IFMA's Performance and Quality Course

Student Guide

IFMA™

Acknowledgments

IFMA's professional development courses – including our world-class credential programs, the FMP®, SFP® and CFM® – are the cornerstone of our industry-leading offerings for career advancement. The contribution of IFMA volunteer members is critical to the relevance and value of our educational programs. The result of their global input is learning for facility managers, by facility managers. We would like to acknowledge the cumulative hours and expertise our members have contributed to educational content development and review, from design through delivery, with special acknowledgement to Chris Hodges and Mark Sekula as lead contributors, ensuring that IFMA's Performance and Quality Course accurately reflects the body of knowledge and skills required of FMs in today's global business environment.

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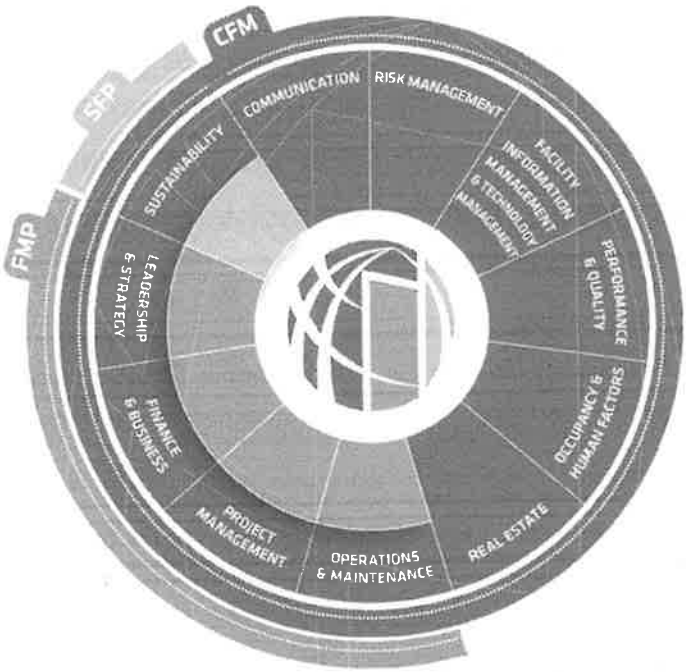
IFMA Credentials

About IFMA Credentials

After analyzing the work performed by facility managers, we have defined 11 competency areas. Our three world class FM credentials, — Facility Management Professional™ (FMP®), Sustainability Facility Professional® (SFP®), and Certified Facility Manager® (CFM®) — are based on these competencies.



1. The FMP® is the foundational credential for FM professionals and industry suppliers looking to increase their depth-of-knowledge on the core FM topics deemed critical by employers.
2. The SFP® is the leading credential for all FM and like-minded professionals with an interest in the development of sustainable FM strategies.
3. The CFM® is the premier certification for experienced FM professionals. A comprehensive exam assesses knowledge, skills, and proficiency across all FM competency areas.

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IFMA's Core Competency Courses

IFMA's 11 core competency courses, developed from IFMA's Global Job Analysis (GJTA), comprise the body of knowledge for facility managers. IFMA continuously refreshes the courses to align with global industry standards for FM knowledge, skills, and tasks. The courses provide practical knowledge and examples to help you improve your performance.

IFMA's Core Competency Courses include the following:

Communication: develop the skills you need to be an effective liaison between external and internal stakeholders.

Participants will be able to:

- Create and deliver the right message for the intended result.
- Develop an FM communication plan.
- Identify and share relevant information to the appropriate audience.

Risk Management: address the role of the facility manager in supporting or leading risk management planning; emergency preparedness, response and recovery; facility resilience and business continuity.

Participants will understand how to:

- Respond appropriately to emergencies affecting the facility.
- Meet the organization's business continuity goals.

Facility Information Management and Technology Management: understand how to leverage modern tools and techniques for today's workplaces and occupants.

Participants will be able to:

- Understand secure, efficient data collection supports decision-making processes to meet core business objectives.
- Conduct technology needs assessments and anticipate the impact of new technologies.
- Understand decisions are made to keep, update, augment, or replace technology.

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Occupancy and Human Factors: grow your ability to support organizational and individual occupant performance, while leading the FM team to develop and implement practices necessary to achieve success.

Participants will be able to:

- Create an environment where motivation, productivity, and retention are the norm.
- Blend safety and security with innovation.
- Negotiate service level agreements.

Real Estate: understand real estate principles and practices and how they contribute to achieving the core business strategy.

Participants will be able to:

- Develop and implement a real estate strategy to support the core business including assessing, acquiring, and disposing of real estate, and space management.
- Understand project management principles for managing new construction and other major projects.

Performance and Quality: define and make relevant what it means to capture fitness for the intended purpose, embrace a continuous improvement mindset, and satisfy stakeholders' needs.

Participants will be able to:

- Determine the needs and expectations of stakeholders for the facility and related service requirements.
- Understand and describe what comprises a comprehensive quality management system for FM.
- Measure the FM organization's performance to make continual improvements.

Sustainability: define the basics of five areas of sustainability and make relevant what it means to embrace sustainability.

Participants will be able to:

- Understand the management basics of:
  - Energy
  - Water
  - Materials and Consumables
  - Waste
  - Workplace and Site

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Welcome

Course Introduction

Welcome to Performance & Quality Course!

Participant Introductions

- → Your name
- → Company name and/or job responsibilities
- → Reason(s) for taking this course — expected outcome(s)
- → Your experience in FM — years and work responsibilities over your career

Expectations

Learner responsibilities:

- → Be prepared – complete class pre-work
- → Take part in class discussions and activities
- → Follow the rules of common courtesy
- → Provide feedback to the instructor and IFMA

Course Audience

Welcome to IFMA's Performance & Quality Course! This course is designed for persons interested in developing knowledge and skills in IFMA's FM Core Competencies and who wish to gain practical knowledge to enhance FM industry professional development.

Course Chapters

Performance includes eight (8) chapters:

- Chapter 1: Setting the Strategic Direction
- Chapter 2: Identifying Performance Improvement Opportunities
- Chapter 3: Metrics
- Chapter 4: Measuring and Monitoring
- Chapter 5: Performance Reporting

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- Chapter 6: Facility Management Quality Fundamentals
- Chapter 7: Quality Measures for the Facility Organization
- Chapter 8: Quality Assessment of Facility Management Services

Course Goals

The goals for this course are as follows:

- Work with stakeholders to understand the needs and expectations for the facility and related service requirements.
- Understand and document the processes used to deliver these services.
- Measure the performance of the Facility Management organization and service providers to make continual improvements.
- Understand and describe what comprises a comprehensive Facility Management Quality System.
- Use the basic quality tools and basic statistical tools for better analysis of data with a quality system.
- Understand what is necessary to monitor and maintain Facility Management Quality.

Course Overview

Good FM requires skilled coordination and productive information gathering during the maintenance process. The necessity for high quality pertains to construction works and workmanship and subsequently the coordination and maintenance of a building.

Facility managers need to develop a "systems thinking" perspective and provide critical insights that apply to quality-related FM practices. Performance and quality management techniques and practices have been functional for years, a good facility manager must bring them together in a comprehensive toolbox to meet the needs and requirements of the demand facility and stakeholders.

Just like any discipline, Performance & Quality have their own terms and definitions. The Performance & Quality terms that are relevant to FM are available in the **IFMA Master Glossary**, and will not be presented in this course .

Performance and Quality Competencies in FM

Outlined below are the competencies and the performance standards that a facility manager should know regarding performance and quality management.

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Given the need to ensure a standard of quality, a competent facility manager conducts a quality management process in a manner that:

- Customer satisfaction is measured and results are documented to guide process and service improvements.
- Service delivery performance metrics are documented.
- The methods for measuring customer satisfaction and service delivery are valid.
- The frequency of measuring is optimal.
- The results of the act of measuring customer satisfaction and service delivery are communicated to the appropriate providers and staff, used to identify opportunities for improvement and corrective actions needed, used as benchmarks for future measuring efforts, and used to recognize and reward excellent performance.
- Methods for collecting, verifying and analyzing performance data are valid and timely.
- Data is used to evaluate the current level of service.
- Data is used in the creation of future service level agreements.
- Data is used to set performance goals.
- Data is used to identify processes that need improvement.
- Data is used to recognize and reward exemplary performance.
- Policies and procedures of the FM organization are reflective of quality management process.

Given the need to determine performance of FM functions, a competent facility manager conducts a performance management process in a manner that:

- Potential improvements to workplace productivity are identified.
- The assessment makes use of current productivity metrics.
- The assessment considers the design of the job or task in question, the adequacy of information available, the adequacy and cost of the resources used in the execution of the task, the adequacy of the direction given, and the cost of resources.
- The conclusions or findings are used to reduce resource consumption, use less costly resources, improve the information and direction, and improve processes to reduce cycle time and improve productivity.
- The improvements identified are documented, tested and communicated to the appropriate staff or service providers.
- The implementation considers the risk of service interruption.
- The improvements are based on actual observation of the task, input from staff and service providers and current metric.

- The proposed improvements are feasible and sustainable.
- Productivity improves and is sustained as a result of the implementation.
- Customer satisfaction improves and is sustained as a result of the implementation.
- Cost savings are realized and sustained as a result of the implementation.
- Improvements can be correlated with changes in key performance indicators.

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Chapter 1: Setting the Strategic Direction

Introduction

To set the strategic direction, a facility manager must:

1. Understand the FM Model
2. Use the Life Cycle Model to align with the organization
3. Use metrics to monitor workplace and facility performance

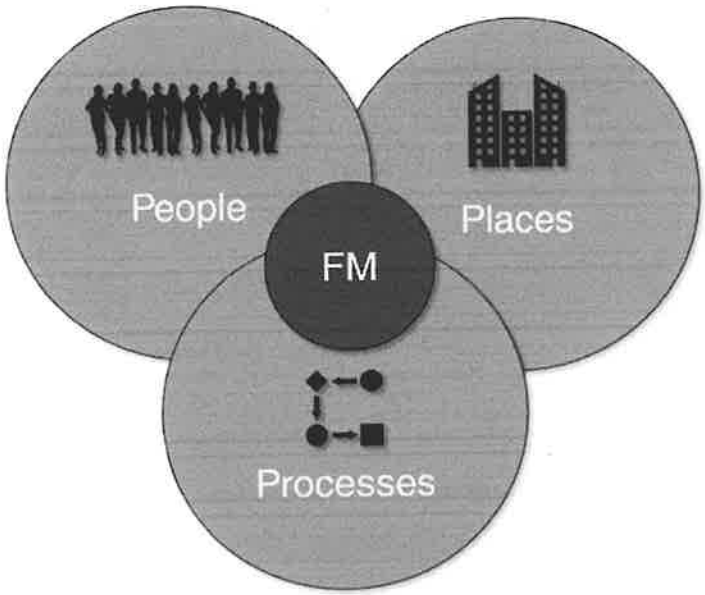

Figure 1 The FM Model

Lessons

- Objectives
- Lesson 1: What is a Quality Management System?
- Lesson 2: FM Model
- Lesson 3: Life Cycle Model
- Lesson 4: Developing an FM Strategic Plan - A Starting Point
- Lesson 5: The Strategic Planning Overview Model for Facility Management
- Lesson 6: Aligning FM with the Demand Organization's Mission

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Objectives

Chapter 1: Objectives

On completion of this chapter, you will be able to:

- Explain how a Quality Management System (QMS) can be a useful tool in facility management
- Identify the role of the FM Model in performance management and how it ties to the overall mission of the demand organization
- Understand the role and importance of the Strategy Life Cycle Model and/or Facility Strategic Plan in the performance management system
- Describe the elements within the strategic planning model
- Describe ways to align facility management with the demand organization's mission

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Lesson 1: What is a Quality Management System?

Lesson 1: Objectives

On completion of this lesson, you will be able to:

- Explain how a Quality Management System (QMS) can be a useful tool in facility management

What is a Quality Management System?

What is a Quality Management System (QMS)? In ISO terminology, the QMS is a set of policies, processes, and procedures required for planning and executing the services, production, and development in the core business area of an organization.

QMS in Facility Management

QMS integrates internal processes into a systematic approach to project execution. This enables organizations to identify, measure, control, and improve the core business processes that will ultimately lead to improved business outcomes. In facility management, QMS starts with facility managers. They must know their stakeholders and what those stakeholders expect of the facility and the related facility services (See Figure 2). They must be able to measure the performance of the FM organization and the service providers to continually improve their products and services.

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Figure 2 The Quality Management System

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Overview of Performance Management

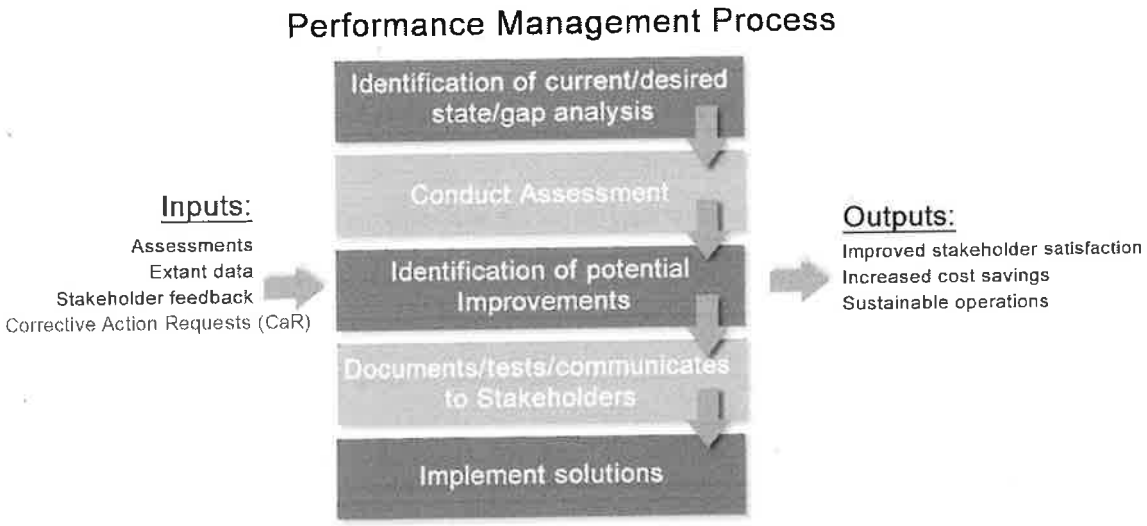

Figure 3 Performance Management Process

Performance management is all about measuring and monitoring those products and services. Given the need to determine the performance of the FM functions, a facility manager conducts a performance management process that does the following:

- Starts with documentation of the current state.
- Identifies potential improvements to the workplace and facility.
- Includes assessments that:
  - Use current productivity metrics as part of an overall assessment
  - Consider the design of the job, the adequacy of the information and the cost of resources used in the execution of the tasks and the costs of resources
  - Use the findings of the assessment to reduce resource consumption, look for more effective cost solutions to improve the facility operations processes and create ways to keep a green and sustainable operation
- Documents, tests and communicates improvement to the staff and suppliers.
- Implements solutions that consider the risk of service interruption and are based on actual observation, input from staff and service providers.

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Lesson 2: FM Model

Lesson 2: Objectives

On completion of this lesson, you will be able to:

- Identify the role of the FM Model in performance management and how it ties to the overall mission of the demand organization

The FM Model

Traditionally, the FM Model has been defined as the interaction of people, places, and processes along with technology. In the past, facility performance was just about the building. Now, performance includes the people served by the FM function and the daily work processes. Think of the people as the internal customers of the FM. The goal of FM is to meet the needs of the demand organization, and to ensure that all occupants and visitors to the facility are in a safe and comfortable environment. We refer to this as the functional performance management system.

The facility manager always keeps in mind the entire life cycle of the facility, which is made up of three main elements:

- People
- Places
- Processes

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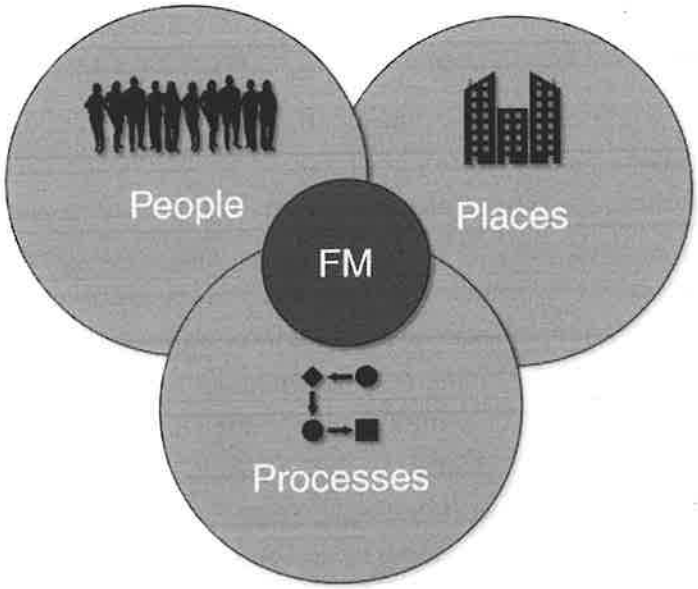

Figure 4 The FM Model

Technology is a tool that is integrated with these elements in the performance of the FM function.

It is the responsibility of the facility manager to manage and oversee each of these elements. A facility manager's decisions today will have an impact for years into the future.

Let us take a deeper look at how we align these main elements with the FM model, starting with people.

People

Fact: Healthy and satisfied people positively impact profits.

Comfort, safety, and productivity are the key elements facility managers provide to people. Comfort and safety are a function of the quality of the built environment and the psychological effect the facility can have on individuals. Individuals expect the facilities that they work in and visit to be secure and to be safe. For workers in a facility, characteristics that can impact the satisfaction of people in the workplace are things like aesthetics, which refers to the visual attractiveness of the building, both internally and externally, and the availability of workplace amenities. These characteristics impact the perception of visitors to a facility as well. Amenities such as game areas, nap rooms, breastfeeding areas for new mothers, desk upgrades, and remote work areas to name a few often dictate individuals'

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level of satisfaction. Even if the organization is a non-profit or a governmental entity, healthy and satisfied people will have a positive impact on organizational performance.

A performance management system should address the people element of the FM model by providing ways to measure the impact of the workplace on satisfaction and to make changes to improve that measure. FM performance management systems often measure and report on areas such as the perceived level of comfort, safety, ergonomics, cleanliness, health and responsiveness of the FM or the organization. These types of measurements tend to be more subjective than those used to evaluate facility system performance (such as metrics provided by maintenance management systems) because different stakeholders will experience each item differently. An example of this is the typical response to a survey about temperatures in an environment. Some users will indicate that they are always too cold, others too warm, and a few will report not being impacted by the temperature. All may be operating in the same space at the same time. These subjective measures are important metrics just the same. Evaluation of the people aspect of FM provides feedback on built environments. It also allows the facility manager to demonstrate the value of the organization's corporate programs to its employees and stakeholders.

Places

Places are the second element of the FM model and refer to the facility management function's role in taking care of the place or the building.

Fact 1 A facility that operates at its best contributes to the demand organization's bottom line.

Fact 2 Behind people, a facility is the second highest expense within an organization.

This high cost, combined with the effect of a properly functioning facility on its largest asset, its people, gives the place an extraordinary and often under-represented role in the value of an organization.

A performance management system keys in on the most important aspects of Place, and it provides a monitoring and measurement system for the facility manager and the organization. These important aspects may vary by type of organization but generally relate to the condition of the facility and how it operates to serve stakeholder needs. Resource use such as energy and water; delivery of comfort factors such as light, heat, and cooling; and services such as cleaning, waste removal, and security are items most often measured and monitored by the performance management system. Performance management systems allow the facility manager to validate the level of service provided.

Processes

A facility manager manages the processes within the day-to-day activities. These processes include:

- Operations of the building and site
- Maintenance activities
- Reactions to daily issues including complaints about the workplace, safety challenges, security, environmental compliance and cleanliness

Technology helps to manage work processes such as routine maintenance, preventive maintenance, and reactive maintenance for handling complaints, breakdowns and calls about cleanliness. Technology can also help with FM-managed processes including capital management, asset retirement, real estate, space management, resource management and finance management. Your organization may be responsible for other processes.

