of renewable resources;
(j) Toxic emissions generated by the product; and
(k) Maintenance costs.

**ACTIVITY 7.3**

Select a VM case study that focuses on the selection of sustainable building materials with your coursemates.

**SELF-CHECK 7.1**

Based on the figure below, list the green solutions that you can apply at your house.

---

*Here are just a few things we can do to enhance your new home...*

- **Engineered Floor System**: Reduces homes impact on forests by using composite engineered I-Joists.
- **Blown Cellulose or Spray Foams Insulation**: New insulation types completely fill wall and ceiling cavities, heating and cooling costs account for at least 1/2 of a home’s energy use.
- **House Sealing**: All spaces between framing lumber are sealed with foam or caulk reducing air loss and saving energy.
- **High Performance Windows**: Low-E, insulated windows offer less energy loss, plus new materials increase life expectancy.
- **Hardwood, Tile and Carpet Floors**: New flooring types that are more costly and/or renewable and recycled forest products make for beautiful floors.
- **High Performance Insulated Doors**: Insulated doors offer less energy loss, plus new materials such as fiberglass look like wood and increase life expectancy.
- **Green Cabinetry**: A green certified cabinet resulting in lower VOC emissions (better indoor air quality) and less impact on the environment.
- **Third Party Duct and Door Blower Testing**: As part of Energy Star and other certifications, independent energy auditors test ducts and the whole house with specialized equipment for air infiltration and test leak.
- **Oriented Strand Board Roof and Wall Sheathing**: Doesn’t use large trees to manufacture - it is resource efficient, enhances durability and is now utilized in over 75% of all new homes.
- **Daylighting Solutions**: Through the use of Velux Skylights and Sun Tunnels, energy requirements are less and people react more favorably to natural light.
- **Fiber Cement Siding and Composite Trim Siding products such as James Hardie, Nuhome and Miniver Trim - leads decay and insect destruction and dramatically increase the life of the building envelope.
- **Engineered Roof Trusses**: Uses less lumber and minimizes lumber waste.
- **On Demand Hot Water**: Systems such as Rinnai Tankless Water Heaters that only supply hot water when you need instead of heating hot water.
- **Indigenous Plants and Drip Line Irrigation**: Saves water usage.
- **Construction Site Recycling**: Products such as wood, drywall and cardboard packaging is expanded and recycled.
- **PEX Water Piping**: Reduces heat water heat loss between the water heating system and the faucet resulting in energy savings.
- **High Efficiency HVAC**: New high efficiency HVAC units use less energy and have lower operating costs.
Value management is a universal approach that needs to be systematically conducted to achieve an optimum value.

Evaluation of project viability is important in order to assess its viability, growth and long-term benefits.

The cost effectiveness concept emphasises the function, value and cost elements.

**Summary**

- Building in value
- Building materials
- Cost effectiveness
- Project viability
- Value management

**Key Terms**

**References**


Topic 8  Assessing Building Construction Quality

LEARNING OUTCOMES

By the end of this topic, you should be able to:

1. Distinguish the basis of building construction quality assessment;
2. Examine the standards available in assessing building construction quality in Malaysia; and

INTRODUCTION

Shouldn’t newly constructed buildings be as appealing as newly made cars? Automobile makers devote an incredible amount of attention to achieving high built quality. It should be the same with buildings. In 2006, the Construction Industry Development Board (CIDB) of Malaysia established the Quality Assessment System for Building Construction Work (QLASSIC) also known as CIS 7:2006. It is one of the two standards available in Malaysia for assessing construction works and projects, the other being the Construction Quality Assessment System (CONQUAS) from Singapore. The remainder of this topic would discuss the assessment standards and requirements, with more emphasis on QLASSIC, how to carry out premise audits, and health and safety considerations in a building.
8.1 BUILDING CONSTRUCTION QUALITY ASSESSMENT (BQA) STANDARDS IN MALAYSIA

Buildings cost a lot of money to build and own. Poor quality buildings would result in so much money being spent on maintenance. Extreme shabby construction might even mean a threat to lives and loss of property. The need of quality construction can therefore not be overemphasised. In the year 2006, CIDB launched the CIS 7:2006 based largely on the Singaporean standard for building quality assessment CONQUAS. Though not a mandatory standard at the moment, the CIS 7:2006 is a system that have been helping development projects achieve a better construction quality. Table 8.1 shows a general overview of the two construction quality assessments standards currently in use in Malaysia.

<table>
<thead>
<tr>
<th>Quality Assessment System for Building Construction Work (QLASSIC) also known as CIS 7:2006</th>
<th>Construction Quality Assessment System (CONQUAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use</strong></td>
<td>Assessment standards for measuring quality of workmanship and building construction works and projects(^1,2).</td>
</tr>
<tr>
<td><strong>Regulator</strong></td>
<td>Construction Industry Development Board (CIDB), Malaysia</td>
</tr>
<tr>
<td><strong>Service area</strong></td>
<td>Malaysia</td>
</tr>
</tbody>
</table>
### Objectives