Metrics, or what is measured, play a key role in a performance management system. Metrics identify those factors that determine how well the FM function is performing. Some of these metrics will be turned into Key Performance Indicators, KPIs, the business drivers that indicate and support the demand organization's success. We will talk more about how to turn the process-focused metrics into KPIs in Chapter 3 on Metrics.

Technology

Technology plays a large role in performance management systems. Whether it is a simple spreadsheet used to track performance metrics in a small, one-building workplace, or a large campus with hundreds or thousands of occupants and visitors, FM technology systems play an important role in managing data. Integrated Workplace Management Systems, (IWMS), Computerized Maintenance Management Systems, (CMMS), and a host of other technological solutions for data measurement, monitoring and analysis serve as a platform for effective facility performance management.

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Lesson 3: Life Cycle Model

Lesson 3: Objective

On completion of this lesson, you will be able to:

- Understand the role and importance of the Strategy Life Cycle Model and/or Facility Strategic Plan in the performance management system

The Life Cycle Model

While a framework is a systematic way to track performance, a strategy is defined as a method or plan designed for the future. The life cycle model is a process that organizations use to develop a strategic plan for delivering facility services.

Strategic planning is both an art and science of organizing resources to accomplish the mission of the organization. The FM strategic plan should feed into the demand organization's mission to prioritize services targeted to those key factors that the business needs to have in place to succeed. Without that careful strategic planning and collaboration, the organization may be prevented from reaching its goals.

The strategic life cycle model is a series of inputs, processes, and outputs where the output of one phase of strategy development serves as the input for the next phase. In FM, the input for the analysis phase is the organization's strategy. The strategy is usually captured in its Mission, Vision, and Values (MVV). For the FM group, the ultimate output is the facility strategic plan.

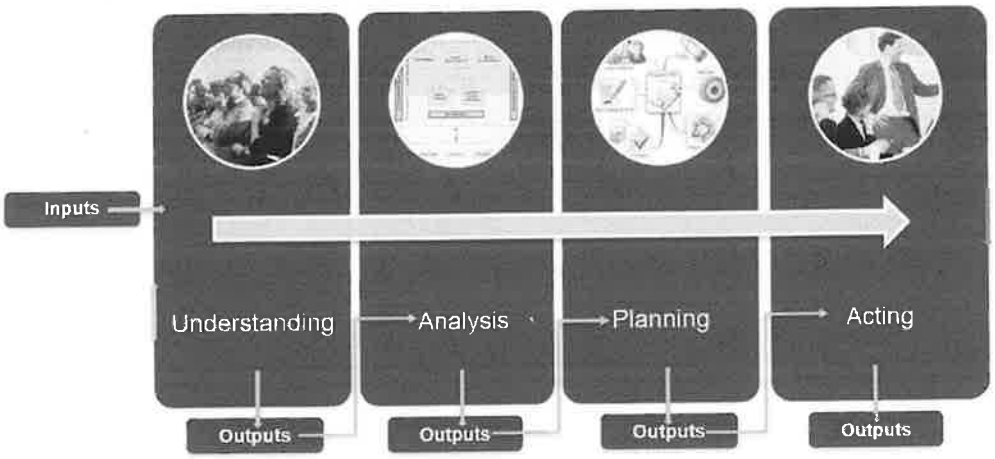

Figure 5 The Life Cycle Model

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Lesson 4: Developing an FM Strategic Plan - A Starting Point

Lesson 4: Objective

On completion of this lesson, you will be able to:

- Understand the role and importance of the Strategy Life Cycle Model and/or Facility Strategic Plan in the performance management system

Developing a Strategy

To develop a strategy for FM, you must understand how the organization intends to fulfill its mission, the assets involved in FM, business plans, and how the organization frames its strategic plan. The Strategic Life Cycle model (SLCM) provides a framework for this development.

The SCLM has four phases:

- Understanding
- Analysis
- Planning
- Action

A Starting Point

Simply stated, the strategic life cycle model is the "starting point" – what the facility manager wants to accomplish and how they plan to do it. These are the steps involved in developing an FM strategy that supports organizational goals and objectives. As the organization moves through each phase, the output of each phase formulates the input for the next phase.

These are the steps involved in developing an FM strategy that supports organizational goals and objectives. As the organization moves through each phase, the output of each phase formulates the input for the next phase. For example, the output of the *understanding* phase is the input for the *analysis* phase.

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Using this model, organizational practices are input to the Understanding phase of life cycle development. Mission and vision are defined in FM terms. The output of this phase of the process includes an FM mission, vision, and goals. The output of the Understanding phase is the input for the Analysis phase.

One of the final outputs of the strategic life cycle model is the performance management system, a framework of measures and metrics that enables the facility manager to determine whether the strategy is being fulfilled.

The facility's strategic plan leads to the development of a facility operations plan or a facility budget. These are the tactical outputs of the strategic planning process; the how-to guides that facility managers and staff would use to carry out day-to-day operations. The performance management framework guides the facility manager in determining what to measure and how to analyze data and information that defines success. The data also assists the facility manager in initiating adjustments and realignments as necessary.

Lesson 5: The Strategic Planning Overview Model for Facility Management

Lesson 5: Objective

On completion of this lesson, you will be able to:

- Describe the elements within the strategic planning model

Strategic Planning Model

FM encompasses many different types of facilities such as airports, hospitals, academic institutions, retail stores, government buildings, etc. Facilities can range from a small area of just a few hundred square meters to campuses with multiple buildings, with a wide range of functions and millions of square meters to manage and maintain. Each organization has its own mission with its own set of requirements for each facility. A facility strategic plan is an important document that links FM to the demand organization's goals and objectives.

The improved alignment of the FM with the mission, vision and values of the demand organization is a strong motivation to complete the process. Strategy and alignment gained by measuring and monitoring the right things and matching the right resources to the service level required will bring performance improvements. Without this analysis, the goals and measures of the FM group and service providers may not correctly align with organizational priorities. Misalignment leads to customer dissatisfaction, cost inefficiencies, operational inefficiencies and ineffective business processes. In addition, poor alignments hamper effective leadership and can lead to poor organizational morale. Following a strategic development process leads to a more effective performance management system that is focused on the right outcomes.

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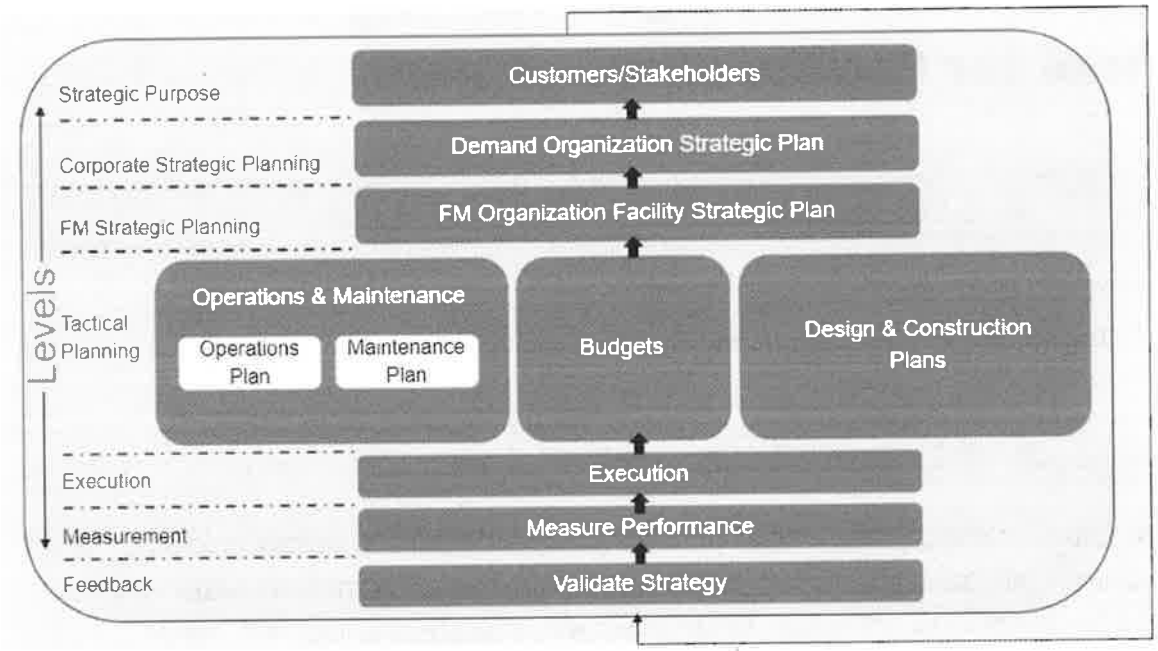

Figure 6 Strategic Planning Model

This leads to the question; how does a facility manager know what are the right things to monitor and measure? Understanding what is important to the organization is key to understanding how to build the strategy and your performance management system. By looking at what is important to the demand organization and organizing the mission in a systematic manner, the facility manager can build a strategic plan that includes their approach to performance management and their tactical plan for performance management. The Mission, Vision, and Values (MVVs) represent what is important to organizational success. Knowing the MVVs helps to create a greater awareness of what drives an organization and how it defines success.

That organizational success is defined by Critical Success Factors (CSF). CSF is a management term for an element that is necessary for the demand organization to achieve its mission. CSFs related to the operation of facilities are those activities that have been identified as being required to ensure a successful facility. Knowing these factors is essential in determining what facility performance issues to monitor and measure, and how to develop those measures into KPIs.

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Lesson 6: Aligning FM with the Demand Organization's Mission

Lesson 6: Objective

On completion of this lesson, you will be able to:

- Describe ways to align facility management with the demand organization's mission

Aligning FM and the Mission

Figure 7 Organization's mission and FM's role in fulfilling the mission

This model shows the relationship between the organization's mission and FM's role in fulfilling the mission (Figure 7). The most important aspect of the strategy development phase is to have a complete understanding of what drives the demand organization and how members of the organization define success.

Success means different things to different organizations. For example, a university is most likely driven by the core values of learning and research. This focuses the facility's strategic plan on optimizing the learning environment and maintaining an infrastructure conducive to research. Each facility will have to provide the appropriate environment for the type of learning and research required. For example, laboratories may have a high energy requirement, ultra-clean environment, or special equipment. The learning environment may require state-of-the-art technology. Each of these special considerations will drive the desired outcomes in the performance management system. Performance management requires the proper definition of these drivers and their translation into data, metrics, and KPIs. Understanding not only the needs of the business but also the needs of all stakeholders is just as critical.

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Chapter 1: Progress Check

1. An effective FM performance management system starts with a clear understanding of:

   a. The competencies of the FM organization
   b. Stretch goals for the FM organization
   c. The environment in which your organization functions
   d. What drives your organization and how it defines success

2. Places, one of the three elements of the FM model, measures metrics such as which of the following?

   a. Energy and water, light, heating and cooling
   b. Building operations and maintenance
   c. Cleaning, waste removal and security
   d. Amenities such as game rooms, nap spaces and break facilities

3. What is the most important aspect of the strategy development phase in a performance management system?

   a. Understanding the competencies of the FM organization
   b. Setting stretch goals for the FM organization
   c. Understanding the environment in which your organization functions
   d. Fully understanding what drives your organization and how it defines success

4. The four phases in the Life cycle model are:

   a. Sampling, Analysis, Planning, Evaluating
   b. Understanding, Analysis, Planning, Action
   c. Measuring, Analysis, Action, Evaluating
   d. Gathering, Evaluating, Planning, Action

5. Proper development of the FM model is critical in performance management because it ties the FM organization to the _____.

   a. Overall mission of the demand organization
   b. Balanced Scorecard
   c. Life cycle model
   d. Deliverables expected of the FM organization

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Chapter 2: Identifying Performance Improvement Opportunities

Introduction

Assessing workplace productivity is a great place to start to identify performance improvement activities. These improvement opportunities will lead to the creation of those FM metrics which we will discuss more in Chapter 3. The focus of this chapter is to prepare the facility manager to look for those areas of performance management that they need to measure.

Stakeholders often base their opinions of the facility management function on their perceptions of the staff, service providers, and contractors. Given the need to determine the performance of FM functions, a competent facility manager operates such that:

- The current state is evaluated and documented
- Potential improvements to workplace productivity are identified
- The assessment makes use of current productivity metrics
- The assessment considers the design of the job or task in question, the information available, the cost of the resources used in the execution of the task and the direction given and the cost of resources

The work environment can be viewed positively or negatively. On the negative side, unsuitable furniture, poorly designed workstations, excessive noise, inappropriate lighting, and things like poor fire safety measures for emergencies can negatively impact the productivity of the workplace. Other things, like heat stress and ergonomic disorders or poorly planned workspace, can adversely impact morale, and give rise to poor motivation and reduced job satisfaction. Factors that positively impact a work environment are not as easy to detect because there are many interacting variables to consider. Items that may be viewed more positively may include access to user controls for lighting, quality acoustics, or views to the outdoors. What applies to one workplace may not be appropriate in another. With all these factors, how can a facility manager make those changes to the work environment and allow a customer to have a positive perspective of FM?

Lessons

- Objectives
- Lesson 1: Three Levels of Performance

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- Lesson 2: The Assessment Model
- Lesson 3: Mapping a Process

Objectives

Chapter 2: Objectives

On completion of this chapter, you will be able to:

- Identify the three (3) levels of performance in a demand organization
- Understand the benefits of conducting a gap analysis
- Determine different sources of information to use in an assessment
- Identify key questions to ask at each step in the Assessment Model
- Develop a feasibility study to determine if potential improvement can be sustained
- Describe the benefits of conducting a risk analysis to assist in the development of a feasibility study
- Describe the benefits of process mapping
- Identify the four (4) types of process maps

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Lesson 1: Three Levels of Performance

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Identify the three (3) levels of performance in a demand organization

Three Levels of Performance

There are three levels of performance to consider in a demand organization.

1. Organizational
2. Process
3. Performer

The organization itself, the process, and the job/performer level. The facility management function resides at the process level in the organization. When we look across the functional boundaries that make up the organizational chart, we can see how work is done. An organization is only as good as its processes. FM must ensure that processes are in place to meet the stakeholders' needs; that those processes work effectively and efficiently, and that the process goals and metrics are driven by the stakeholders' and demand organization's requirements. The best place to start looking for improvement opportunities is at the process level.

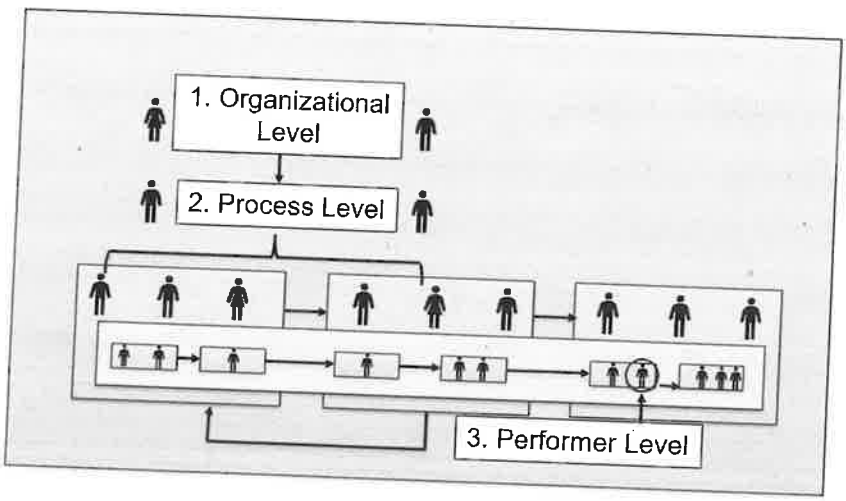

Figure 8 Three Levels of Performance

Lesson 2: The Assessment Model

Lesson 2: Objectives

On completion of this lesson, you will be able to:

- Understand the benefits of conducting a gap analysis
- Determine different sources of information to use in an assessment
- Identify key questions to ask at each step in the Assessment Model

The Assessment Model

Evaluation of performance involves undertaking periodic assessments of both the component elements and the entire system. It also involves communicating with the demand organization and other stakeholders. Assessments should consider communication with suppliers, personnel and other interested parties who implement or are affected by parts of the FM system. Evaluators should look for redundancies, duplications, risks and lack of clarity in process. Assessments should also identify possible opportunities or a need for changes to the FM policies, strategies, objectives or operational processes as well as other elements of the FM systems and commitment to continuous improvement.

Continuous improvement involves many things - from applying a process to continue to review actions, to identification and prioritization of areas to be improved, to ensuring that plans are in place to appropriately address non-conformity. Assessment is a tool to help facility managers continually improve products and services to the demand organization.

While it is not feasible to show an assessment process that will work for every FM organization, we can demonstrate a practical process that will work. The FM assessment model starts out with what is called a gap analysis. The gap analysis defines the current state, the desired state, the gap between those states and solutions to close the gap. This analysis is conducted for each of the Critical Success Factors (CSF) described earlier in this section and is improved with involvement from both the facility manager and from the demand organization. We will review each step in this process.

Defining the Current State

To determine the current state, the facility manager needs to look around the facility, look at the demand organization's records, look at the workspaces, gather information from users and from maintenance request systems, and analyze what is currently happening.

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This analysis should be documented and should answer core questions for each CSF or its KPIs such as:

- Where are we right now? What do we have?
- Do we have the right processes in place?
- How are these processes performing?
- What are those root causes that are responsible for why the things are in their present state now?

These questions circle back to the prime question: "How does a facility manager know?" Where can they find those answers; what measurements are in place that provide the answers?

Before a facility manager can identify performance improvement opportunities, they need to use metrics to clearly define the current state. These metrics may or may not already be in place. They may be available in the form of service or fix requests, facility and equipment condition evaluations, survey or user-reported satisfaction ratings, or any other tracked information. Metrics will be influenced by many things and will differ from one organization to another. The metrics the facility manager puts in place must align with the organizational goals and clearly describe the condition being defined.

Desired State

The next step in the process is all about the desired state. Once the facility manager knows what the current state is, they need to describe the desired state. The "desired state" is all about the future. It should be documented and confirmed by the demand organization to ensure a valid outcome. The core questions that need to be answered are:

- Based on benchmarking, where do we want to be?
- Do we have the right metrics in place to help us to determine how to get where we want to be? If not, what should they be?
- If we measure these things, what values do we want to see a year from now?

Gap Analysis

The gap analysis is simply the difference between the current state and the desired state. Here is an example. The strategic objective is to retain building value and maintain facilities in good condition. A key metric is the facility condition index. The Facility Condition Index (FCI) is a measure of the value of all deferred maintenance divided by the current replacement value of the facility. The lower the FCI, the better the condition of the facility. The current state is a facility condition index (FCI) of 0.3. The desired state is to improve the

facility to an FCI of .15. Doing the math, the performance gap is .15. The gap in the index is 50%. Being able to quantitatively show progress is the key to long-term success in improving any area of an organization.

Another way to show the size of the gap is to quantify the gap in dollars. What does it cost the FM organization to have a facility condition index (FCI) of 0.3 versus an FCI of 0.15.? Putting performance improvements in terms of dollars speaks well to upper management at budget time. It demonstrates the facility management organization's respect for and understanding of the bottom-line goals of the demand organization.

The gap analysis can be documented in a table. It might look something like this:

Example of a Gap Analysis

Item	Current State	Desired State	Gap
1	Facility condition index = 0.3	Facility condition index = 0.15	FCI gap = .15
2	75% of Employees are following compliance codes	100% of Employees are following compliance codes	25% of Employees are not following compliance codes.

Table 1 GAP Analysis Detail

Note: While these are two different things, they both showed up during an assessment.

Solutions

The last step in the model is to identify and document solutions. In this step, the questions that need answering are:

- How do we close the gaps?
- How do we improve the process?
- What do we need to do to improve productivity?
- What do we have to do to get there?
- How do we do those things?