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>(a)</td>
<td>To benchmark the level of quality of the construction industry in Malaysia;</td>
</tr>
<tr>
<td>(b)</td>
<td>To have a standard quality assessment system for quality of workmanship of building projects;</td>
</tr>
<tr>
<td>(c)</td>
<td>To assess quality of workmanship of a building project based on the approved standards;</td>
</tr>
<tr>
<td>(d)</td>
<td>To evaluate the performance of contractors based on quality of workmanship; and</td>
</tr>
<tr>
<td>(e)</td>
<td>To compile data for statistical analysis.</td>
</tr>
</tbody>
</table>

### Scope

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Buildings and projects are assessed based primarily on workmanship standards through actual site inspection.</td>
<td></td>
</tr>
<tr>
<td>- Structural Works;</td>
<td></td>
</tr>
<tr>
<td>- Architectural Works;</td>
<td></td>
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<tr>
<td>- Mechanical;</td>
<td></td>
</tr>
<tr>
<td>- Electrical (M &amp; E) Works; and</td>
<td></td>
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<tr>
<td>- External Works.</td>
<td></td>
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</tbody>
</table>

### Important symbols

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>“X”</td>
<td>failed to meet standard</td>
</tr>
<tr>
<td>“”</td>
<td>has met standard</td>
</tr>
<tr>
<td>“−”</td>
<td>not applicable</td>
</tr>
</tbody>
</table>

<p>| | |</p>
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</tr>
<tr>
<td>- Architectural Works; and</td>
<td></td>
</tr>
<tr>
<td>- Mechanical and Electrical (M&amp;E) Works.</td>
<td></td>
</tr>
</tbody>
</table>

Note: External Works is covered under Architectural Works.
Benefits

- No charges for assessment and processing fee for the time being.
- Enables benchmarking of quality of workmanship of construction projects.
- Provides a standard assessment system for quality of workmanship of construction work.
- Enhances quality control of construction works.
- Specified as a quality criterion for contractors performance scorecard.

- Allows firms to benchmark workmanship quality on an international basis.
- Gives that extra competitive edge to firms that consistently deliver projects with high CONQUAS score.
- Good CONQUAS score track record serves to enhance the image of the firm and ensures future marketability.

8.2 QLASSIC ASSESSMENT CRITERIA

The QLASSIC assessment criteria defines the assessment approach, the elements of building that are covered in the building construction quality assessment, the weightage allocation to the different categories of buildings and the assessment process. Let us discuss these in detail.

8.2.1 Assessment Approach

Building elements that need to be assessed are determined through a sampling and statistical approach and distributed evenly throughout the project at various construction stages. Assessment samples are selected from drawings and plans. All locations in the construction project shall be made available for the assessment. This ensures that the assessment adequately represents the entire building and project. Scoring is done only on the works that are inspected for the first time. Rectification and corrections after the assessment is carried out are not re-scored. Objective of this practice is to encourage contractors “doing things right the first time and every time”. The sum of all four components gives the QLASSIC score, in percentage (%), for a building or project.
8.2.2 What is Covered in a Full Assessment?

QLASSIC stipulates the following elements to be covered in a full assessment.

(a) **Structural Works**
Assessment is performed during the various construction stages. The gross floor area (GFA) is used to determine the number of samples. Structural works assessment includes the following:

(i) Reinforced concrete structure (formwork, pre-cast specific requirements, finished concrete, structure quality and non-destructive testing (NDT));

(ii) Structural steel work; and

(iii) Pre-stressed concrete.

(b) **Architectural Works**
This is upon completion of project with Certificate of Practical Completion (CPC) and prior to handing over. The gross floor area (GFA) is used to determine the number of samples. Architectural work covers essentially finishes. Architectural works assessment includes the following:

(i) Ceiling;

(ii) Floor;

(iii) Internal wall;

(iv) External wall;

(v) Roof;

(vi) Perimeter drain and apron;

(vii) Door and window; and

(viii) Internal and external fixture.
(c) **Mechanical and Electrical (M&E) Works**
This is performed throughout the various stages of construction as Structural Works and upon Certificate of Practical Completion (CPC) is issued upon the completion of the project and prior to handing over. M&E work assessment includes the following:

(i) Electrical work;
(ii) Air-conditioning and mechanical ventilation work (ACMV);
(iii) Fire protection work;
(iv) Sanitary and plumbing work; and
(v) Basic M&E fitting.

(d) **External Works**
This is upon completion of project with Certificate of Practical Completion (CPC) and prior to handing over. The gross floor area (GFA) is used to determine the number of samples. The numbers of samples are determined based on 10m length section or per location, with a minimum number of samples. External work assessment include:

(i) External drain;
(ii) Road work and car park;
(iii) Link-way or shelter;
(iv) Footpath and turfing;
(v) Playground;
(vi) Court;
(vii) Fence and gate;
(viii) Swimming pool; and
(ix) Electrical substation.

### 8.2.3 Building Category and Weightage Allocation

There are four building categories in the QLASSIC assessment system namely categories A, B, C and D (see Table 8.2). The weightage system and allocation is aimed at making the score quantitative in representing quality of workmanship and takes into consideration the distribution between cost proportions of the four components.
Table 8.2: Weightage Allocation According to Building Component and Category

<table>
<thead>
<tr>
<th>Component</th>
<th>Category A Landed Housing (Detached, Semi-detached, Terrace and Cluster House)</th>
<th>Category B Stratified Housing (Flat, Apartment, Condominium, Service Apartment and Town House)</th>
<th>Category C Public Building (Office Building, School and Other Related Facilities/Buildings Intended for Public Use)</th>
<th>Category D Special Public Building (Hospital and Airport Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Works (%)</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Architectural Works (%)</td>
<td>60</td>
<td>50</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td>M&amp;E Works (%)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>External Works (%)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total Score (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

8.2.4 Assessment Process

The assessment process involves five stages. These stages can be seen in Figure 8.1.
Figure 8.1: Assessment process flow

- APPLY TO CIDB
  - developers/project owners/contractors to submit application

- SCOPE OF ASSESSMENT
  - architectural work
  - structural work
  - M&E work
  - external work

- SAMPLING BY ASSessor
  - number of samples to be assessed are based on the sampling guideline in CIS 7 (GFA)
  - location of samples are predetermined and marked in the construction drawing

- ONsite ASSESSMENT
  - independent and qualified assessors to carry out assessment
  - quality of workmanship are based on requirements in CIS 7
  - assessment form

- QLASSIC SCORE (%)
  - CIDB to issue assessment report on project basis

START

END


8.3 CARRYING OUT PREMISE AUDITS FOR BQA

Here, we will continue our discussion on carrying out premise audits for BQA.

8.3.1 Due Diligence

Due diligence must be employed in conformity with standards and regulations. For instance, whether as a QLASSIC or CONQUAS assessor, the two standards specify what to be done in all circumstances of the exercise. Clients, in many circumstances, might have preconceived ideas and would try to impose them on the assessor. The assessor should know the boundaries of what is acceptable ethically and what is not. Diplomacy should always be used in dealing with overbearing clients and the assessor’s opinion on the outcome of the exercise should be objective.

8.3.2 Methodology

In this type of building inspection, the method of executing it is not at the assessor’s discretion or convenience. While it is not a written rule, QLASSIC has developed a methodology checklist. This is to make sure that all aspects and components that are supposed to be covered under the inspection are indeed covered. For instance, for internal inspection of architectural works, there is what QLASSIC calls the six-plus-one formula. This stipulates the building elements that must be covered for this purpose and the flow in which they must follow. The six-plus-one formula means all the building elements in this format, FWCDWF, plus M&E Works, as follows:

(a) Floor;
(b) Wall;
(c) Ceiling;
(d) Doors;
(e) Windows;
(f) Fixtures; and
(g) M&E works.
Beyond this, all the aspects to be inspected under the elements mentioned above are also stipulated in a methodological manner. This certainly would eliminate the tendency of omissions during inspections.

8.3.3 Tools

There are a variety of tools used in inspecting buildings for built quality purposes. Spirit level (1.2m), L-Square (300mm x 200mm), tapping rod, taper wedge, taper gauge, inspection mirror, measuring tape (steel), steel rule, UPV metre (check degree of uniformity of hardened concrete), etc. Table 8.3 shows some of these tools.

<table>
<thead>
<tr>
<th>Name of Tool</th>
<th>How It Looks Like</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirit level</td>
<td><img src="image1" alt="Image" /></td>
<td>Check wall and floor evenness</td>
</tr>
<tr>
<td>L-square</td>
<td><img src="image2" alt="Image" /></td>
<td>Check wall angles</td>
</tr>
<tr>
<td>Tapping rod</td>
<td><img src="image3" alt="Image" /></td>
<td>Check hollowness in walls and floors</td>
</tr>
</tbody>
</table>

Table 8.3: Common Inspection Tools and Their Use
Taper wedge | Measure the extent of openings and allowances such as those between door shutters and the floor

Taper gauge | Measure the extent of openings and allowances such as those between door shutters and the floor

Inspection mirror | Access hard to view areas such as top of door shutters, etc.

Measuring tape (steel)/Steel ruler | Measure distances between two points

**ACTIVITY 8.1**

Go online and find out other tools that are used in inspecting buildings for built quality purposes.
ENVIRONMENTAL AND HEALTH SAFETY CONSIDERATIONS

The expectation now is that buildings should be more sustainable, offer better comfort and health safety to occupants. It is part of the sustainability campaign to reduce the impact on the environment. In today’s considerations, a responsible building should be able to offer at least the following: reduced greenhouse gas (GHG), such as carbon emissions by being more energy efficient, health safety such as better air quality, fire safety, etc.

8.4.1 Emissions

Interact friendly with the environment with less adverse impact by reducing carbon emissions.

8.4.2 Air Quality

Building materials, adhesives, sealants, finishes and furnishings should not contain, generate or release any particulate or gaseous contaminants including volatile organic compounds (VOCs). When smoking must be accommodated, dedicated smoking areas physically isolated with dedicated HVAC systems should be provided.

8.4.3 Fire Safety and Protection

Malaysian standards for fire safety and protection particularly. comprise several major headings that include the following aspects of design and operational provisions (you can also refer to Malaysian Standard Catalogue in this link: http://www.msonline.gov.my):

(a) Uniform Building by-Laws (UBBL) 1984;
(b) Occupational Safety and Health (OSH) Management System (MS 1722:2011);
(c) Universal Design and Accessibility in the Built Environment (MS 1184:2014);
(d) Fire Detection & Fire Alarm System (MS 1745:2004);
(e) Design and Installation (Extinguishing Systems) (MS 1590:2003);
(f) Gaseous Fire Extinguishing Systems (MS ISO 14520:2004); and

(g) Fire Dampers and Installation (MS 555:2003).