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Some analysis may assist with this assessment. Consider:

- The design of the job and or task. Ask questions in terms of the task time, the cycle time of the process, the number of steps in the process or the percentage of time spent in approvals or retrieving information (tools, equipment, resources), as well as the non-value-added activities;
  - Is the information helpful? Is it adequate in terms of completeness, accuracy, timeliness, and accessibility?
  - The adequacy and cost of the resources used in the execution of the task
  - If the direction given is adequate?
  - The cost of the resources.

Assessment findings and conclusions may be used to target process improvements. Those improvements can add value to the information and direction, improve processes to reduce cycle time, and increase productivity.

In addition to assessments, other sources can be used to look for performance improvement opportunities.

Identifying Improvement Opportunities

Extant Data

Extant data is data that already exists, and it can come from internal as well as external sources. Extant data collection methods include both the review of various kinds of written documents or visual materials and the performance of an unobtrusive observation. Internal extant data may come in the form of log sheets that lend information to how a process is running. External extant data may be research done on the web to benchmark a facility's processes or to learn what other organizations are doing to improve their own performance. Extant data is another avenue for FM to use to look for those improvement opportunities. A note of caution here. Be sure to use what is relevant to the demand organization. It will not do any good to benchmark an operation if the facility does not have the ability to put a similar solution in place or if that benchmark does not contribute to the CSFs of the demand organization.

Using Corrective/Preventative Action Reports for Improvement

Facility managers can also use both internal and external audits, such as the regulatory audits, to look for improvement opportunities. Quality auditors are trained to look at all

three levels of performance management: the organizational, process, and individual performer level. They comply with a strict Quality Management System, QMS, and are trained to systematically identify deficiencies in systems, processes, and the way people do the work. They look at documented procedures that define the processes, and they observe people doing their jobs to see if they are following those procedures. In the FM function, quality auditors evaluate many things. For example, they look at how FM evaluates and selects those subcontract organizations to do facility work. They evaluate equipment on the operations floor to determine if there is a preventive maintenance schedule in place and that it is being followed. All the audit findings are reported. When a nonconformity and corrective action occurs, FM should control, correct, and deal with any consequences. So that the issue does not occur again, FM should also consider the need to eliminate the causes of nonconformity. Take advantage of what is reported. The findings may point to areas where a deeper dive will suggest more performance improvement opportunities.

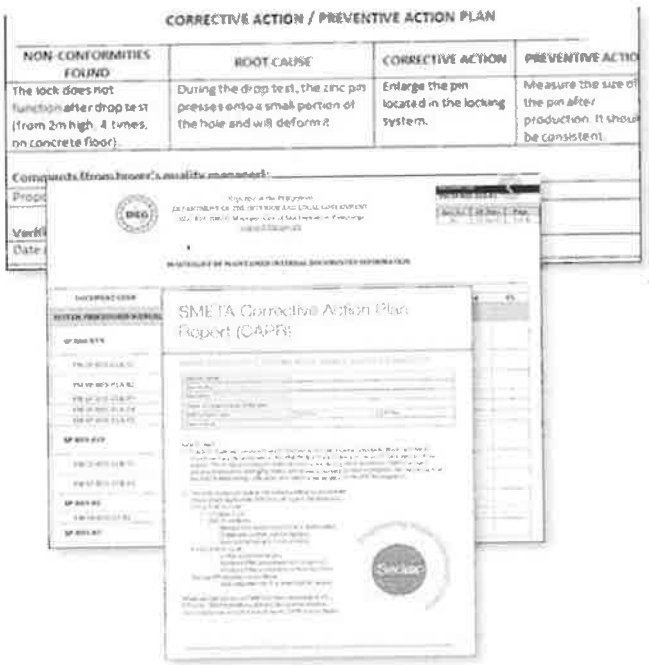

Figure 9 Corrective Action/Preventative Action Plan

If the demand organization is ISO 9001 certified, or has their own QMS in place, the facility manager will most likely be asked to sit in on the audit report findings. If the demand organization is not asking the facility manager to sit in on the audit review, they should ask to be included. The findings can point to other performance improvement opportunities that may not have been considered or found in the assessment.

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Lesson 3: Mapping a Process

Lesson 3: Objectives

On completion of this lesson, you will be able to:

- Develop a feasibility study to determine if potential improvement can be sustained
- Describe the benefits of conducting a risk analysis to assist in the development of a feasibility study
- Describe the benefits of process mapping
- Identify the four (4) types of process maps

What is Process Mapping?

Another way to analyze a process is to map it. The most common map is known as a flowchart. You will learn about a flowchart in more detail in Chapter 2 of the Quality Course, as part of the content on the seven basic quality tools.

Process maps are similar to flow charts in that they use graphics to represent a process and show the sequence of activities as well as the inputs and outputs. These two types of maps differ in the level of detail. Process maps include inputs, outputs, and steps in the process, including key details such as major and minor activities, decision points, and other keys to show how the process is completed.

Benefits of Process Mapping

Because a process map includes more information than a simple flow chart, it allows the user to review the whole flow of the process, from start to finish. The visual nature of the process map helps users to better understand the flow.

The process map crosses functional barriers, or silos. This helps functional managers understand how their function operates in the big picture of the product or service cycle, starting with the customer.

Process maps help to find bottlenecks, duplicated effort, non-value-added steps and inefficiencies. They can be used to help brainstorm improvements. They are also effective tools to evaluate proposed changes, test alternative scenarios or conduct a "what-if" analysis before changes to a process are implemented.

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Types of Process Mapping

There are four standard types of process maps:

Type	Description
As Is	An **"as-is"** process map shows the present condition or state of the process. This type of process map can help identify and troubleshoot steps that might not add value or may cause delays.
Should-be or "to-be"	"**Should-be "or "to-be**" process maps show the desired future state. These tools help users to visualize how a process being re-worked will function once bottlenecks and non-value steps are removed, and to assess whether the changes will improve the process. These process maps are great tools to use to analyze proposed solutions and evaluate against one another.
Ideal	An **"ideal"** process map shows the ideal state – how the process would work in a perfect world of no time, technology or cost constraints. This type of process map challenges traditional thinking and asks the user to step outside the box to find creative ways to improve the process.
Cross-Functional	A **"cross-functional"** process map, also known as a cross-functional process chart, swim lane chart, or deployment chart, focuses on hand-off points in the process – where responsibility or control changes hands. These key points can create errors and inefficiency.

Table 2 Types of Process Mapping

All these processes are best developed by a team rather than by an individual

Places to Measure Within the Maps

Process maps can be used to measure cycle times for whole processes or for functional elements. A key point for measurement, though, is where output from one function becomes input to another function.

There are three types of metrics to consider:

- M1 = The metric that measures at the performer level. This is internal to a sub-process

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- M2 = The metric between the sub-processes that measures queue time or wait time
- M3 = The output metric

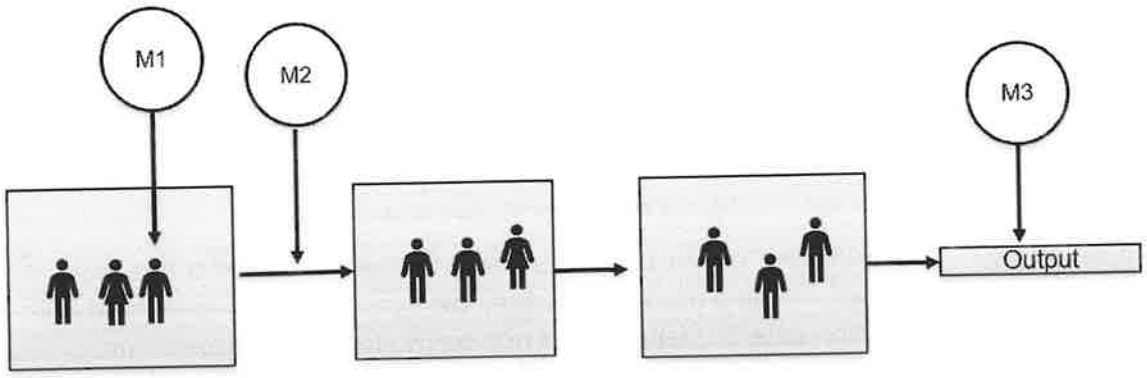

Figure 10 FM Work Order Process

For example, consider the FM work order process. The time it takes for equipment to break and a work order to be filled is considered a metric in between two processes. This would be considered an M2 measure. The time it takes to fulfill the work order is an output measure. This is considered an M3 measure. The time it takes to enter the work order into a work management system is at the performer level. This would be considered an M1 measure.

Process mapping will help to determine when and where data can be collected. Mapping can help with the establishment of data collection processes from all relevant interested parties, including service providers. Process mapping shows the data flow as well as the integration of data sources to planning, operations, and reporting where technology systems are appropriate for the size, complexity, and capability of the demand organization. It can also help to evaluate the organization's ability to maintain the appropriate quality and timeliness of the data.

Determining Feasibility and Sustainability of Proposed Improvement

Process mapping is a way to help FM determine where potential improvements could be made. When an improvement has been identified, an evaluation should be done to determine:

- Sustainability of the improvement
- Capital and/or operating costs

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- If the improvement aligns with the demand organization's goals and objectives and FM goals and objectives
- Cost, payback, savings, etc.
- Benefits
- Risks

The results of the evaluation should be documented. A facility manager trying to get approval or convince someone about the improvement must demonstrate its value. Use information from all the FM core competencies to contribute to the case for the improvement. To speak professionally to the appropriate levels in the organization, the study should include an executive summary and a call to action.

The same basic tenets of effective project management, planning, designing, executing and monitoring, are essential to sustaining a proposed improvement. An organization proposing significant process changes will need to ensure that the change is supported from the top levels of each functional element and that the functional units are all in agreement.

Identification of Risk, Migration of Risk or Interrupted Service

In the previous section, risk was noted as a factor that helps determine the feasibility and sustainability of a proposed improvement. Failing to plan properly for these risks can cause problems during a planned change. The team developing the process map is a good resource to identify risks associated with the proposed change and to plan how to deal with those potential risks. The team may benefit from a brainstorming meeting to identify risk factors, which can include (but are not limited to):

- Culture of the organization and its tolerance for change
- Availability of resources to support the change
- Reliance on others to create, implement or support the change
- Stability of needed resources

As risks are identified, the team should use a scale to determine the probability that the risk event will occur and the severity or impact should that happen. (Consider using a scale, perhaps 1-5, with 1 representing lowest risk.) The two factors are multiplied to determine the risk score, and the risks are prioritized from highest (highest risk = highest score) to lowest. Teams generally create a cutoff score, below which the risk is considered acceptable.

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For those risks above the cutoff score, the team can list strategies or actions that could reduce the risk or the impact should the event occur. These actions can include avoidance (change the plan so that the risk goes away), acceptance (do nothing), transfer or migration (shift the risk to another party, generally through contracting or insurance), or mitigation (planning what to do if the risk occurs in order to minimize an interruption).

A visual representation of this risk evaluation might look something like this example (Table 3):

Using a scale of 1 to 10 to rank probability and severity with 10 being the highest and 1 being the lowest.

Risk Element	Probability/ Likelihood	Severity/ Impact	Risk Score	Priority	Risk Response
X occurs	5	4	20	2	Transfer (list action)
Y occurs	2	2	4	3	Accept
Z occurs	4	9	36	1	Mitigate (indicate actions)

Table 3 A Visualization of Risk

Risk is more fully addressed in IFMA's Risk Management Core Competency course.

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Chapter 2: Progress Check

1. What is the first step in the Assessment Model?

   a. Writing a survey
   b. Developing a project team
   c. Identifying the current state
   d. Defining the gap

2. Web-based search to benchmark your facility's processes is an example of what type of information source to look for process improvement opportunities.

   a. Gap Analysis
   b. Extant Data
   c. Corrective/Preventive Action Reports
   d. Balanced Scorecard

3. What type of process map is most useful for finding steps in an existing process that may not be necessary?

   a. Should-be Process Map
   b. Cross-functional Process Map
   c. As-is Process Map
   d. Ideal Process Map

4. What formula is used to develop a numeric calculation to aid in ranking risks?

   a. Probability/Likelihood minus Severity/Impact
   b. Severity/Impact divided by Probability/Likelihood
   c. Probability/Likelihood plus Severity/Impact
   d. Probability/Likelihood times Severity/Impact

5. Company P is conducting a feasibility study to determine whether a proposed process improvement is sustainable. Which of the following should it evaluate in that study?

   a. Sustainability of the improvement, capital and operating costs, payback and savings, fit with goals, and risks vs benefits
   b. Costs and benefits, payback and savings (financial metrics) only
   c. Sustainability of the improvement and fit with goals only
   d. Environmental factors, fit with FM goals, operating costs and risks

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Chapter 3: Metrics

Introduction

In the age of information, we are often inundated with data. When building a performance management system, it is important to remember that the goal of data-gathering is to improve business decision-making.

For FM to be effective and complete, a tight relationship must exist between FM and technology representatives of the demand organization. Even though facility managers are not usually technology experts, they need a basic understanding of technologies. The knowledge required includes:

- Networks
- Databases
- Current software architectures
- A basic understanding of the connection between facility systems and IT security

It is important to consider consistent and accurate data via data standards and governance programs. You should also address the configuration of technologies to collect and categorize data for proper analysis and review. Use data that can be provided through a computer aided facility management system (CAFM) or through data mining from the internet. Technology can help you make better decisions.

Because this course is focused on performance improvement and quality, we only touch on the importance of Information and Communications Technology (ICT). More will come in the Facility Information Management and Technology Management course. For now, we continue our discussion on building a performance management framework.

Lessons

- Objectives
- Lesson 1: Making Better Decisions with Data
- Lesson 2: Establishing Metrics and Measuring What is Important
- Lesson 3: The Role of the Performance Management System
- Lesson 4: Relationship of Metrics to FM Characteristics
- Lesson 5: Steps to Establish Metrics and Measure Performance
- Lesson 6: How to Choose the Right Metrics to Monitor, and How to Focus on Trends

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Objectives

Chapter 3: Objectives

On completion of this chapter, you will be able to:

- State the goal and purpose of a performance management system
- Describe the types and quality of metrics that might be measured in a performance management system
- Explain the importance of establishing metrics and measuring facility performance
- Identify data relevant to stakeholders and the overall performance management system
- Identify challenges and barriers to building and delivering a functional performance management system
- Describe how metrics relate to different facility performance characteristics
- Describe the four-step process to establish performance metrics
- Determine the considerations necessary to prioritize and implement metrics linked to an organization's KPIs
- Describe the considerations for selecting the right metrics
- Describe the three levels of the performance reporting cycle

The Balanced Scorecard (BSC) methodology offers a systematic way to build and maintain a performance management system that aligns with organizational goals and objectives. The BSC uses strategy maps as the "picture" of how the group intends to fulfill the strategy. It includes a set of initiatives to be implemented using metrics, targets and status indicators. There are several alternative approaches to the BSC, and each organization chooses how to best measure and monitor performance for its specific needs.

This section identifies the work management and building performance characteristics to measure. It explains how to use FM technologies to efficiently manage data, develop metrics and monitor key performance indicators (KPIs).

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Lesson 1: Making Better Decisions with Data

Lesson 1: Objectives

On completion of this lesson, you will be able to:

- State the goal and purpose of a performance management system
- Describe the types and quality of metrics that might be measured in a performance management system

The Goal of Performance Management

The goal of any performance management system is to improve decision-making to optimize operational performance. To do this, you need to establish a baseline performance level and collect data that accurately represents facility performance.

The most important concepts in data management are to assure 1) that we collect the right data, 2) that we can derive useful information from that data and 3) that we can turn that information into business knowledge that helps us make better FM decisions. Creating useful business knowledge, or wisdom, makes it much easier to make better decisions about how to manage FM resources.

The facility data management process should make the journey from data collection to decision-making as effective as possible. It is easy to get bogged down in the collection and reporting of facility information. It is also easy to confuse common facility metrics with KPIs. Using a structured performance management system makes it easier to understand what is important to measure and how to distinguish the difference between a metric and a KPI.

Again, it is important to:

- Collect the right data
- Derive useful information
- Turn information into business knowledge

To improve decision-making, especially in an environment that is budget-competitive, the journey from data collection to the gain of business intelligence requires the consideration of the following important business drivers:

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- Stakeholder satisfaction
- Corporate objectives, such as social responsibility
- Business continuity - defined as the maintenance and/or recovery of business operations during and after conditions of duress (a disaster)

FM Information and ISO 41001 Data Requirements

The International Organization for Standardization (ISO) has a voluntary standard for an FM management system. Whether or not formal certification or self-certification by the demand organization is a goal, this standard can be a useful guide.

Figure 11 ISO 41001

ISO requires an organization to determine the information requirements to support its FM system and achieve its organizational objectives. In doing this, the organization should:

- Identify those services most critical to the strategic objectives
- Identify performance outcomes that:
  - Indicate a risk of failure or create an opportunity to prevent failure

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  - Align with the strategic objectives
  - Lead to achievable improvement opportunities
- Identify and select a suitable number and mix of operational and process metrics, management metrics, and key performance indicators, KPI's, to a broad overview of performance
- Aggregate those performance indicators for top management to enable them to make informed decisions regarding strategies
- Collect data which permit measurement of performance at each level
- Establish appropriate sampling and evaluation methods
- Establishing realistic measures against expected performance measures

Activities or outcomes with a significant impact on the organization's ability to achieve its goals are likely to require KPIs. The organization should distinguish between KPIs and routine performance indicators. In FM, as with any other support service, it is important to be clear about what constitutes key performance for the demand organization and what constitutes key performance for the FM organization. These are rarely the same thing. Both should be tracked and reported to different interested parties.

The FM organization is responsible for specifying, implementing and maintaining processes for managing its information and data. It is also responsible for aligning financial and non-financial terminology related to asset management throughout the organization.

To meet the objectives of the demand organization's agenda, the FM organization needs to ensure consistency and traceability between the financial and technical information and data, and other relevant non-financial information and data.

It is important for a facility manager to know that there is a voluntary International Organization for Standardization (ISO) standard for a FM management system (Figure 11). Even if certification is not a goal, or if self-certification by the demand organization is a goal, this standard can be a useful guide.

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The Need for Metrics

Need

Metrics help the FM organization manage. They should also demonstrate value by showing how the FM organization supports the demand organization's strategic objectives. Facility managers sometimes struggle with separating cost/budget/volume of work from "marketing" the value proposition of FM. Consider doing some of the following:

- let people know what facility managers are working on or the volume of work being managed by an FM organization
- show that we are spending our demand organization's money wisely
- show that we are focused on successfully meeting the needs of end users to support a healthy, safe and productive work environment
- show the value of FM

Sources

Metrics may come from several different sources. They may be regulatory measurements such as mandatory safety or energy consumption data reporting. They may also be driven from a financial perspective, such as the need to reduce costs. In addition, there may be voluntary reporting requirements that support corporate goals such as citizenship or social responsibility. An example of corporate citizenship is an organization's commitment to measuring, monitoring, and reporting sustainability outcomes, such as a reduction in energy, water, and waste production over a specific period. The role of FM here is to report on how its processes support these goals.

People

People metrics are also important. Think about the friction of not being able to find a place to meet or being too hot or too cold or too noisy. Some studies predict that every time a business replaces a salaried employee, it costs 6 to 9 months' salary on average in recruiting and training costs.

Customer

Most metrics are quantitative. They can be determined with known and relatively exact measures.

Customer metrics are usually survey-based and qualitative by nature. They are subjective or open to interpretation by those asking the questions and those answering them. Surveys can be difficult to construct and can be interpreted differently to what is intended. Answers are based on perspective and will not yield the same answers at different times or different facilities.

The most effective customer service surveys are those that tuned to the right audience and perspective and are repeated in a consistent manner over an extended period.

What is a Balanced Scorecard?