The Uniform Building by-Laws 1984 has mandated the strategic need to ensure developers, consultants, contractors and building owners comply with good engineering practices in design, construction and maintenance of buildings with their attendant facilities and services. Set of management measure is deemed necessary to focus both passive and active fire protection and fighting systems.

The fundamental approach to passive design is to include the provisions for designing fire-rated material used for building elements. While the active approaches to protection for example is to ensure that any fire extinguishers and other fire control equipments employed on site must be in easily accessed locations and must be serviced, audited and improved regularly. Alarms should be in working condition and occupants should be made aware of what to do and how to behave in case of a fire through briefings and signages.

These sets of standards provided reflect the significant importance of both passive and active fire prevention approaches whilst to insure the fire risk is mitigated. Therefore, a proactive management measures is inevitable given the fact that work-premise or buildings experiencing retrofitting and change of use over time.

1. Why is building construction quality assessment necessary?
2. Outline the objectives, scope and benefits of building construction quality assessment standards.
3. Elaborate on the components covered in building construction quality assessment.
4. Outline and briefly discuss the procedure and tools for performing premise audit for building construction quality.
Buildings provide just more than shelter and are becoming even more interactive. The quality of its structure and components is integral to this nature.

Ensuring high quality of building construction works is through the use of assessment standards and benchmarking systems such as the QLASSIC and CONQUAS.

These standards are yet to be legally mandatory in Malaysia, but they provide contractors, building buyers, owners and occupants a way to ensure that the built quality of constructions is of the highest degree and can match counterparts around the world.

**KEY TERMS**

- Building construction quality assessment
- Building construction quality assessment standards
- CONQUAS
- Environment
- Health and Safety
- QLASSIC

**REFERENCES**


INTRODUCTION

Assets, be it buildings, plants, machinery, equipment and so on are prone to deterioration. This could happen over a short period of time, sometimes immediately after construction, or it could happen over a long period of time. To retain whatever purpose a property is built and held, it must be constantly maintained. In this topic, we would look at the need and types of maintenance in buildings, how to plan maintenance, obsolescence in buildings and refurbishment, and a brief outlook on maintenance management.

9.1 MAINTENANCE IN BUILDINGS

Maintenance is simply any action or work carried out to preserve or sustain the required functionality of a building, structure or component. The British Standard 3811 of 1993 defined maintenance as follows:

The combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function.
9.2 NEEDS FOR MAINTENANCE WORK

Maintenance is a continuous process once a building is constructed and its life cycle revolves around it. How much a building lasts and functions depends greatly on how well it is maintained. To the facilities manager, the scope of maintaining a building has transcended day-to-day operations to a strategic (the thinking) level. The question he must have in mind now is conducting maintenance with the needs and preferences of the organisation and building occupants in mind as employee and occupancy work productivity is becoming increasingly tied to the workplace. This has called for serious understanding of how the design stage of a building’s construction affects its maintenance during its life cycle.

The need to accommodate the maintenance requirements of a building right at the design stage of its construction so as to reduce costs and maintenance needs is gradually gaining popularity among professionals in the construction process. Maintenance of buildings is carried out to achieve the following: retain value of investment, ensure functionality, good aesthetics, increase workplace productivity, offer health comfort and safety.

9.3 PLANNING MAINTENANCE IN BUILDINGS

When planning for maintenance, factors such as costs of the maintenance works, availability of resources to carry out the maintenance works, the urgency of the nature of work, future use of the component or structure or building, age of the property and social considerations (effects to occupants’ sensibilities and the environment) must be considered.

9.3.1 Nature of Maintenance Works

The nature of maintenance works could take the following forms:

(a) **Servicing or Day-to-day Maintenance**

These are basically routine cleaning or servicing operations carried out at stipulated schedules. This could range from daily routines to years’ intervals to keep components and the building in the acceptable working condition. Such works could include sweeping and mopping floors daily, washing or cleaning windows, repainting of walls and decorations, lawn mowing, clipping flowers, HVAC servicing, etc.
(b) **Rectification**  
This involves actions or work carried out to correct faults. It could occur early in the life of the building as a result of faulty design, inherent faults or simply unsuitable components, incorrect assembly or installation, items damaged while in transit, or it could occur when some on maintenance works have been carried out arising from some of the same reasons stated above. Rectification work is done to ensure that the right components are installed for the right purposes.

(c) **Replacement**  
This is work done to completely replace components as the name implies. Components could be replaced either because they have broken down completely or have reached the end of their lives, in which case they could still be functional, but, say, safety or operating conditions require that they be replaced.

(d) **Refurbishment or Renovation**  
This consists of restoration, overhaul or modification from the original design and specification of the building with the aim of improving the original design. On a one-time basis, renovations are more capital intensive and should be planned very well in advance. Lack of proper budgeting and costing, and knowledge of the true extend of renovation works to be done could result in abandoned renovation projects.

### 9.3.2 Approaches to Maintenance

Maintenance falls generally into two categories: planned and unplanned maintenance. Under these two categories falls the various types or approaches to maintenance activities.