The Balanced Scorecard is one of the most used systems for performance management. It is used by many businesses to create the path from business strategy to the delivery of results. The BSC was created in the early 1990s by two Harvard Business School associates, Kaplan and Norton, to bridge the gap between strategy and business results. Kaplan and Norton developed the BSC to create a more holistic view of a business. Up to that point, business success was related primarily to financial performance.

The BSC process includes the perspectives of:

- customers, or how they see us
- the process, or what we must do well
- learning & growth
- the financial perspective

So, what is a BSC? A BSC is a carefully selected set of quantifiable measures derived from an organization's strategy. The BSC allows for alignment between organizational mission and service delivery. It quantifies business measurements as the required outcomes of the business process, and it aligns the actions of any group or department with the demand organization's overall mission.

The BSC also recognizes that over-reliance on lagging (past performance) indicators, such as quarterly earnings which is not a good indicator of future performance. The BSC encourages the development and use of leading indicators - those that can forecast future performance.

The BSC provides a hierarchy, which ensures consistency in application. In its simplest terms and applications, the BSC is an organized structure for delivering on a strategy. It does not need to be more complicated than a spreadsheet. It is a tool that can be scaled to meet the needs of any size of FM organization, from a single facility to a large campus or multinational organization.

Finally, the BSC provides the link between the organizational mission, vision, and values to the spreadsheets, dashboards, and information systems that make up the performance management system. The BSC introduces an intermediate step, the development of a strategy map. The strategy map is the visual representation of the organization's strategy as it relates to the FM organization.

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The Strategy Map

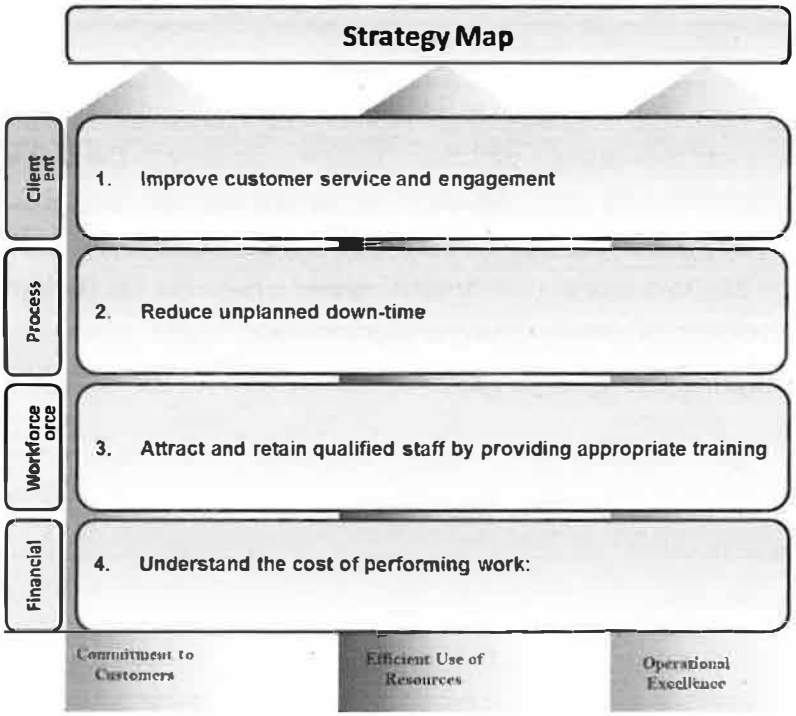

Figure 12 The Strategy Map

Overview

The strategy map is useful in creating alignment between the mission and the delivery of FM services. It provides a balance between financial and non-financial objectives and measures. The BSC also balances between leading and lagging measures and shows a balance between the short-term and long-term success factors of the organization. Consider it a type of graphical framework for a management system that represents what the organization must do well, balancing the four perspectives: the relationship between customers, processes, the need for learning and growth, and financial results.

The strategy map shown above (this one in the form of a highly simplified Balance Scorecard, BSC) highlights the balanced perspectives necessary for the organization to succeed. Let's examine the various perspectives

Stakeholders Perspective

From the stakeholder perspective, we answer the questions:

- Who are our targeted customers and clients?

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- What do they expect or demand from us?
- What is our value proposition in serving them?

Learning & Growth Perspective

From the learning and growth perspective, we answer the questions:

- What skills, knowledge and competencies does our workforce need to fulfill the needs of the demand organization?
- How do we demonstrate those skills?
- How do we develop behaviors or desired knowledge, skills and abilities (KSAs) that support the facility-related functions?

Process Perspective

From the process perspective, we answer the questions:

- What are the work management processes that relate to the organizational goals?
- Do the FM processes we employ best serve the organization?
- Are they in alignment with the organizational goals?

Finance Perspective

Lastly, from a finance perspective, we answer the questions:

- Which of the FM financial metrics best describes success for the organization?
- Which metrics relate to the full life cycle of the facility?
- Which metrics lead to the demonstration of the best value in the delivery of FM services?

Balance Perspective

Balance in the BSC is often thought of as having an equal number of objectives in each perspective. However, it really means the following:

- A balance between financial and non-financial objectives and measures
- A balance between leading and lagging measures
- A balance between short-term and long-term success

Balance Scorecard Example

Vision: Facilities Operations Technology leader that utilizes ever-evolving creativity and innovation

Mission: Facilities will continuously strive to remain a technology leader by increasing the

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level of flexibility and quality through employee development. The technological advancements shall be focused upon problem prediction and prevention (Figure 13)

Figure 13 Balance Scorecard Perspectives

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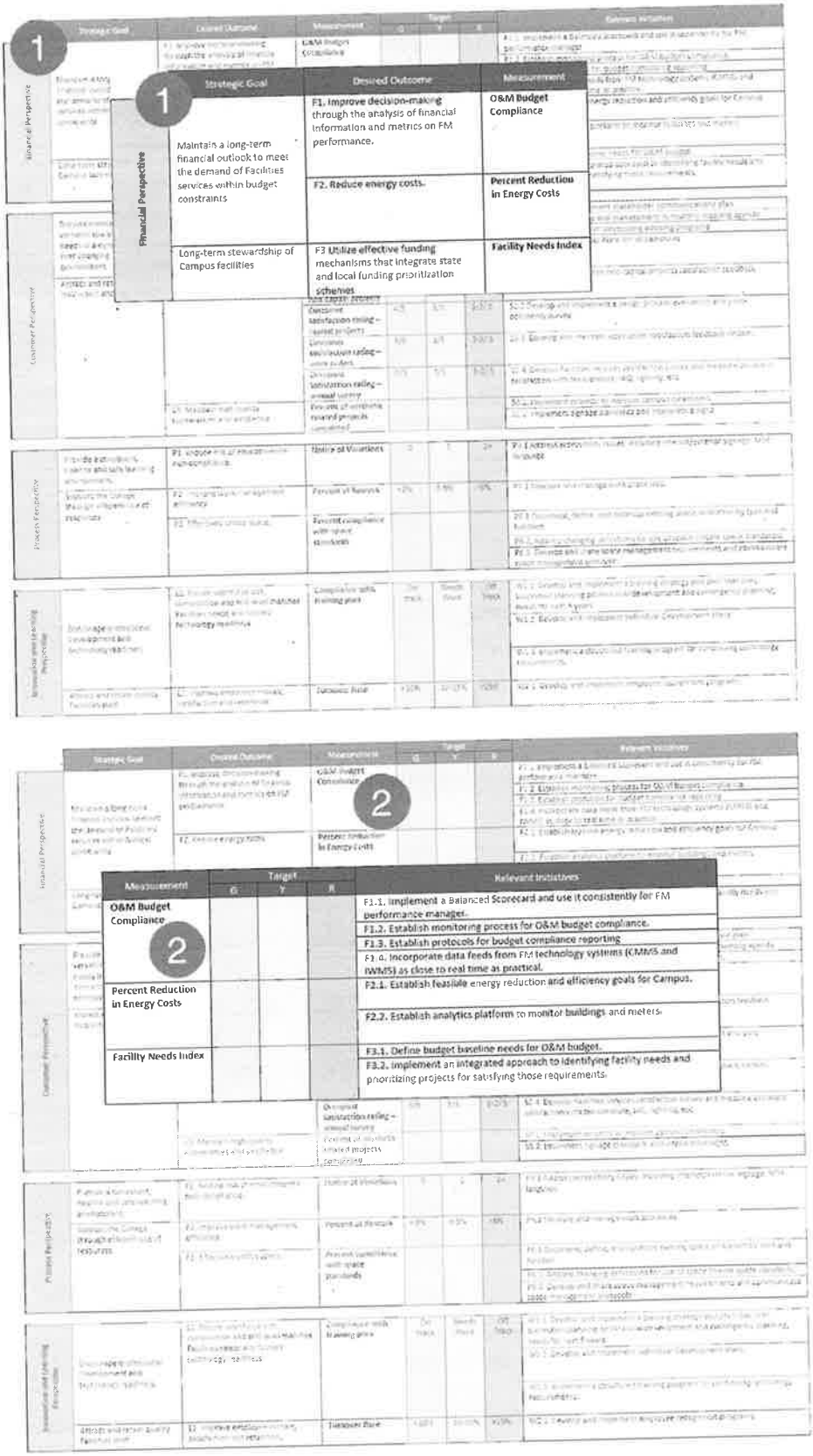
Balanced Scorecard Example (Cont.)

	Strategic Goal	Desired Outcome	Measurement	Target: G	Y	R	Relevant Initiatives
Financial Perspective	Maintain a long-term financial outlook to meet the demand of Facilities services within budget constraints	F1. Improve decision-making through the analysis of financial information and metrics on FM performance.	O&M Budget Compliance				F1.1. Implement a Balanced Scorecard and use it consistently for FM performance manager F1.2. Establish monitoring process for O&M budget compliance F1.3. Establish protocols for budget compliance reporting F1.4. Incorporate data feeds from FM technology systems (CMMS and BMS) as close to real time as practical
		F2. Reduce energy costs.	Percent Reduction in Energy Costs				F2.1. Establish feasible energy reduction and efficiency goals for Campus F2.2. Establish analytics platform to monitor buildings and meters
	Long term stewardship of Campus facilities	F3. Utilize effective funding mechanisms that integrate state and locally funding capital plan schemes	Facility Needs Index				F3.1. Define budget baseline needs for O&M budget F3.2. Implement an integrated approach to identifying facility needs and planning projects for satisfying those requirements.
Customer Perspective	Provide flexible and versatile space to meet needs in a dynamic and ever changing environment.	C1. Identify and align Facilities services with stakeholder values	Compliance with communication of master plan	On track	Needs work	Off track	S1.1. Develop and implement stakeholder communications plan S1.1.1. Include space use and management in monthly meeting agenda S1.2. Sustain active role on developing advising programs.
			Schedule compliance of Master Plan				S1.3. Develop new Master Plans for all campuses
	Attract, engage and retain Quality employees and students.	C2. Continuously improve customer satisfaction with Facilities services	Customer satisfaction rating – non-capital projects	4/5	3/5	1-2/5	S2.1. Develop and maintain non-capital projects satisfaction feedback system
			Customer satisfaction rating – capital projects	4/5	3/5	1-2/5	S2.2 Develop and implement a design process evaluation and post-occupancy survey.
			Customer satisfaction rating – work orders	4/5	3/5	1-2/5	S2.3. Develop and maintain work order satisfaction feedback system
			Occupant satisfaction rating – annual survey	4/5	3/5	1-2/5	S2.4. Develop Facilities services satisfaction survey and measure occupant satisfaction with temperature, IAQ, lighting, etc
		C3. Maintain high quality appearances and aesthetics	Percent of aesthetic related projects completed				S3.1. Implement projects to improve campus cleanliness. S3.2. Implement signage standards and interpretive signs
Process Perspective	Provide a consistent, healthy and safe learning environment.	P1. Reduce risk of environmental non-compliance.	Notice of Violations	0	1	2+	P1.1 Address accessibility issues, including interior/exterior signage. MSA language
	Support the College through efficient use of resources	P2. Improve work management efficiency	Percent of Rework	<3%	3-5%	>5%	P4.1 Measure and manage work processes.
		P3. Effectively utilize space.	Percent compliance with space standards.				P6.1 Document, define, and optimize existing space utilization by type and function. P6.5. Address changing definitions for use of space (create space standards) P6.7. Develop and share space management requirements and communicate space management protocols.
Innovation and Learning Perspective	Encourage professional development and technology readiness.	L1. Ensure workforce size, composition and skill level matches Facilities needs and fosters technology readiness	Compliance with training plan	On track	Needs Work	Off Track	W1.1. Develop and implement FM training plans by and plans that links succession planning professional development and contingency plans that needs for next 3 years W1.2. Develop and implement Individual Development Plans W1.3. Implement a structured training program for continuing technology requirements.
	Attract and retain quality Facilities staff.	L2. Improve employee morale, satisfaction and retention	Turnover Rate	<10%	10-15%	>15%	W2.1. Develop and implement employee recognition programs



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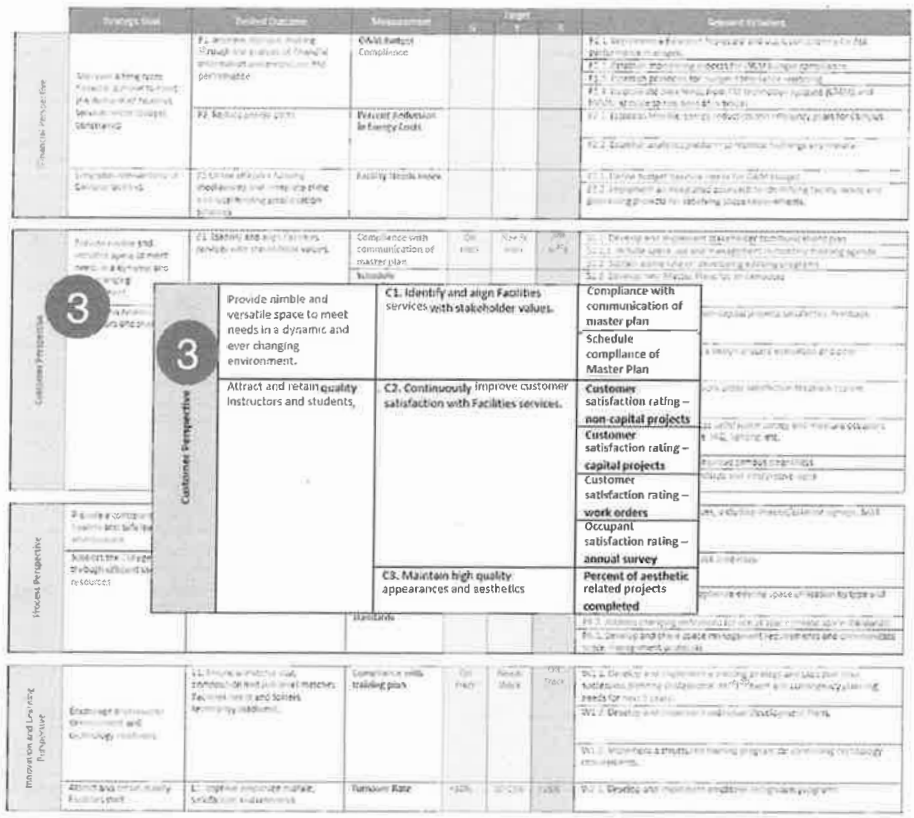
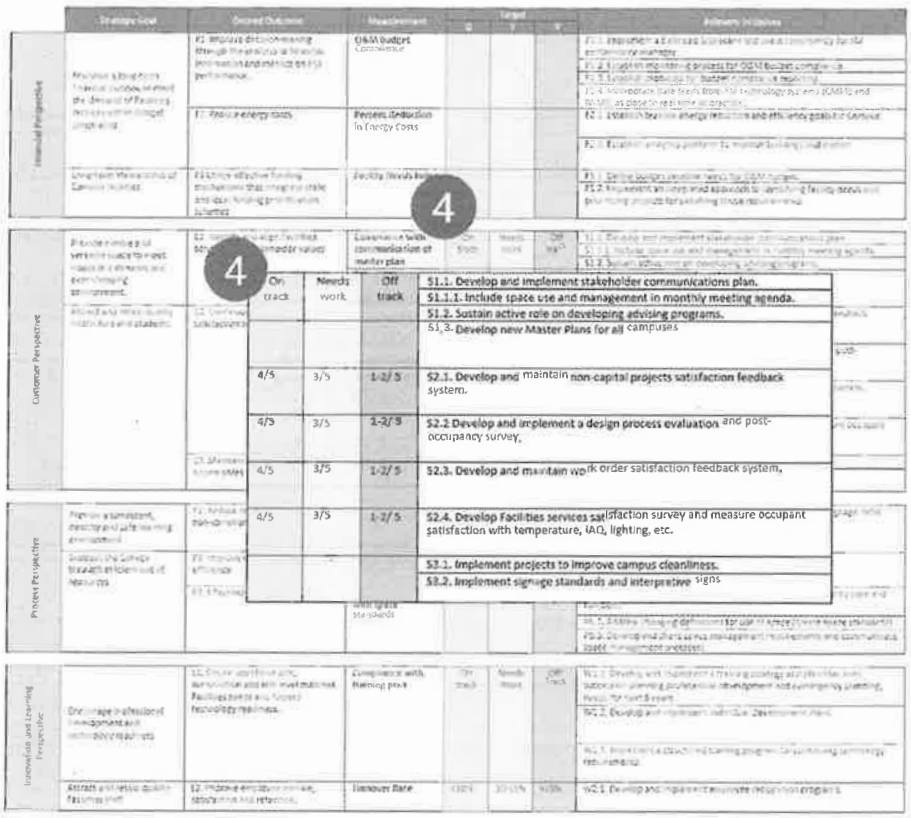


3	Provide nimble and versatile space to meet needs in a dynamic and ever changing environment.	C1. Identify and align Facilities services with stakeholder values.
		Compliance with communication of master plan
		Schedule compliance of Master Plan
	Attract and retain quality instructors and students.	C2. Continuously improve customer satisfaction with Facilities services.
		Customer satisfaction rating – non-capital projects
		Customer satisfaction rating – capital projects
		Customer satisfaction rating – work orders
		Occupant satisfaction rating – annual survey
		C3. Maintain high quality appearances and aesthetics
		Percent of aesthetic related projects completed



On track	Needs work	Off track	
			S1.1. Develop and implement stakeholder communications plan.
			S1.1.1. Include space use and management in monthly meeting agenda.
			S1.2. Sustain active role on developing advising programs.
			S1.3. Develop new Master Plans for all campuses
4/5	3/5	1-2/5	S2.1. Develop and maintain non-capital projects satisfaction feedback system.
4/5	3/5	1-2/5	S2.2 Develop and implement a design process evaluation and post-occupancy survey.
4/5	3/5	1-2/5	S2.3. Develop and maintain work order satisfaction feedback system.
4/5	3/5	1-2/5	S2.4. Develop Facilities services satisfaction survey and measure occupant satisfaction with temperature, IAQ, lighting, etc.
			S3.1. Implement projects to improve campus cleanliness.
			S3.2. Implement signage standards and interpretive signs

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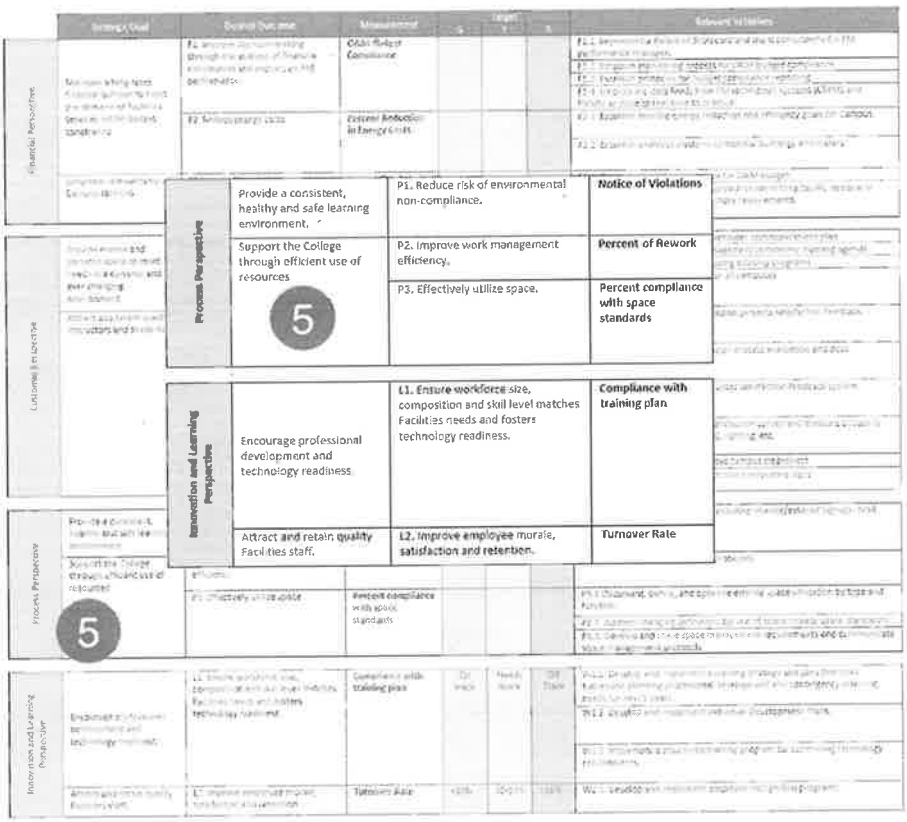

Process Perspective	Provide a consistent, healthy and safe learning environment.	P1. Reduce risk of environmental non-compliance.	Notice of Violations
	Support the College through efficient use of resources	P2. Improve work management efficiency.	Percent of Rework
		P3. Effectively utilize space.	Percent compliance with space standards
Innovation and Learning Perspective	Encourage professional development and technology readiness	L1. Ensure workforce size, composition and skill level matches Facilities needs and fosters technology readiness.	Compliance with training plan
	Attract and retain quality Facilities staff.	L2. Improve employee morale, satisfaction and retention.	Turnover Rate

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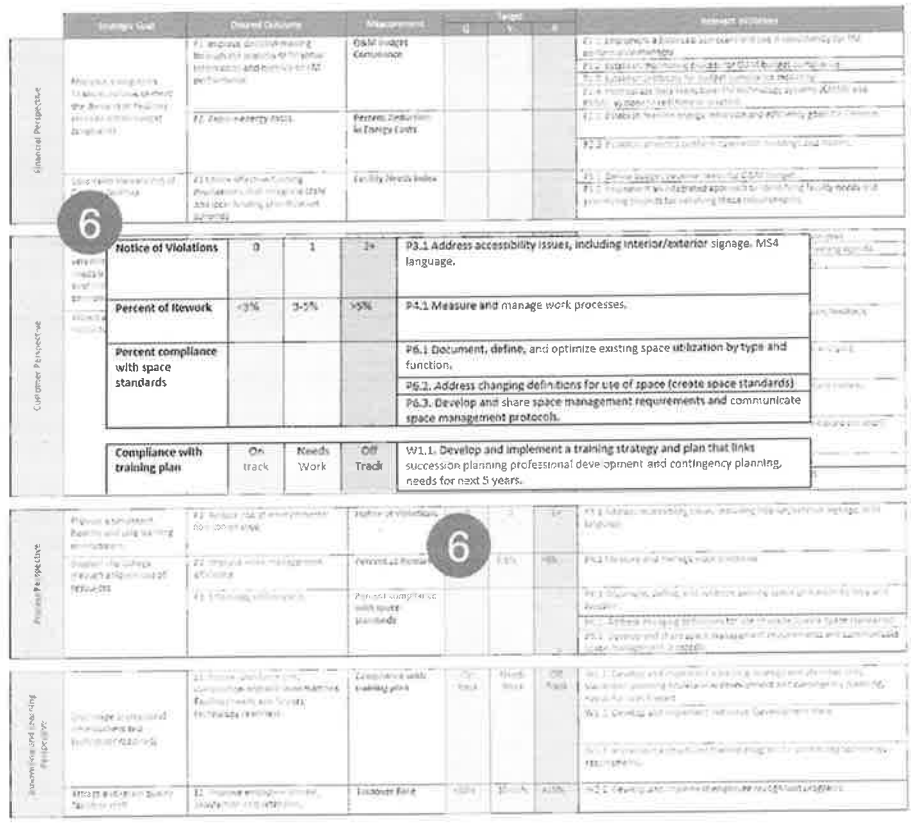

Notice of Violations	0	1	2+
Percent of Rework	<3%	3-5%	>5%
Percent compliance with space standards			
Compliance with training plan	On track	Needs Work	Off Track

P3.1 Address accessibility issues, including interior/exterior signage. MS4 language.

P4.1 Measure and manage work processes.

P6.1 Document, define, and optimize existing space utilization by type and function.

P6.2. Address changing definitions for use of space (create space standards)

P6.3. Develop and share space management requirements and communicate space management protocols.

W1.1. Develop and implement a training strategy and plan that links succession planning professional development and contingency planning, needs for next 5 years.

6

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BSC - Based Performance Management System

The Evaluate and Align Phase

As stated in the first chapter, there are four phases in setting the strategic life cycle model: understanding, analysis, planning, and action. The first phase in the development of a BSC-based performance management system is understanding - the *evaluate and align* phase.

The difference between the BSC methodology and other performance management systems is that mission, vision, values and organizational drivers are translated into the four perspectives of stakeholder, process, learning and growth, and financial within the Balanced Scorecard. This structure facilitates alignment and makes it easy to translate the metrics for FM into KPIs.

BSC Phase 1

In setting the strategic direction, the facility manager would evaluate organizational drivers, align with mission, vision, and values (MVV), and create the framework for performance management. The BSC uses the strategy map to capture and align with the organization's mission. Phase 1 of setting strategic direction is the development of the strategy through the strategy map.

BSC Phase 2

In Phase 2, facility managers do the following:

1. Evaluate the organizational mission, vision and values to determine the demand organization's philosophy and support for FM
2. Restate the organizational Mission, vision and values in terms of facility management
3. Align the facility-related issues with organizational goals and reporting framework
4. Evaluate the impact of facilities on meeting the overall organizational goals
5. Develop a strategic plan for performance management that includes strategic goals and initiatives that support and align with the organizational philosophy.

BSC Phase 3

Phase 3 is the development of initiatives phase or planning. This phase includes metrics, targets, actions, and status indicators that promote improved facility performance for each

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of the initiatives identified in Phase 2. An example of this would be planning to replace a building's old and worn-out heating, ventilation, and air conditioning system with a new system that improves resource efficiency by being more energy-efficient and that improves environmental quality by providing better air quality, temperature, and humidity control.

BSC Phase 4

The last phase is the *implementation*, or *action*, phase.

Metrics are displayed as units of measure. The targets represent the desired changes in those units, and the status indicator represents how close we are to achieving our targets. In this case, the status is represented as a stoplight. Red, yellow, and green represent the status of our metric relative to the target.

The BSC format is used to track initiatives that the FM organization planned to meet overall FM goals that support the mission. It is particularly effective in showing how these measures progress over time. This type of format is effective if there are not too many initiatives and they are reasonably distributed among the four perspectives.

An important element of a performance management system is a list of actions required to implement the initiative and achieve the objective. In this case, there is likely a much more detailed action plan behind the ACTION REQUIRED column on this chart. However, the chart can be used to communicate status and could be converted into a status dashboard for performance management.

As with most performance management systems, the BSC provides a way to track initiatives - measures - targets - status. The BSC format can be used to track initiatives for the FM organization, such as sustainability initiatives or other high priority goals. For example, a distribution management division may track on-time deliveries. A maintenance division may track response time. An energy division may track resource usage, such as gas, electricity, or even water.

This format also lists the organizational goals and sustainability objectives. Listing these in this manner demonstrates "traceability" back to the organizational drivers. It shows alignment with programs such as corporate social responsibility, and organizational programs such as the global reporting initiative.

Additional PM Models

Two other common frameworks are offered here as alternatives to the BSC:

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Ideal Operating State (IOS)

The identification of the "Ideal Operating State," also known as IOS, is a similar type of performance management technique. It encourages FM organizations to think deeply about the demand organization's mission and how each facility contributes to risk, compliance, cost-effectiveness, customer relations, and functionality. This is similar to the method used to develop the BSC. The output between the two methods is similar as well. Development of the IOS can be especially effective when integrating FM with other departments within the organization, particularly the design and construction communities. The IOS methodology encourages the design community to recognize important operational parameters that might otherwise be missed.

Outcome Based Performance Management System

In an Outcome-Based Performance Management system, the emphasis is on the mission, but compliance, facility conditions, efficient operations, and customer outcomes are also included in the framework. The framework in the outcome-based system is similar to the BSC, and many of the metrics and measurements are similar or the same as those of a BSC-based system.

The primary difference is that the outcomes-based framework can be more adaptable to mission-critical facilities. For example, a manufacturing or research and development facility may place a higher priority on evaluating health and safety measures than worker satisfaction with temperatures or energy efficiency.

ISO 41001:2018 PDCA Cycle

ISO 41001:2018 illustrates a Plan-Do-Check-Act (PDCA) model that covers many of the elements demonstrated above for developing an evaluation framework. This process-approach methodology can be briefly described as:

Plan: Establish the objectives and processes necessary to deliver results required by the stakeholders and the organization's policies. Remember that requirements apply to internal customers as well as to external customers.

Do: This is where you implement the processes, solutions, etc.

Check: Monitor and measure the processes and products against the policies, objects, and requirements for the process, along with the reporting of results.

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Act: This is where the facility manager takes actions to continually improve the process performance.

The PDCA process originally was called the Shewhart Cycle. You may also have heard this referred to as the Deming Cycle. The process repeats and is intended to support continuous improvement.

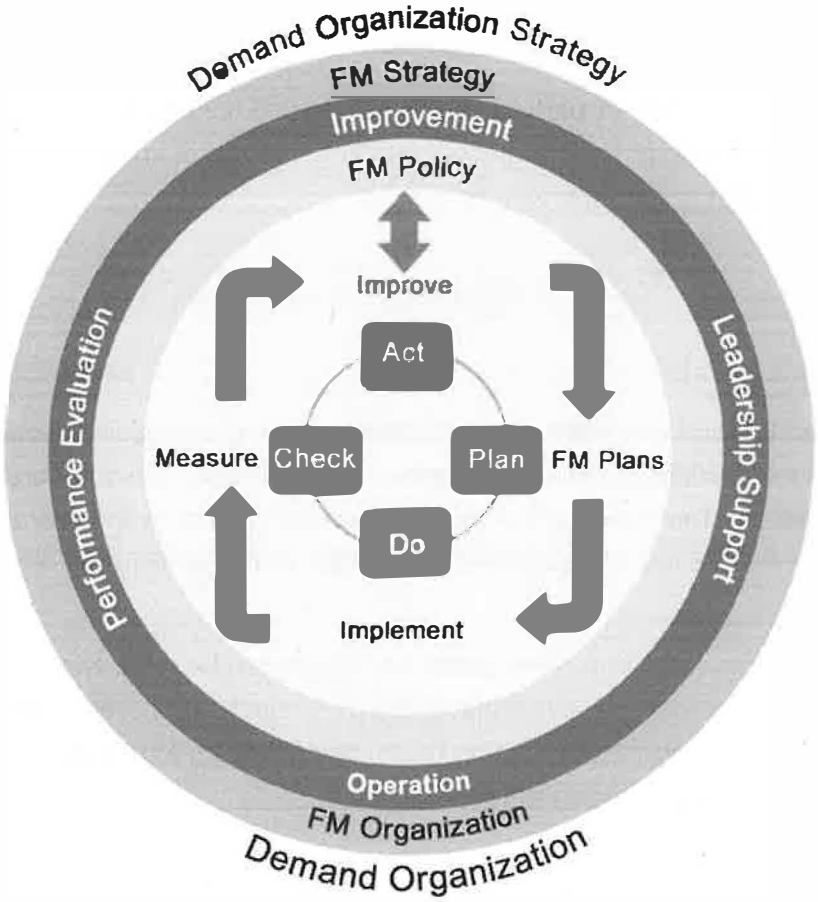

Figure 14 PDCA Cycle

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Lesson 2: Establishing Metrics and Measuring What is Important

Lesson 2: Objective

On completion of this lesson, you will be able to:

- Explain the importance of establishing metrics and measuring facility performance

Establishing Metric

To get the information needed to measure performance, you need to ask two key questions: 1) What is included in the facility portfolio? and 2) Using the facility register, what resources do we have to manage and what resources are needed (staff, service providers, suppliers, money, etc.) to manage the portfolio?

Facility Portfolio

A Facility Management portfolio can consist of a single building or an entire campus. The buildings can exist in one geographic area, or they may be located around the globe. The type of facility managed can range from an airport to a commercial office building to a cruise ship.

The first step in performance management is to gain a thorough knowledge of the facility portfolio. This is done with tools such as the facility register, which is a complete listing of facility assets that are managed by the organization. The next step is to assess the resources needed to manage the portfolio. This includes staff, service providers, vendors, suppliers, and money. Once these are known, the facility manager develops a strategy that best serves the needs of the organization and determines where to invest those resources to support the mission.

Metrics & Performance Management

The motivation for developing and implementing a performance management system is that it will solidify the link between a facility's organizational goals and its ability to support the mission of the demand organization. To optimize the delivery of FM services, budgets need to be established to allocate funds for long-term facility function as well as short-term operations and maintenance. The performance management system should support the decision-making process by deriving data from operations and maintenance practices

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and processes to provide information about facility performance. That information is then linked with the business mission of the organization. The progression from data to information to business intelligence provides a mechanism for better decision-making on how and where to invest in a facility to yield a safe, comfortable environment that leads to a more attractive and productive workplace.

Measurement practices in the performance management system need to link to the primary business, business goals, and success factors of the organization. The business goals of the organization are not often directly aligned with the workplace, but they are frequently highly influenced by the functionality of the facility. The facility can have a significant effect on the employee's and visitor's well-being, safety, and comfort. In this way, the workplace can either enhance or detract from the productivity of the people.

Importance of Data

Access to data on facility performance is critical in making informed decisions about comfort, safety, and productivity. When the facility manager lacks data, decisions about where to allocate resources are impaired and the ability to make the business case for dedicated resources to FM is diminished.

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Lesson 3: The Role of the Performance Management System

Lesson 3: Objectives

On completion of this lesson, you will be able to:

- Identify data relevant to stakeholders and the overall performance management system
- Identify challenges and barriers to building and delivering a functional performance management system

Identifying Quality Data

When delivering a performance management system, the need for relevant data is obvious. Advances in technology have allowed us unprecedented access to vast quantities of data in our everyday lives. However, we are often not capable of determining how critical the data is since there is so much of it. We also need to identify data sources that can provide the right data at the right time to the right people. To achieve that goal, the data must have appropriate focus, be a valid measurement and connect the user and recipient. When selecting data, focus on information that enables the organization to gauge success in supporting the desired outcomes. Data selection should focus on what is essential for success, not what is easy to measure. The data should be a valid measurement and provide specifics. The data must make the connection between the user of the data and the recipient of the service; that is, between FM services and the stakeholder. The FM technology should align with and support the performance management system. The performance management system should also provide a direct link between all phases in the life cycle of the facility. It is important to note that relevant, clear, compatible, and authentic performance metrics serve multiple purposes.

They:

- Facilitate the understanding of driving forces in a building's performance
- Assist designers in creating an efficient facility
- Support owners in operating a building in an efficient manner, and
- Help management and decision makers in tracking performance.

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Let's explore some challenges you might face when building and delivering a performance management system.

Challenges and Barriers

You may encounter several barriers when taking a structured approach to building and delivering a functioning performance management system. These barriers include competition for funding in the FM field, other opportunities for investment of time and funds that create competing priorities, and the need to make the business case for a function that is often considered "overhead" or a cost center. This speaks to our ability in the FM industry to be effective in telling the story of the value of FM.

- Challenges:
  - Quality & Complexity of Data available on facility performance
  - Available resources to measure and interpret results
  - Variances in data
  - Multiple sources of data
- Barriers:
  - Competition for funding in FM field
  - Other opportunities for investment of times
  - Funds that compete for priorities
  - The necessity to make the business case for a function that is often considered overhead

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Lesson 4: Relationship of Metrics to FM Characteristics

Lesson 4: Objectives

On completion of this lesson, you will be able to:

- Describe how metrics relate to different facility performance characteristics
- Describe the four-step process to establish performance metrics

Relationship of Metrics to FM Characteristics

When establishing metrics, keep in mind that metrics can relate to a few different facility performance characteristics. Four of the most common categories are: Physical, Financial, Functional (space-related) and Survey-based (customer).

- Physical characteristics relate to the appropriateness for function, quality, accessibility and resource consumption. Measurements may be quantitative or qualitative.
- Financial characteristics relate to the cost, capital cost, current replacement value, and operational costs, such as utilities, services and maintenance.
- Functional characteristics are those aspects related to the business mission, space, employees and any other supportive facility functions.
- Survey-based characteristics measure environmental and psychological aspects of a facility - that is, the customer or stakeholder perspective of the BSC.

Physical Metrics

The physical metrics most often measure how well the facility is performing relative to the resources used. This includes

- Energy consumption
- Water consumption
- Waste production including waste management practices
- Recycling
- Waste disposal in landfills

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- Space use in a facility using measures such as the percent occupied, vacancy rates, space efficiency, etc.

Data for these metrics can come from several different sources, including the Building Automation System (BAS), Energy Management System (EMS), utility providers, and FM technology systems.

Financial Metrics

Financial metrics are usually the most important FM metrics analyzed by the organization's management. These are the ones that most frequently define success in FM. These metrics need to be most closely aligned with the organization's KPIs. Although the focus of these metrics is on cost, they should also reflect the organization's tolerance to risk. In other words, what will happen if we do not spend an adequate amount of funds on a facility function, or if we do not prioritize the use of funds in alignment with organizational goals?

Although the risk is often viewed as hard to quantify, it is not as difficult to define the cost of a failure, or the cost of NOT doing something, as one might think. For example, if the chiller in a building fails, and the building cannot be occupied while the chiller is being replaced, the FM organization should be able to estimate the organizational cost of that failure. The facility manager may need some assistance from other departments, such as HR, IT, or Finance, to determine the cost of these failures, but it should be measurable and reportable.

Functional Metrics

It is also important to measure and monitor functional data. This includes information about the efficiency and effectiveness of the workforce. This information is usually captured in the Computerized Maintenance Management System (CMMS), the Computer-Aided Facility Management System (CAFM), or the Integrated Workplace Management System (IWMS). The types of metrics captured include but are not limited to:

- Labor hours by task
- Number of work orders accomplished
- Preventive maintenance tasks performed
- Response time to work orders
- Customer responses and
- Cost of work management

These are all intended to measure the efficiency and effectiveness of the work management function in FM.

Survey Based Data

Most of the metrics we have discussed so far are quantitative. We determined them with known and (relatively) exact measures. Customer metrics are usually survey-based and are qualitative in nature. Most surveys use a Likert scale, which is a type of rating scale that measures attitudes or opinions. With this scale, respondents are asked to rate items on a level of agreement such as "strongly agree", "somewhat agree", "agree", "disagree" or "strongly disagree". They are subjective, not objective, meaning that they are open to interpretation by those asking the questions as well as those who are answering them. Surveys are often difficult to construct, and questions may be interpreted in several different ways. Because people answer based on their perspectives, responses can be different at different times and in different facilities. The most effective customer service surveys are those that are tuned to the right audience and perspective and are repeated in a consistent manner over an extended period.