**Planned maintenance** is thought out, documented, monitored and executed in an organised manner. Unplanned maintenance is the direct opposite. There is no plan or forethought whatsoever to this type of maintenance. **Unplanned maintenance** is basically of corrective nature and could or could not involve emergency maintenance.

Let us now further discuss other approaches of maintenance, including corrective and emergency maintenance which fall under planned maintenance.

(a) **Preventive Maintenance**  
As the name implies, this approach involves carrying out measures that tend to avoid failures in components and the entire building. Measures are taken to replace components or keeping them in good condition before
failure could occur. This type of approach is further broken commonly into two forms:

(i) **Scheduled Preventive Maintenance**
Maintenance work is carried out on the item or component based on the scheduled period, which could be usage or time based, despite its actual condition. Most scheduled maintenance actions are recommended by the suppliers based on either limited knowledge of the actual use condition of the component or from past experiences.

(ii) **Condition-based Preventive Maintenance**
In the latter, a preventive measure is initiated based on the actual condition of the item or component. Routine and continuous monitoring of the component informs its condition and the need to carry out a preventive action to avoid its eventual failure. A preventive maintenance checklist should be developed and adhered to.

(b) **Corrective Maintenance**
This is an action carried out to restore an item or component that had already failed. It is intended to return the component or item in a condition in which it can again satisfactorily perform its required function.

(c) **Emergency Maintenance**
This approach is employed to rectify issues that might result into disastrous failures or serious consequences. It could be day-to-day actions resulting from incidents as they occur. For example, a plumbing pipe leak would require an emergency fix that if left unattended could lead to serious water loss or a gas pipe leak within a house that could lead to a fire outbreak if no immediate action is carried out to fix it.

(d) **Run-to-failure Maintenance**
This is also referred to as “just in time maintenance”. In this approach, only routine servicing is carried out on the item or component until the item or component is broken or ceases to function. This type of approach can only be employed when the cost of preventive measures to failure outweighs the impact the actual failure would cause. It is also justified only when the impact of failure of the item or component is negligible to the overall functioning of the building. Thereby, investing heavily in preventive measures would be an unwise decision.
9.3.3 Understanding Building Elements

A building is a structure with walls and a roof. A building could be a residential building, a commercial building or an industrial building. Several elements make up the building structure. A completed and functioning building generally consist of the substructure, the superstructure, finishing, fittings and fixtures, and services (internal and external). The facilities manager must understand what structural, functional and aesthetic functions these elements bring to the building.

(a) The **substructure** is the point of the building structure at and below ground level. The substructure’s basic function could be seen as that of “Atlas” shouldering the entire weight of all the other elements of the building structure above it. It consists of the foundation and all its components – walls, ground floors, damp-proofing and other membranes, etc. Sub-soil drainages and basement floors are also considered the substructure of a building.

(b) The **superstructure** is made up of all the building elements above ground level. It consists of walls, staircases, upper floors, windows, doors, ceiling, roof, etc.

(c) **Finishing** is the element that adds the final cosmetic outlook to a building structure. They could include floor screeds; wood, metal, glass or PVC paneling; plastering and rendering; painting and other decorations, etc.; and are meant to be visually appealing.

(d) **Fittings and fixtures** are basically permanent attachments considered a part of the building structure such that removing them would affect either the fabric or make the building envelop incomplete. Such as doors and window frames, built-in wardrobes/cupboards/shelf units, lighting fittings such as sockets, etc. There are a wide range of fixtures and fittings in a building. Some are included in the next element as services.

(e) **Services** are installations for the general functionality of the building. They are basically fixtures and fittings. While some are removable and not considered part of the building envelope, some are considered permanent fixtures and fittings to the building. Services in a building could include water supply systems, HVAC systems, fire protection systems, lighting and power supply systems, communication systems, elevators, conveyors, escalators, etc. In automated buildings, monitoring and control systems such as building management systems (BMS) are also considered services. External services could include external sewer drainage channels,
stormwater collection channels, etc. There are a wide range of services within and outside a building.

9.4 OBsolescence

Buildings whether maintained or not would gradually deteriorate over time and/or lose usefulness. While proper maintenance limits the level of this deterioration, lack or poor maintenance aggravates the rate of physical wear and tear, functional incapacitation and inability to command value – be it income or occupancy satisfaction. Obsolescence, be it of any form, results basically from two things: deficiency (inadequacy) or over- or super-adequacy. Obsolescence in general terms is a state in which an item or component, structure or building is no longer in a state of usefulness. Emphasis should be placed on “usefulness” here, given the many factors that could adversely affect the usefulness of a property beyond just bad working condition as a component, structure or building could be obsolete despite being in good condition.

That brings us to the question: “When is a building considered obsolete?” To answer this question, the three types of obsolescence in buildings are as follows:

(a) Physical Obsolescence
This type of obsolescence is caused by factors within the property. It is the deterioration of a property due to physical wear and tear or abuse. This could be as a result of inappropriate use to which the property was constructed, excessive strain on facilities and structure, gradual wear and tear as a result of old age, physical obsolescence could be both curable and incurable. Curable meaning the rate of deterioration could be mitigated and the physical integrity of the property returned to normal. It could be incurable when the structural integrity of the property could no more withstand any form of rectification and repair. In this case, the structure could be due for demolition and redevelopment.