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Lesson 5: Steps to Establish Metrics and Measure Performance

Lesson 5: Objectives

On completion of this lesson, you will be able to:

- Describe the four-step process to establish performance metrics
- Determine the considerations necessary to prioritize and implement metrics linked to an organization's KPIs

Establishing Metrics

Establishing facility performance metrics is accomplished by following several steps (Figure 15) including:

- Defining Outcomes
- Prioritizing
- Implementing
- Measuring and Monitoring performance

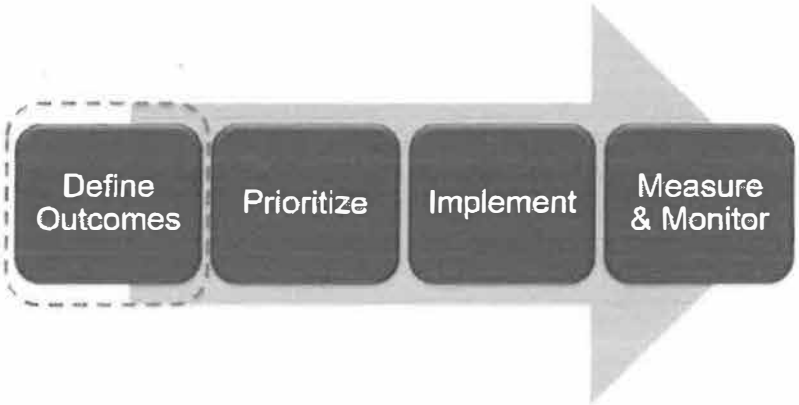

Figure 15 Four-Steps in Developing Metrics

The first and most important step is to define the desired outcomes, those that align most closely with the mission of the organization. These outcomes include operating and maintaining a sustainable facility, providing a safe and productive work environment and providing an infrastructure for uninterrupted workflow. They usually stem from key

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organizational drivers and form the KPIs (the outcomes of your efforts) that will define whether the delivery of FM services is considered a success. These outcomes are linked to the organization's critical success factors (CSFs), those things that your success is based upon.

Establishing Desired Outcomes

Establishing desired outcomes is a process of defining what success looks like. Borrowing from one of Steven Covey's tenets, "Begin with the end in mind." In a facility performance management system, some common outcomes might include:

- Having great customer service (as defined by reliability, response time, quality of work and positive experiences for customers)
- Managing finances well (as defined by budget adherence, process improvements and reduction in the cost of any facility while maintaining expected levels of service) or
- Reducing the amount of business downtime (as defined by proper management of downtime when needed, improving facility system reliability and performing maintenance at the right time to avoid failures).

In choosing the right metrics, alignment with organizational priorities is critical to producing the right outcomes. Consider organizational characteristics such as goals, organizational structure, communication protocols, workflow processes, physical function, staffing, resources, technology, customer satisfaction, and employee satisfaction. So that the right message about any facility is received and alignment with organizational priorities is achieved, important processes, like communication protocols within the organization, need to be respected. The quantity and type of resources available to measure and monitor performance are important, as are the staffing and technology tools available to the FM organization. Most performance management systems (such as the BSC) also include stakeholder and employee feedback and satisfaction as a quantified and monitored component.

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Prioritization

Figure 16 4 Steps in Developing Metrics

Since the resources needed to manage and operate a facility are not always adequate to cover all functions all the time, prioritization of resources is critical. A facility performance management system may include dozens or even hundreds of individual initiatives meant to improve the FM function. Since the facility manager may not have all the labor and funds to accomplish all tasks, a prioritization scheme is needed.

The prioritization scheme may take the form of an Effort vs. Benefit chart, where the initiatives with the least amount of effort for the highest level of benefit take priority over those with less benefit and higher cost. Also, in prioritizing efforts toward process improvement, those efforts that link directly to an organization's KPIs may take precedence over those that are at the management or process level of the measurement and monitoring hierarchy.

Implementation

Figure 17 4 Steps in Developing Metrics

Implementation of the performance management system includes the following steps:

- Identify data sources such as Building Automation System (BAS), Energy Management System (EMS), or other work management systems
- Collect data from these same systems

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- Create metrics including those related to physical performance, and FM performance workforce metrics
- Process metrics into business information by translating data to information and to business intelligence. This may involve combining metrics and measures or interpreting data elements into trends or forecasts of performance. For example, energy cost and energy consumption data may predict future energy needs.

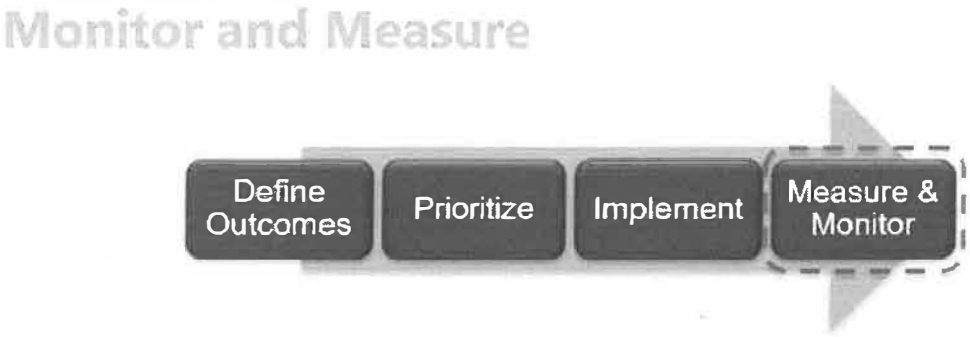

Figure 18 4 Steps in Developing Metrics

The final step in the development and implementation of a performance management system is to measure and monitor. This step includes the following activities:

1. Define the measurement framework. Choose the framework you will use, such as the Balanced Scorecard, spreadsheets or written documents.
2. Document the process and communicate the document to all interested parties.
3. Integrate with FM technology. Draw data from different sources and integrate with FM technology, including:
    - Building operating systems
    - Work management systems
    - Human resource systems
    - Financial systems, and
    - Enterprise IT systems

Although it looks quite complex, the sample above is constructed in an organized fashion around the four perspectives of the Balanced Scorecard and could serve as the "management plan" for an FM organization for many years. A plan such as this BSC can and should be modified and updated on a periodic basis, and integrated with an organization's operations and maintenance plan, capital improvement plan, and operational budget.

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Lesson 6: How to Choose the Right Metrics to Monitor, and How to Focus on Trends

Lesson 6: Objectives

On completion of this lesson, you will be able to:

- Describe the considerations for selecting the right metrics
- Describe the three levels of the performance reporting cycle

Choosing the Right Metrics

In the previous steps, we created a framework to evaluate the organizational drivers that govern our facilities and considered the desired outcomes to best support our mission. Whether we use the Balanced Scorecard or a simple spreadsheet, we need to be able to report our progress over months, quarters and years in order to show the long-term value of our physical assets. The output of the management plan is a reporting system that analyzes and consolidates all the process and management metrics and shows how they contribute to KPIs at the organizational level.

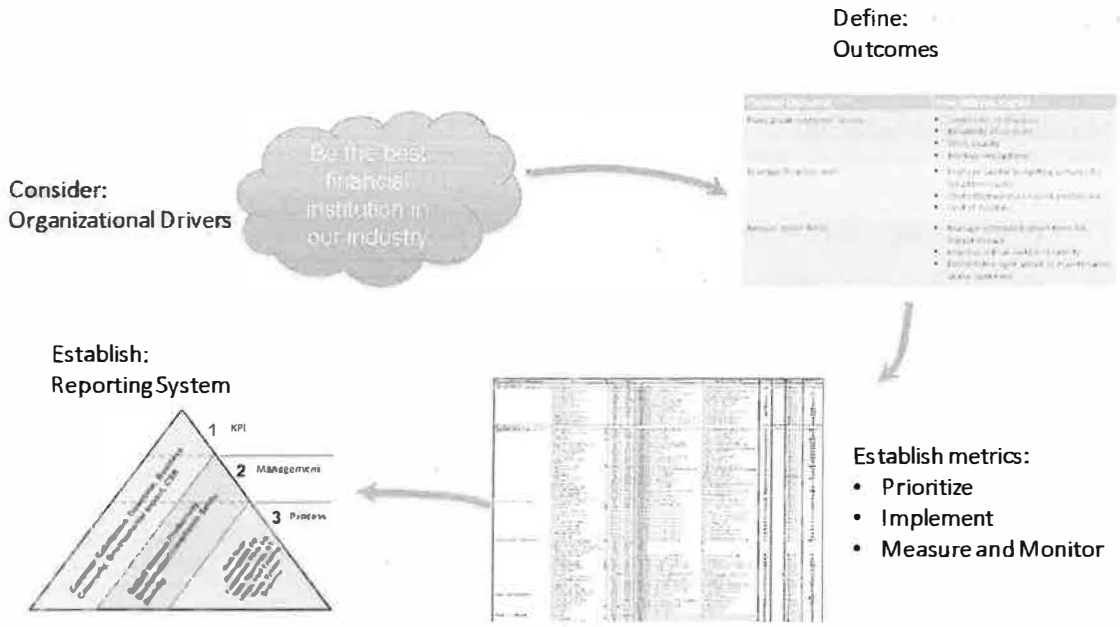

Figure 19 Choosing the Right Metrics

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Performance Reporting

Customer-Physical-Functional-Financial Model

The reporting system should always consider the long-term plan. The facility manager is responsible for facility assets and their performance over decades, through many capital replacements and years of operational costs. The measurement and reporting system should be based on trends and should emphasize both life-cycle costs and total cost of ownership.

In BSC methodology, the four perspectives for performance reporting (Figure 20), are the stakeholder, process, learning and growth, and financial, each with its own set of characteristics. However, many performance management systems consider physical and functional facility characteristics over the learning and growth perspective. The two are similar, so learning and growth sometimes becoming a subset of the functional category of characteristics.

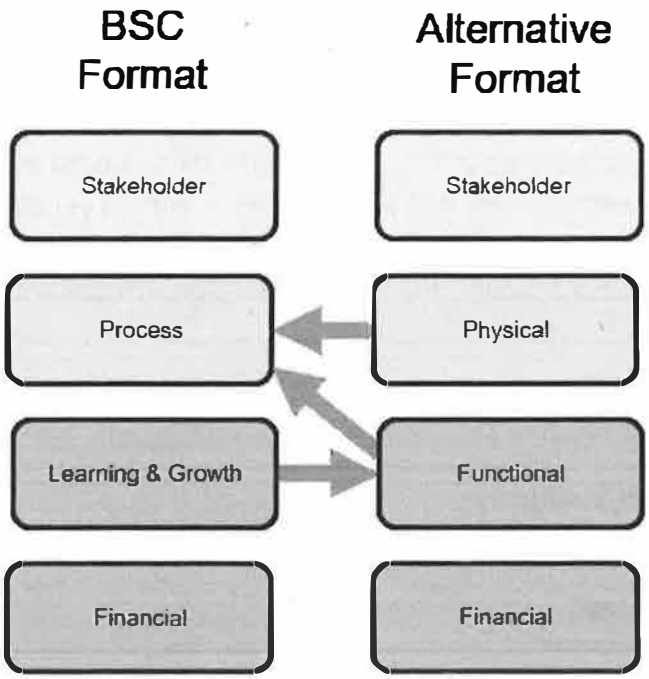

Figure 20 Four perspectives for performance reporting

Another model where the output of the measurement and monitoring system becomes the input to the reports produced by FM is the Customer-Physical-Functional-Financial model.

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Physical Measures

Trend analysis is important for tracking physical performance metrics. Trend analysis means looking for patterns in the data over time, be it a shift, a pattern, or a trend in the data. Watching for trends in the data gives important information on how a process is behaving.

Physical performance metrics that can be tracked using trend analysis are:

- Energy consumption
- Water consumption
- Building condition

Physical metrics provide information on how efficient the physical infrastructure is. Examples include the use of resources like energy and water. Physical metrics can also relate to environmental factors, such as temperature control and chemical use. Since physical metrics are used by the supervisory level to assure that building systems and components are running efficiently and the workforce is being assigned the right work at the right time, most map to the Process level of the metrics pyramid.

Building condition is another measure of physical reporting. This is not an easy metric to quantify, so organizations use a variety of methods evaluate it. One commonly used method is the Facility Condition Index, or FCI. The FCI is the ratio of deferred maintenance (all the capital repairs and replacements that are on schedule but not yet completed) to the value of the facility (often called Current Replacement Value or CRV). The ratio is simple to calculate but determining what goes into the deferred maintenance category can be complex.

Functional Metrics

Functional (process) metrics include:

- Work management (work orders)
- Workforce effectiveness
- Labor efficiency
- FM learning (Learning & Growth)

Efficiency of Work Processes

Functional metrics reflect how well work is accomplished. Most functional metrics measure the efficiency of work processes - efficient use of labor hours, amount of work accomplished per unit of time, response times, different work processes such as preventive

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and corrective (demand) maintenance, and distribution of labor by work type. Space management is also considered a functional metric since it relates to the efficiency in space utilization. These measures and metrics can be consolidated, analyzed, and assessed to determine how effectively the FM workforce is managing the right things and developing measurement systems that align with organizational priorities. Since functional metrics are used to efficiently manage the workforce and to create indicators of organizational effectiveness, most map to the management metrics level of the metrics pyramid.

Efficiency of Workforce

Functional metrics also assist the management level in determining the efficiency of the workforce in responding to customers and in managing the workload. Workforce data is collected at the maintenance operational level, usually through the work management system - that is, computerized maintenance management system (CMMS), computer-aided facility management system (CAFM) or integrated work management system (IWMS). Data input includes work order type, response time, efficiency in getting tasks accomplished and information on material required. The process includes the handling of the work order, assignment of priority and work management processes. The output is a series of metrics that demonstrate efficiency, customer responsiveness and effectiveness. The management level of the FM organization uses this information to evaluate budget compliance, workforce productivity, environmental and safety compliance and security.

Functional Metrics Example

ZONE A	Inventory			Preventive Maintenance					
Equipment Type	Qty	Annual LH	Total LH	PM Frequency W	M	Q	SA	A	PM ID
8.0 MECHANICAL SYSTEMS									
8.1 Heating Systems									
Unit Heater - Gas-Fired	26	1.240	32.24				✓	✓	UHX-1
Unit Heater - Electric	14	1.240	17.36				✓	✓	UHE-1
Expansion Tank	27	0.446	12.04					✓	EXP-1
Air Separator Tank	31	0.446	13.82					✓	ASP-1
Boiler	2	12.528	25.05		✓	✓	✓	✓	BLR-1
Boiler Feed Pump (In-Line)	2	1.266	2.532				✓	✓	PMP-1
Heat Pump	16	3.586	57.37			✓	✓	✓	HPM-1
HVU (Built-Up Unit)	4	2.060	8.24			✓	✓	✓	HVU-1
VAV Boxes w/ Water Re-Heat	276	1.212	334.51			✓	✓	✓	VAV-2

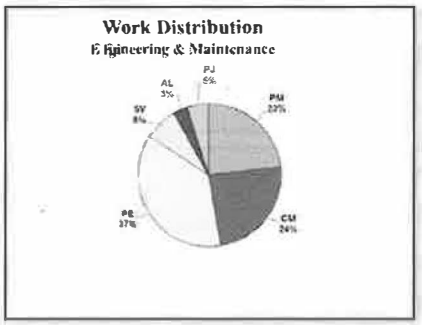

Figure 21 Functional Metrics Example

Financial Metrics

Financial performance metrics include:

- Space cost
- Operational cost (Custodial, O&M, etc.)
- Capital Budget (% of Replacement Cost)

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- Total Cost of Ownership (TCO)

Financial Metrics: Budgets

Financial metrics include several different FM elements that are found in the operations and capital budgets. Since operational budgets include everything required to keep the facility running on a day-to-day basis, they can be a significant part of an organization's budget. Facility budgets are generally considered to be second in size only to the personnel budget for an organization. Each facility has a significant influence over the comfort, safety, and productivity of the workforce, making the FM function one of the most valuable functions of any organization.

As stewards of the facility's life cycle, the facility manager should take the long view and first consider the Total Cost of Ownership (TCO) of every facility and each capital asset. While the initial cost is important, it may be only a fraction of the cost to operate, maintain and ultimately dispose of a facility asset. The total cost of ownership should be considered for any facility capital purchase. Operational costs include energy, utilities, supplies, FM labor and administration, and operational functions, such as cleaning and janitorial services, maintenance of equipment and systems, repairs and collection and disposal of waste. Capital costs include major repairs and equipment, as well as system replacements.

Financial metrics show the efficiency of the capital and operational budgets for each facility. They include metrics that reflect the cost-effectiveness of the use of space, operational cost ratios, and capital budget-based metrics, such as building cost, which is usually expressed as a unit cost as it relates to other metrics like the cost of O&M per unit and FCI.

Performance Reporting Cycle

Financial and stakeholder satisfaction metrics reflect the effectiveness of the entire FM organization. They are usually the most visible and highest contributors to the CSFs and KPIs of the organization. This business information as seen in metrics such as stakeholder satisfaction, the total cost of ownership, business continuity, and corporate social responsibility. These are the factors that demonstrate value; that is, factors that align with and support the mission. In this example, APPA, Leadership in Educational Facilities levels of service standards serve as critical success factors for the FM organization and KPIs for the overall organization. This includes levels of service for appearance, care, building condition indices, and measures of customer satisfaction.

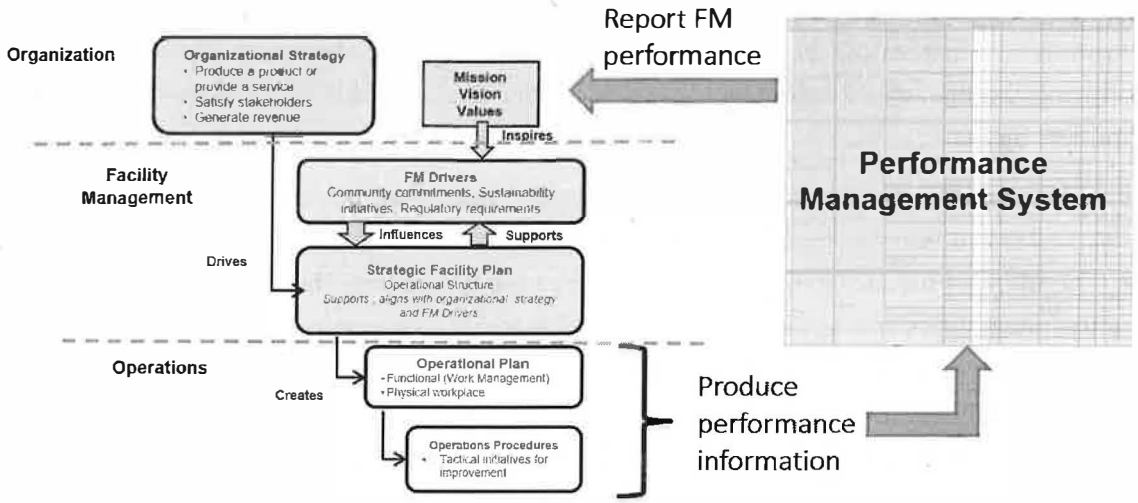

Figure 22 Performance Reporting Cycle

The performance reporting cycle starts with the organizational drivers - mission, vision, and values. It aligns with, and cascades to, the FM level, with outcomes documented in the plan. The operational plan is an output of the FM group, and the performance management system provides the framework and documentation required for day-to-day management. This is often called the management plan. The performance management system is the basis for FM reporting. Reports can be produced at each level of the organization that requires business information to determine success, including the process level, the management level, and the senior leadership (KPI) level. To promote continuous improvement, this should be a cyclical process. Feedback at each reporting level will reinforce the value of the information and metrics to provide guidance for modifying and improving the performance management system for future iterations.

Examples

Example 1: Golden Gate National Park Conservatory

In this first example, we will look at the Golden Gate National Parks Conservancy (the Conservancy). The Conservancy operates a few facilities on behalf of the National Park Service. Although the Conservancy has a large facility footprint, the FM group is small, has limited dedicated internal resources, and relies heavily on contractors and service providers. One of the first challenges faced by the FM staff was to determine what drives the

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performance of the Conservancy and how the FM staff can best support the mission of the organization. The first output of FM was to produce a strategic facilities plan. The intention of producing the plan was to use it as a visual reminder to stakeholders of the value contribution by FM.

The first challenge was to identify what drives the performance of the Conservancy. The first part of the strategic facilities plan was to reiterate the organization's mission and values. This allowed the facility manager and staff to see where they "fit" in delivering service to stakeholders and to evaluate which FM functions were most important to the organization. The plan was used to report the key goals and performance drivers for FM - the next level that cascades for the organizational mission and vision. From there, FM was able to establish the key drivers of safety, service, preservation, efficiency, and environment

In essence the strategic facilities plan for the Conservancy answered important questions such as: "What do we manage?", "Where do we fit in the organization?", "What do we do?", and "How do we accomplish our work?". These factors are important in demonstrating value. Stakeholders often do not have an appreciation for the work involved in FM and often are unaware of the size of the portfolio, work required, or work processes involved. By showing the buildings, reporting structure, how every facility "fit" and how a typical work order is accomplished, the stakeholders gain a greater appreciation of the work of FM and how FM supports the Mission.

In this segment of the long-range strategic plan, the facility manager can report how its execution of projects serves the mission by supporting the key drivers of safety, service, preservation, efficiency, and environment.

Even though this report does not have dozens of metrics and is not necessarily reflective of a management plan, it is an excellent demonstration of the first key steps in performance management; that is, to evaluate drivers, align the strategy, and report on the key elements that support organizational success. It is also a good example of how a small FM staff can produce big results by concentrating on what is most important for success.

Example 2 & 3: Healthcare Organization & Education

Addressing Alignment & Drivers

Align metrics with:

- Mission
- Values

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State:

- FM Goals
- FM Drivers

Example 2: Healthcare

A healthcare organization was focusing on sustainable FM. A scorecard was constructed to support the organizational mission, vision, and values along with the key drivers of culture, customer service, excellence, innovation, integrity, partnership, and stewardship.

This example represents a true management plan - a document that serves as a day-to-day and month-to-month reminder of the major goals and initiatives that lead to the management of energy, water, carbon, and waste.

Example 3: Educational Institution

This higher education organization was using the Balanced Scorecard to focus on a series of metrics and performance indicators. This style of management plan directly re-states the organizational drivers of performance and serves as a constant reminder of "why we are here."

The desired outcomes are also clearly stated. The measurements, status, required input and responsible party are clearly stated in the plan.

Regardless of the format of the scorecard or management plan, the goal of any performance management system is to improve decision-making for better operational performance.

The desired outcomes are also clearly stated. The measurements, status, required input and responsible party are clearly stated in the plan.

Depending on the size of the FM organization and the complexity of data, the performance management system can improve decision-making by turning data into useful business information. If that information is aligned with organizational strategy and outcomes are well defined, the organization's critical success factors will be addressed.

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Chapter 3: Progress Check

1. The Ideal Operating State and Outcome-Based Performance Management System are alternatives to the Balanced Scorecard. What is one of the key differences between those alternatives and the Balanced Scorecard?

   a. The Outcome-Based System can be an effective process when integrating FM with other departments within the organization, particularly the design and construction communities.
   b. Mission, vision and values and organizational drivers are translated into the four perspectives of customer, or stakeholder, process, learning & growth, and financial within the Balanced Scorecard
   c. In the Ideal Operating State framework, the emphasis is on the mission, but compliance, facility conditions, efficient operations, and customer outcomes are also included in the framework.
   d. The IOS can bring faster results than the BSC or the Outcome-Based system.

2. What category of metrics would report on energy and water consumption, waste production and disposal, and space usage?

   a. Physical
   b. Functional
   c. Financial
   d. Survey-based

3. What metrics are usually the most visible and highest contributors to the critical success factors and KPIs of the organization?

   a. Physical
   b. Functional
   c. Financial
   d. Survey-based

4. What is the first step used to establish metrics and measure performance?

   a. Measuring
   b. Defining Outcomes
   c. Monitoring Performance
   d. Implementing
   e. Prioritizing

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5. What is an effective metric for supporting the "process" perspective of the BSC?
   a. Energy consumption
   b. Training hours
   c. PM work order completion rate
   d. Cost per square foot for operations and maintenance

6. What is the second step used to establish metrics and measure performance?
   a. Measuring
   b. Defining Outcomes
   c. Monitoring Performance
   d. Implementing
   e. Prioritizing

7. What does the FM accomplish during the "Plan" phase of the PDCA model
   a. Monitors and measure processes and solutions
   b. Implements processes and solutions as required by stakeholders and policies
   c. Establishes objectives and processes required to deliver results in accordance with stakeholder requirements and the organization's policies.
   d. Takes actions to continually improve the process performance.

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Chapter 4: Measuring and Monitoring

Introduction

Monitoring resources involves understanding the following:

- The performance measures in general terms
- The specific measures to be monitored
- The data that will be gathered and how that data will be gathered
- How the data will be stored and recovered for analysis
- The "who" analyzes the data
- The "who" uses the resulting reports

Data gathering involves understanding the data that is needed to assess the services. This could include the use of FM technology to track activity and productivity but not the specifics of what is managed in the system. Data gathering considers the scale and complexity of the facility, which could be stated in terms of area, height, other quantitative size information or description of the uses of the facilities. Data gathering also involves the specific components or items in the facility that should be listed, the reporting requirements either to customers, the demand organization, personnel or other interested parties and whether there is information that should remain confidential/internal and why.

Lessons

- Objectives
- Lesson 1: Determining what needs to be monitored and measured
- Lesson 2: Where to look for data

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Objectives

Chapter 4: Objectives

On completion of this chapter, you will be able to:

- Explain the asset life cycle model as it relates to the total cost of ownership
- Summarize the difference between cost avoidance and cost savings and how it can impact budget planning
- Explain the importance of implementing observation along with measuring systems
- Identify the importance of the service provider relationship and measures to evaluate service providers
- Determine where ROI fits into the measurement scheme and explain how that measure is determined

Lesson 1: Determining what needs to be monitored and measured

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Explain the asset life cycle model as it relates to the total cost of ownership

What Needs to be Monitored?

Determining what needs to be monitored and measured requires an understanding of the total cost of ownership and the differentiating requirements for each service, taking into account the following:

- How critical the service to the organization's primary activities
- The strategic importance of the activity to the organization's goals
- The cost of service being monitored relative to all services being delivered
- The likely reliability of the data coming from the measurement
- How easily the data can be obtained
- The ability to make changes to the service volume, quality and cost because of any analysis

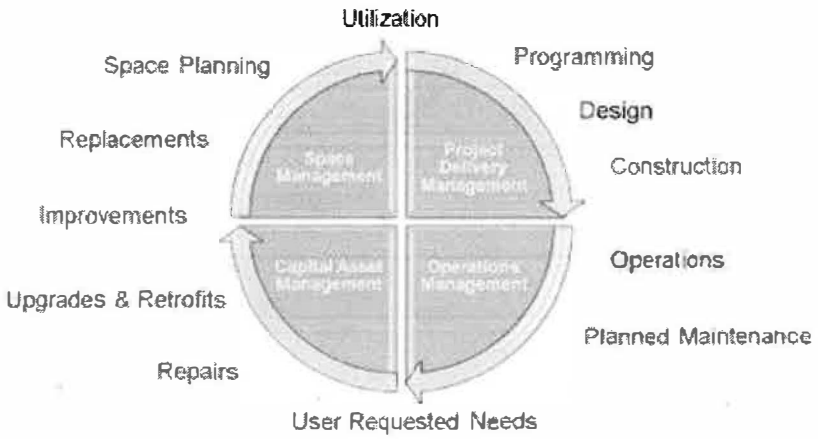

Figure 23 Life Cycle Model

Establishing & Monitoring

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Establishing methods for monitoring involves developing systematic processes for monitoring, measurement, analysis, and the evaluation of FM activities, as well as defining the data format and/or carrying out the measurement on a planned basis aligned to the relevance of the indicators.

The monitoring procedures, the data gathering procedures, and data recording systems should be consistent. If technology is used, the configuration should be accurate and consistent in capturing and reporting performance data.

Aggregate Data

Data needs to come from the entire FM System. Deciding when to monitor and measure involves understanding the services required relevant to the outcomes, the risks, and opportunities associated with the service, the frequency of the service delivery, the time needed to acquire the data, and the variability in service volumes over time.

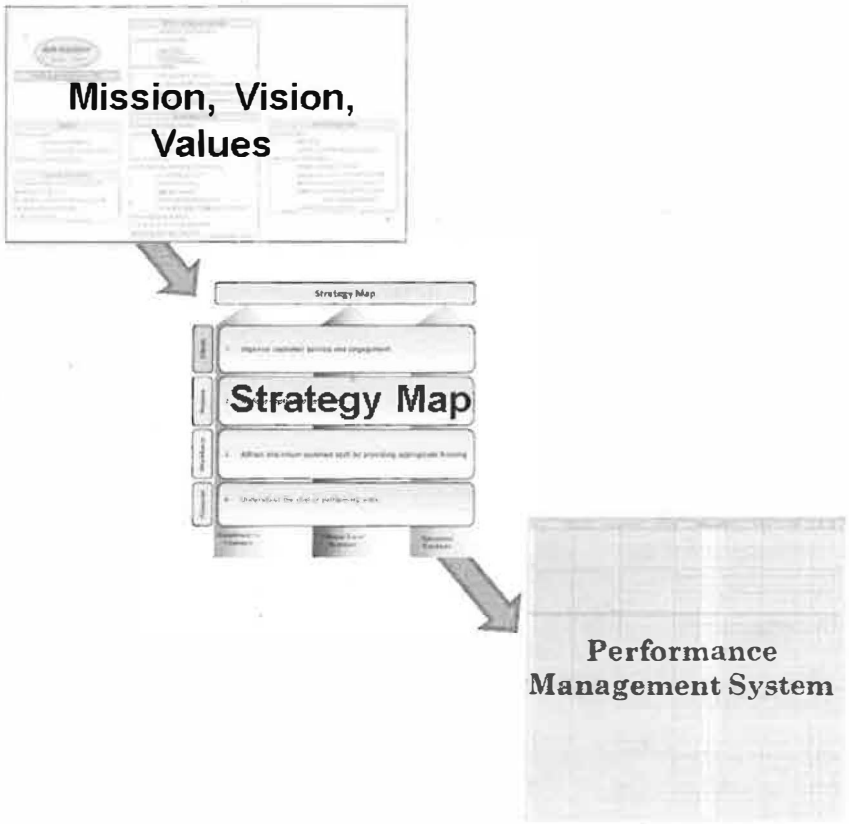

Figure 24 Aggregate Data

The facility manager needs to understand the reporting requirements of the demand organization to create a schedule of the monitoring and measurement requirements based on those reporting needs. They also need to ensure that those responsible for collecting,

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analyzing and reporting the information have the necessary resource capacity and skills to undertake the monitoring and measuring activities required at the time.

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Lesson 2: Where to look for data

Lesson 2: Objectives

On completion of this lesson, you will be able to:

- Summarize the difference between cost avoidance and cost savings and how it can impact budget planning
- Explain the importance of implementing observation along with measuring systems
- Identify the importance of the service provider relationship and measures to evaluate for service providers
- Determine where ROI fits into the measurement scheme and how that measure is determined

Where to Look for Data

Observations and data come in many forms.

- CAFM
- CMMS
- IWMS
- BIM

Monitoring for trends can provide insight into how a process is performing over time. Evaluating/observing the data that is gathered by these systems for shifts, patterns, or trends can help you to see where the performance improvement opportunities are.

If you work for a small or medium-sized company and do not have the IT infrastructure to support a large system such as a CAFM, the manual measurement systems you put in place also need to be monitored. Analysis of system/equipment failures as well as corrective work orders can help to build cases for increased maintenance or capital funding. Stakeholder satisfaction results help to explain why taking a low bid for something, such as cleaning, can be a bad thing if the ratings on cleaning are low, or demonstrate your capabilities if results are high. A demonstrated increase in work performed helps provide the backing for staffing requests etc.

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Service Providers

- Facility Manager is now considered the internal service provider to the demand organization.
  - Tactical Level: Communicate with internal clients to measure & monitor FM services providing
  - Operational Level: Monitoring and communicating with the external service providers it utilizes.
- FM must select competent sub-contractors
  - FM could have a BSC or similar tool to evaluate the sub-contractors and/or service providers based on their level of quality and services

An organization can be viewed as being made up of the stakeholders it serves. It is the responsibility of the client to specify its needs and service requirements to obtain the required FM services. Said differently, the facility manager is now considered the internal service provider to the demand organization. At the tactical level, the facility manager should be communicating with the internal clients to measure and monitor the services FM is providing. At the operational level, the facility manager should be monitoring and communicating with the external service providers it utilizes.

FM must select competent subcontractors. Organizational rules or guidelines regarding the quality of the service provider make it easier for the facility manager to select the right provider. When selecting new providers, FM should use this information and work through its procurement department where possible to help define selection criteria specific to the need.

It is important to recognize that every customer complaint, both internal and external, produces additional input from the service provider. As a result, each complaint is added as a service request to the measurement tool, whether it's a computerized system or a log sheet. This input should be monitored and measured. FM could have a BSC or performance management framework to evaluate the subcontractors and/or service providers based on their level of quality and services. As a part of this system, service providers are audited at specified points, and their work performance is measured.

ISO 41012:2017, Facility Management – Provide guidance on strategic sourcing and the development of agreements may be a useful resource for the FM organization.

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Return on Investment (ROI)

ROI is an acronym for "return on the investment". This is a measurement that communicates to the executive team, the value of a given proposed opportunity or solution. ROI communicates to the executive team how quickly the cost of a solution will be returned or repaid.

Variable Symbol	Numeric Value	Numeric Value
A	4485.64 €	4485.64 €
B	1375 €	1375 €
C	2.3 months	2.3 months
D	34%	0.34
E	31%	0.31
F	82%	0.82
G	-	0.465
	ROI Autodesk Revit 57%	ROI "ROI-DC" 20%

Figure 25 Return on Investment Example

Intangible costs are those things that are difficult to measure, for example, long setups, lengthy installations, etc., but these intangible costs need to be quantified and added to the ROI. Key intangibles should be listed in the benefits portion, as well as the key payoff measures, such as a reduction in customer complaints and reduced turnover. Payoff measures can be realized as money.

The ROI methodology deals with quantitative numbers, so it should not be used for every situation. While almost everything can be quantified, even intangible costs, it may not be appropriate to utilize ROI for a business process improvement project that is undertaken for non-profit reasons, such as corporate responsibility values. However, if the facility manager is going to make a large capital expenditure, an ROI analysis should be done before the decision is made to go ahead.

There are two (2) ways to calculate ROI, both are correct:

Method #1:

$$ROI = \frac{Net\ Return\ on\ Investment}{Cost\ of\ Investment} \times 100\%$$

Method #2:

$$ROI = \frac{Final\ Value\ of\ Investment - Initial\ Value\ of\ Investment}{Cost\ of\ Investment} \times 100\%$$

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Refer to the Finance & Business course for more information on ROI, and other methodologies such as payback, NPV, and IRR.

Cost Avoidance versus True Cost Savings

Many FM stakeholders will want FM to be clear on true cost savings versus cost avoidance. These are complementary items, but they are materially different. In terms of absolute $, this may or may not be true, but they are different in terms of when the savings are realized. Cost savings in general refers to the benefits of a project that a customer can put back into the budget and spend. These are costs that have already been planned but are now unnecessary.

Cost avoidance includes costs that can be reduced IF management chooses to do so, but until action is taken, no real costs are saved. Often cost avoidance involves slowing the rate of cost increases or obtaining value-added services. As an example, for cost avoidance, consider the example of reducing labor hours needed to produce a fixed volume of work. Unless an increased volume of work is completed by the team with the same headcount, no real savings are realized.

Cost Savings	Cost Avoidance
For any ***action*** that results in a ***tangible*** financial benefit that lowers current spending, investment or debt levels.	Any ***action*** that ***avoids*** having to incur costs in the future.
Cost saving measures are reflected in the financial statements and next year's budget.	Cost avoidance measures are **never reflected** in the financial statements and next year's budget. They will only be reflected in situations where the proposed action is not implemented, resulting in a cost increase.

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Chapter 4: Progress Check

1. Why is reducing the labor hours required to produce a fixed volume of work considered cost avoidance rather than cost savings?

   a. That reduction is considered both a cost avoidance and a cost savings
   b. Unless an increased volume of work is completed by the team with the same head count, no real savings are realized
   c. The resources saved are assigned to other tasks, reducing budget need
   d. The reduction in hours cannot be documented and thus is not considered a cost savings

2. Identification can help a facility manager to identify:

   a. Shifts, patterns, or trends, to identify potential or emerging performance improvements
   b. The metrics needed to validate the need for the FM budget
   c. Organizational KPIs
   d. ROI on an investment

3. What is the purpose of creating a BSC or similar structure for a contract vendor?

   a. Provides the vendor with a way to communicate its concerns about the contract
   b. Is the basis for determining vendor compensation for the contract
   c. Demonstrates the formal structure of the relationship between vendor and FM
   d. Enables auditing and monitoring of service performance service levels

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Chapter 5: Performance Reporting

Introduction

In Chapter 4, we discussed what needed to be monitored. Chapter 5 will focus on looking specifically at how you report on those measures.

The BSC is a comprehensive format for reporting performance measures from several different perspectives, especially those of the customer. Choosing metrics and measurement processes that contribute to an organization's critical success factors is an important function of the performance management framework. The BSC is well-suited as a framework that can evolve and change as priorities shift. The framework is easily updated, and it performs well to track trends in data that are important for evaluating FM over months and years.

Lessons

- Objectives
- Lesson 1: Tracking Performance

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Objectives

Chapter 5: Objectives

On completion of this chapter, you will be able to:

- Describe the main components of a performance report
- Explain why the KPI metric is a function of performance reporting

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Lesson 1: Tracking Performance

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Describe the main components of a performance report
- Explain why the KPI metric is a function of performance reporting

Tracking Performance

The BSC usually starts with the stakeholder or customer perspective. As the scorecard cascades from the organization's strategic plan and goals, the FM organization translates those high-level goals into statements about how the FM organization will support those goals and deliver outcomes that align with the production of positive outcomes in the management of any facility. Since "stakeholders" can be representative of several different groups, the framework can address the delivery of FM services from the stakeholder perspective. Quality is defined by the end-user - i.e., the stakeholder. That means when the measures do not include numbers or quantities, the perception of the stakeholder determines the level of quality.

The BSC is considered a quality management tool and provides the ability to monitor the delivery of FM services for continuous improvement. The "framework" for performance management is sometimes referred to as a "management plan" - a working document that is used to monitor performance on a weekly, monthly and quarterly basis. It forms the foundation for the FM reporting system that is delivered to senior management on a quarterly and annual basis.

Monitoring and Reporting

Going back to the balanced score card example, this is a "big picture" view of what a performance tracking spreadsheet might look like in a Balanced Scorecard format. The objective here is not to be able to read each line item, but to be able to see the broad scope of measurements that may be part of a performance management system in a medium to large facility, or a portfolio of facilities.

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Perspective and Strategic Objectives

As we move from the translation of the higher-level goals (on the left of this spreadsheet), we define the measures that will be used to evaluate whether we are achieving success. In this example, the desired outcome is to produce a process where we can solicit customer feedback and form partnerships with our customers and stakeholders.

The most relevant measurements in facility management include responsiveness, quality of service delivery, amount of time spent with the customer, positive interactions, and a system to solicit and evaluate feedback. These measures are captured in the second column called "Measurement".