(b) Functional Obsolescence
When a property could not or no more perform its functional requirements, such a property is considered functionally obsolete. Note that a functionally obsolete property could still be in good physical condition. Functional obsolescence is a vital factor to loss of value in property. It is also caused by factors within the property such as inadequacy, inability to perform designed functions or deficiencies in technology. It could result from improper design and improper installations. For instance, a residential building with all bedrooms upstairs and toilets/bathrooms downstairs is a functionally deficient building and such a building will
suffer from functional obsolescence. Functional obsolescence could be both curable and incurable. Curing it might require slight to large modifications to address either the inadequacy or over-adequacy. At its worst stage, the property might require a complete redevelopment.

(c) Economic Obsolescence
This form of obsolescence is caused by factors beyond the property such as external and environmental factors. A building could suffer loss in desirability and subsequently loss in value as a result of external activities not directly within the property’s influence and control. This could be as a result of change in construction fashion, change in demand for type of accommodations, regulations, location and so many other external activities. A building located by the highway where there is tremendous amount of traffic could suffer loss in value compared to its counterparts located away from the highway traffic but within the same neighborhood. The traffic is an external activity affecting the value of the property in question. This is also referred to as external or environmental obsolescence. The shift in taste and need, for instance, for 2-bedroom houses would see a decline in desirability for one-bedroom or 3-bedroom houses. Economic obsolescence is generally considered to be incurable because the factors causing it are from external sources and are beyond the property owner’s influence or control.

9.5 MAINTENANCE MANAGEMENT

Maintenance management involves the coordination of all activities (administrative, financial and technical) required to plan maintenance operations. Buildings are becoming increasingly complex. The challenges of maintaining a variety of different and complex building components are increasing. Buildings are no more than just walls and floors and roofs. Even small residential buildings nowadays incorporate components and services that a decade or so ago, were not there. There is increasing need for buildings to be much more responsible, more interactive, and sustainable and the facilities manager’s job is to ensure these buildings function optimally.

9.5.1 Support Services
Support services for facilities departments for operations and maintenance is becoming mandatory. According to Thomas, Graham Lane, vice president of Business Development Graphics Systems, the principle of maintenance management is that, “What you do not maintain today you will have to maintain tomorrow, except that the costs will be far more greater”. The application of a
Computerised maintenance management system (CMMS) is proving to be an effective maintenance management service. Thomas points out further that a successfully implemented CMMS can provide the business framework to build a successful FM department.

9.5.2 Description

A fully implemented CMMS will track all work performed by a facilities department or organisation and should meet the following requirements:

(a) Address all resources involved;
(b) Maintain maintenance inventory;
(c) Record and maintain work history;
(d) Include work tasks and frequencies;
(e) Accommodate all methods of work accomplishment;
(f) Effectively interface and communicate with related and supporting systems ranging from work generation through work performance and evaluation;
(g) Support each customer's mission;
(h) Ensure communication with each customer;
(i) Provide feedback information for analysis; and
(j) Reduce costs through effective maintenance planning.

9.5.3 Application

A CMMS can be used to manage small, simple or large and complex facilities, from a single building to a complete campus. A CMMS can also be used to manage the maintenance programme for a grouping of equipment such as a fleet of vehicles. The systems are very versatile since most are in modular form for the various maintenance functions and can be customised to fit the particular application. Whatever system or set of modules are selected for use, careful consideration needs to be given to functional requirements and a sound deployment plan. The CMMS must meet the needs, constraints, and opportunities of the business. Proper configuration, testing and training should be a high consideration when bringing a new CMMS or upgrading an existing system to an organisation.
The functionality of a building depends on how well it is maintained.

To the facilities manager, the context of maintenance had transcended day-to-day operations to a strategic level of maintenance management.

Support services such as CMMS have become a useful, and in some cases, mandatory tool for the facilities manager in maintenance management.
Approaches to maintenance  Maintenance management
Building deterioration  Obsolescence
Maintenance
As this is the final topic of this module, you will need to recap all the FM scopes of study that have been covered in the previous topics. In Topic 10, the aim is to give an understanding of functional plans and its elements; namely space planning, need analysis and FM Value Map. At the end of this topic, you should be able to understand how space planning can affect the workplace design and environment as well as the importance of needs analysis and FM Value Map as the strategic planning in FM project delivery.

Quality of office spaces have been associated as having a connection and to making an impact to the social sector, comfort, satisfaction, as well as productivity level. This would be one of the major social and economic consequence, as a large fraction of the workforce in modern society spend the bulk of their productive time in office spaces (Clements, 2000). The indoor environment in particular, was evaluated to have the biggest influence on productivity in relation to job dissatisfaction and job stress (Roelofsen, 2002). Among the issues that are normally related to space design are sustainability, comfort and productivity.
Management of space in any particular building serves to increase the comfort level of the occupants, where a good arrangement of room can introduce sufficient natural lighting and adequate natural ventilation in the building. Natural lighting naturally would reduce the usage of energy consumption for artificial lighting. In addition, proper space design will facilitate the movement of the occupants and enhance the comfort level and ease activities to be done by the occupants by providing access paths all over the building and ability to walk around the building smoothly and without any disturbance or obstruction.

## 10.1 SPACE PLANNING

**Space design** is one of the many factors that have an impact on Facilities Management (FM) of a building. One of the important factors is to demonstrate that design space functions to manage a workplace to serve users safely and comfortably in order to achieve maximum productivity. It is very important to understand that a better workplace produces better results. In most cases, the workplace is usually designed by taking into account the nature of the job and individuals of the office and customers. In general, many factors can play a role as an effective reason to affect productivity such as employees, technology and objectives of the corporation.

Employees spend most of their time indoors, partially inside office buildings. Therefore, it is very important to take into account the physical environment of the office or workplace, as it is also very important to develop a healthy working environment for the building users. The need of office building space planning development is to facilitate the coordination and accommodation of any professions’ activities within the work area.

Continual researches have demonstrated several characteristics of office environment. It has been mentioned that office buildings can have a significant effect on employees’ behaviour, perception and performance. There is a positive relationship between productivity and work environment. It can be seen that employees are often assumed to produce better work outcome when they are more satisfied with the physical environment of their workplace. Therefore, satisfaction of office building users is recognised to be an important factor that can be the key indicator to increase employees’ performance and subsequently an organisation’s success. It has been demonstrated that employees’ satisfaction with their work environment is connected directly to their job satisfaction and indirectly to the overall organisational commitment and turnover intention.
10.1.1 Office Environment

Office environment includes the physical environments such as lighting, noise, temperature and openings, for example windows. This has an impact on employees’ attitudes, behaviours, performance and satisfaction. It also covers the overall furniture and layout of the office depending on the nature of the organisation. It is very commonly known that employees who are not satisfied about the temperature, lighting and noise condition in their offices are more likely to have a lower productivity level, as those factors have an effect on their concentration at work.

10.1.2 Physical Workplace Design

A workplace environment has a fundamental aspect that can contribute to employees’ behaviours such as the layout of office space. It is very common to find that designs of workplace tend to provide closed private offices or rooms for employees. However, the concept of an open space plan is continuously increasing due to its low cost and convenience for space arrangement. An open plan design is defined as individual workstations constructed within an open space in offices, although sometimes being divided by panels, but it also includes conventional shared offices with several employees working in an office space. The concept of an open office plan is introduced to provide a work environment that helps to increase efficiency and facilitate communication between the employees, while reducing construction cost. Figure 10.1 shows an example of an office that adopts an open space concept.
The open plan concept for offices is highly recommended and favoured by most organisations to create flexibility in designing office space and allows reduction in renovation time. It also has a higher capability to accommodate a great number of employees in reduced space amounts in an office building, if compared to other designs. As a result, the use of total office space requirement will be minimised. Other related costs from air conditioning service, building maintenance and building construction cost will also be reduced. Some organisations that support open plan design claim that this method of space design increased the integration and communication level between the employees. As a result, employees’ performance has improved and same goes with satisfaction level and productivity. Figure 10.2 illustrates the open plan layouts of an office.
10.1.3 Maximising Space Efficiency

Space is a very crucial element of an organisation’s property. Most companies would rather spend higher than an average budget to get their space consulted to produce an efficient working space that can highly contribute to the overall productivity and satisfaction of their employees. There is also a list of key items that can be emphasised in maximising space efficiency:

(a) Install modest additions and extensions to the built space of new buildings;
(b) Provide a high ratio of usable area to overall gross built-up area;
(c) Provide versatile space, furniture and other fittings that can also be used for various other functions or purposes;
(d) Allow the design features that can be used for different activities at different times;
(e) Optimise space standards and functions for effective work;
(f) Create versatile office and research space equipped with appropriate open plan areas, meeting and quiet space areas;

(g) Select office furniture that are ergonomic and has a long-term usage and lifetime; and

(h) Equip the office space with convenient services and connection such as wireless internet connection to allow flexible and effective use of space.

The introduction of the new space concept, whether it is new or conventional, has to be assisted with good planning and implementation as follows:

(a) Conduct a survey to the space occupiers to evaluate their feedback on the provision of equipment and the existing layout that they would like to improve;

(b) Gather information pertaining to the new design and discuss with the employees to get their opinion. This will also show that their opinions are highly valued;

(c) Compare or benchmark the cost and layout comparison for improvement;

(d) Incorporate the space efficiency requirements to get a total review of the new concept to be implemented;

(e) Promote the benefits of versatile spaces and the right furniture; and

(f) Conduct a post occupancy review once the new layout has been installed for continuous monitoring and review.

**ACTIVITY 10.2**

1. With a coursemate, list the benefits of space efficiency to the organisation.

2. Draw or sketch an efficient working space that you can imagine based on the proposed attributes.
RELATIONSHIP BETWEEN EMPLOYEES’ PERFORMANCE AND WORKPLACE DESIGN

Over the last decade, many organisations have been trying new design concepts and techniques in office buildings, which can improve productivity and develop employees’ comfort. Space design can play a part along with effective management processes to improve productivity.

It has been highly noted that workplace design plays an important role in increasing employees’ productivity and helping to improve organisational performance. Research by the architects Gensler (2006) of 200 UK business managers showed that an improved workplace would boost employee productivity by 19 per cent and their own productivity by 17 per cent. These improvements have great implications for the economy as being proven. Gensler followed up this research with a survey of 2,000 office employees in the USA which showed that 90 per cent of the respondents believed that better interior design and layout result in better general employee performance.

NEED ANALYSIS

The functional need analysis in FM, in relation to space planning for example must incorporate the following criteria:

(a)  The rooms and space required for functions and other activities;
(b)  Inclusion of significant amount of ancillary space (such as retail space or cafe areas) rather than primary functional space within a new building;
(c)  Consideration of items or issues that might affect costs (overall or specific itemised items);
(d)  Consideration of limitations or restrictions imposed by funding and phasing that may affect the overall project planning and management;
(e)  The pressure on finite funds to address a significant backlog of maintenance work promotes a “make-do and mend” approach rather than a longer term redevelopment strategy;
(f) The need for flexibility and adaptability to accommodate any future changes in teaching strategy and the university’s long term aspirations;

(g) The inability of small- to medium-sized refurbishment projects to make effective amounts of surplus space available;

(h) The need to spend significant amounts on infrastructure upgrades before usable space can be refurbished; and

(i) Funding streams and sources that place greater emphasis on capital cost limits (and, in particular, cost per m² limits) rather than space efficiency or whole life cost considerations.

### 10.3.1 Strategic Need Analysis

**Strategic need analysis** is a method conducted in advising clients at the strategic or pre-design stage. This technique analyses and reviews client objectives, proposes alternatives and confronts participants with making choices. Strategic need analysis is closely related to the **Value Management (VM)** process. This involves management briefings, participant selection, interactive workshops and the use of neural network-based software forms part of the structure for strategic decision making. Facilities managers can provide vital information to this process and informed decision making at this critical stage.

A procedural process must be established to ensure that strategic needs analysis can make a valuable contribution to the strategic stages of a project. This can be done by ensuring that the analysis can be useful, flexible, well organised, sensitive to client and stakeholder needs. The analysis should aim to achieve client objectives and be designed to provide more effective, efficient, innovative and better solutions. The intention of strategic needs analysis commences with the main aim to deliver a solution that will be the best one to satisfy the client’s strategic needs. The strategic needs analysis is not limited to just construction or either facilities management project. It can also be implemented in both scopes of projects. Strategic needs analysis is designed to make a valuable contribution to this important formative stage of a project. It reflects and is sensitive to the strategic direction identified in the strategic management process and so overlaps it.

The project initiation phases and stages for strategic needs analysis is shown in Figure 10.3. The phases start with planning phase, development of idea, concept phase, client development brief, evaluation phase and the final one would be the review or decision on the commitment to proceed.
Figure 10.3: Phases of strategic needs analysis
Source: Jackson (2000)
10.4 FM VALUE MAP

The main focus of facilities management (FM) has for a long time been on cost reductions, but in recent years we have noticed a change towards the need for FM to create added value. Value as a concept has many different meanings and usages. There is a basic difference between value in singular, expressing the worth of something, and values in plural, which is related to personal belief and social behaviour. **FM value map** is also driven based on two main aims that are to increase the growth of revenue and profitability. The objectives of each aim is shown in Table 10.1.

<table>
<thead>
<tr>
<th>Aims</th>
<th>Objectives</th>
</tr>
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<tbody>
<tr>
<td>Revenue Growth</td>
<td>• Increase value of assets;</td>
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<tr>
<td></td>
<td>• Promote marketing and sale;</td>
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<td></td>
<td>• Increase innovation; and</td>
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<td></td>
<td>• Increase employee satisfaction.</td>
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<tr>
<td>Profitability Growth</td>
<td>• Increase productivity;</td>
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<tr>
<td></td>
<td>• Increase flexibility;</td>
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<tr>
<td></td>
<td>• Reduce cost; and</td>
</tr>
<tr>
<td></td>
<td>• Increase employee satisfaction.</td>
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</tbody>
</table>

**ACTIVITY 10.3**

In a group of three to four students, propose an FM Value Map based on any selected case study. In your proposal, demonstrate how the aim and objectives leading to revenue and profitability growth can be achieved.

**SELF-CHECK 10.2**

Brainstorm on other values of FM Value Map other than the ones leading to revenue and profitability growth.
SUMMARY

- Space planning is deemed as a strategic method taken by an organisation in valuing the space or property of the premise with emphasis given on the productivity, flexibility, performance, convenience and environment factors.

- Needs analysis is highly recommended to be implemented according to the procedures and phases in its structure to maximise the optimum value delivery of the approach.

- FM Value Map is a tool that can assist FM managers in understanding the path that the organisation is heading.

KEY TERMS

<table>
<thead>
<tr>
<th>FM value map</th>
<th>Space planning</th>
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<tbody>
<tr>
<td>Needs analysis</td>
<td>Strategic needs analysis</td>
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<tr>
<td>Open plan concept</td>
<td>Workplace environment</td>
</tr>
</tbody>
</table>

REFERENCES


If you have any comment or feedback, you are welcome to:

1. E-mail your comment or feedback to modulefeedback@oum.edu.my

OR

2. Fill in the Print Module online evaluation form available on myVLE.

Thank you.

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