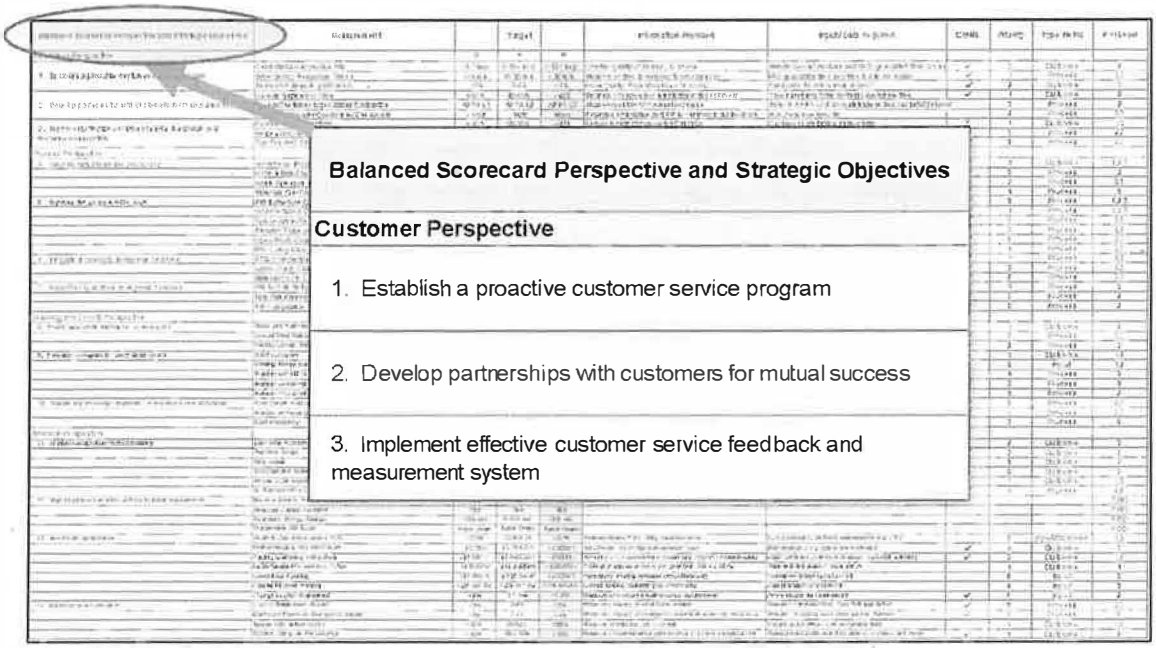

Figure 26 Balanced Scorecard: Perspective and Strategic Objectives

Process and Methodology

As we step through this management plan, the process and methodology will become more specific.

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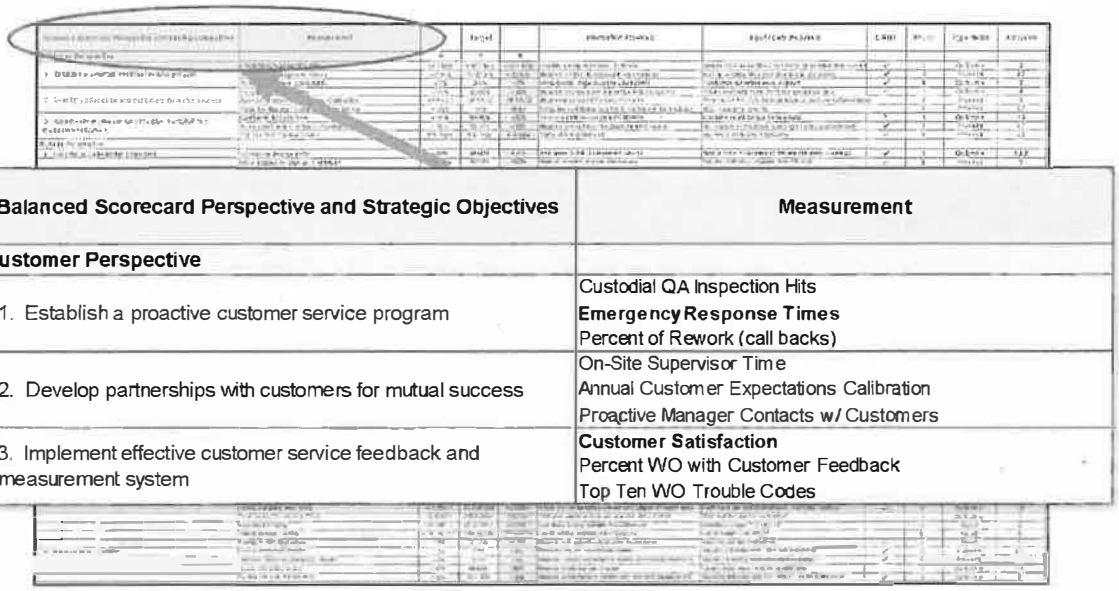
This is a look at the first two elements of a different perspective – the Process perspective. The "process perspective" is specific to the BSC methodology and typically includes those metrics we have previously labeled "functional" and "physical" in this course.

"Process" relates to facility management processes we use to deliver services. It is what we need to be "good at". These include such things as how we deliver maintenance procedures for preventive and corrective maintenance. The process is how we accomplish the work (work management). The positive outcomes we desire from managing the work efficiently and effectively are documented in the management plan.

The labels, "functional", and "physical" are characteristics of facilities that describe outcomes of the FM processes and are different elements of the Process perspective of the BSC.



Balanced Scorecard Perspective and Strategic Objectives	Measurement
Customer Perspective	
1. Establish a proactive customer service program	Custodial QA Inspection Hits **Emergency Response Times** Percent of Rework (call backs)
2. Develop partnerships with customers for mutual success	On-Site Supervisor Time Annual Customer Expectations Calibration Proactive Manager Contacts w/ Customers
3. Implement effective customer service feedback and measurement system	**Customer Satisfaction** Percent WO with Customer Feedback Top Ten WO Trouble Codes

Figure 27 Perspective and Strategic Objectives

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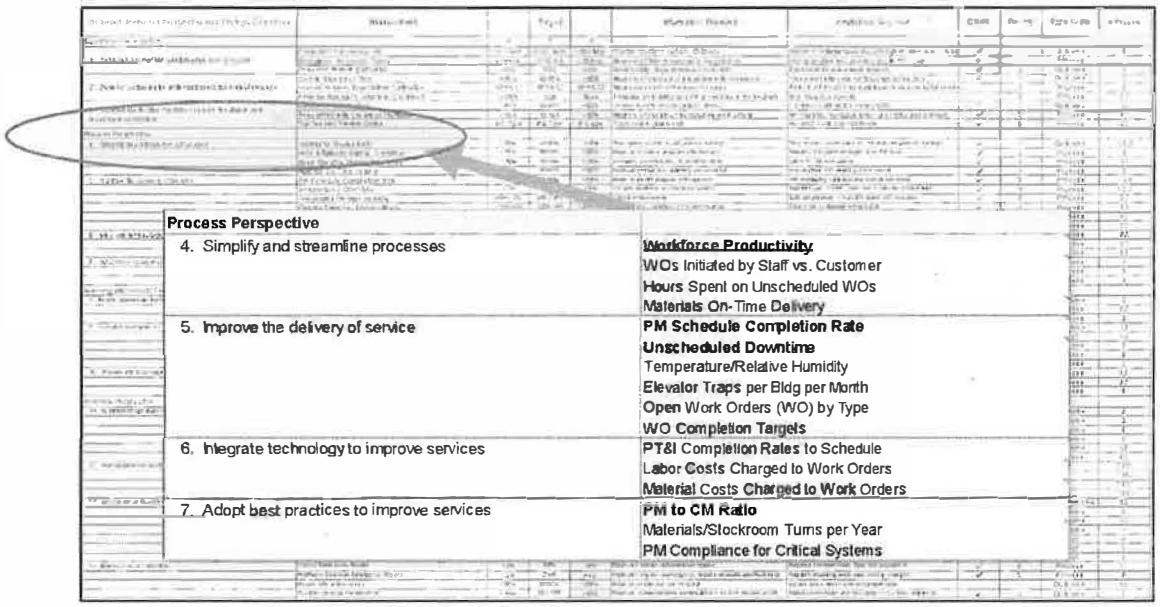

Process Perspective	
4. Simplify and streamline processes	**Workforce Productivity** WOs Initiated by Staff vs. Customer Hours Spent on Unscheduled WOs Materials On-Time Delivery
5. Improve the delivery of service	**PM Schedule Completion Rate** **Unscheduled Downtime** Temperature/Relative Humidity Elevator Traps per Bldg per Month Open Work Orders (WO) by Type WO Completion Targets
6. Integrate technology to improve services	PT&I Completion Rates to Schedule Labor Costs Charged to Work Orders Material Costs Charged to Work Orders
7. Adopt best practices to improve services	**PM to CM Ratio** Materials/Stockroom Turns per Year PM Compliance for Critical Systems

Figure 28 Perspective and Strategic Objectives

Measurement

Moving from the "measurement" column to the "target" columns, we see how the measurements are defined in quantifiable terms. The customer perspective may be a bit more challenging to measure and monitor success. It includes a few measures and metrics that are more subjective and requires a bit more effort to translate from a qualitative measurement to a quantitative measurement.

This is the challenge when monitoring and quantifying customer satisfaction. Customer surveys that solicit feedback need to be carefully crafted to reduce or eliminate biases in asking and answering questions.

Targets in this category can be developed based on several different standards and practices in facility management.

In this example, "APPA Lx" refers to the Association of Higher Education Facilities Officers (APPA) levels of service. APPA service level is defined by the organization and refers to the "quality level" of the facility about appearance care, operations, and maintenance, and buildings and grounds care. APPA has researched and published a few facility performance indicators that serve as guidelines for defining FM performance outcomes.

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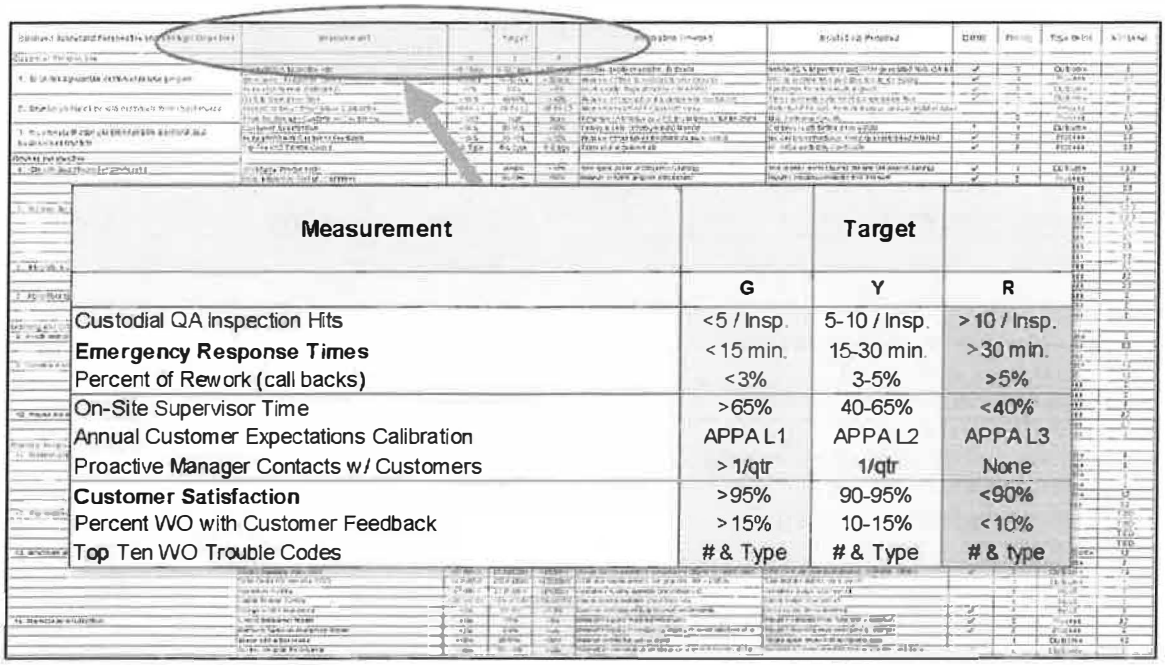

Measurement		Target	
	G	Y	R
Custodial QA Inspection Hits	<5 / Insp.	5-10 / Insp.	> 10 / Insp.
Emergency Response Times	< 15 min.	15-30 min.	>30 min.
Percent of Rework (call backs)	<3%	3-5%	>5%
On-Site Supervisor Time	>65%	40-65%	<40%
Annual Customer Expectations Calibration	APPA L1	APPA L2	APPA L3
Proactive Manager Contacts w/ Customers	> 1/qtr	1/qtr	None
Customer Satisfaction	>95%	90-95%	<90%
Percent WO with Customer Feedback	>15%	10-15%	<10%
Top Ten WO Trouble Codes	# & Type	# & Type	# & type

Figure 29 Measurement

Information Provided

The "Information Provided" column provides further details and a brief explanation of what is being measured. The "Input/Data Required" column provides even further details as to what is being measured and how that measurement is quantified.

In this example, the data is derived from the computerized maintenance management system (CMMS). This is the FM technology used for maintenance management. The "priority" is specific to this example organization and most likely represents an internal metric priority system linked with the CMMS system.

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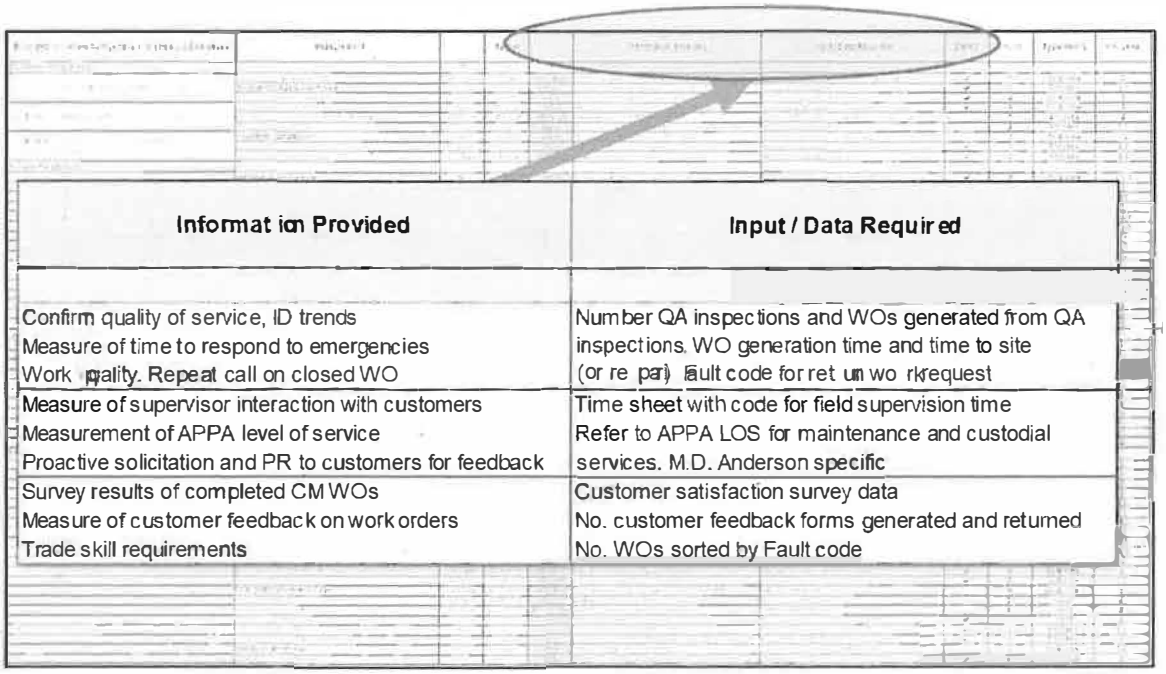

Information Provided	Input / Data Required
Confirm quality of service, ID trends Measure of time to respond to emergencies Work quality. Repeat call on closed WO	Number QA inspections and WOs generated from QA inspections. WO generation time and time to site (or re pair) fault code for return work request
Measure of supervisor interaction with customers Measurement of APPA level of service Proactive solicitation and PR to customers for feedback	Time sheet with code for field supervision time Refer to APPA LOS for maintenance and custodial services. M.D. Anderson specific
Survey results of completed CM WOs Measure of customer feedback on work orders Trade skill requirements	Customer satisfaction survey data No. customer feedback forms generated and returned No. WOs sorted by Fault code

Figure 30 Information Provided

In this example, the data for customer satisfaction metrics are generated from the work management system, timekeeping records, and customer survey results. This portion of the management plan "what" information is required and the format of the information.

The last several columns in the management plan identify the specific source of the data, the priority code used, the type of metric (input, process, or outcome), and the KPIs level that aligns with the reporting structure (process or management metric or KPI).

The type of metric (input-process-output) refers to a systems approach to labeling. A measurement is identified as either an input to a metric, a process metric, or the final output metric that provides the level of business intelligence being sought. A series of measurements may go into formulating a metric that is used to create business intelligence. For example, several labor-related measurements, such as time spent on a task, material required, and travel time, may indicate how effective the workforce is in accomplishing the task. These measurements are inputs for a process metric used at the "management" level to determine the efficiency of a work process.

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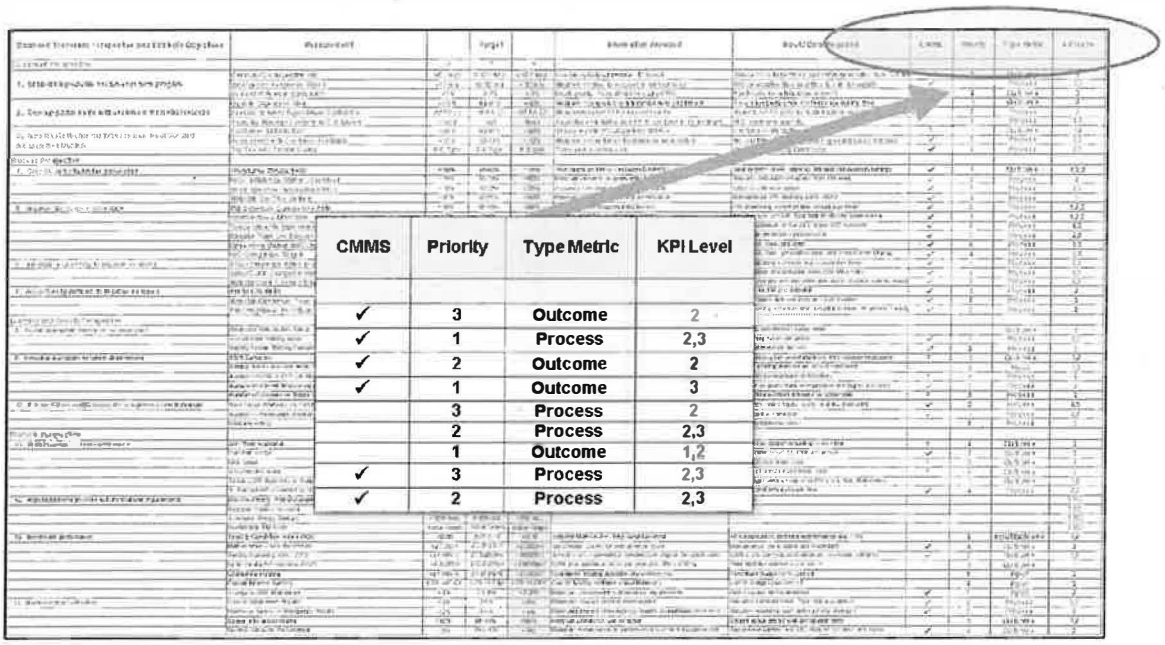

CMMS	Priority	Type Metric	KPI Level
✓	3	Outcome	2
✓	1	Process	2,3
✓	2	Outcome	2
✓	1	Outcome	3
	3	Process	2
	2	Process	2,3
	1	Outcome	1,2
✓	3	Process	2,3
✓	2	Process	2,3

Figure 31 Input/Data Required

The KPI Level

The final column, KPI level, refers to the final output metric – whether it is used at the process level (used by work supervisors to accomplish work efficiently) or the management level (used by facility managers to determine the effectiveness of the workforce). KPIs are used by senior management and FM director-levels to determine whether the facility management function is adequately supporting the mission of the organization.

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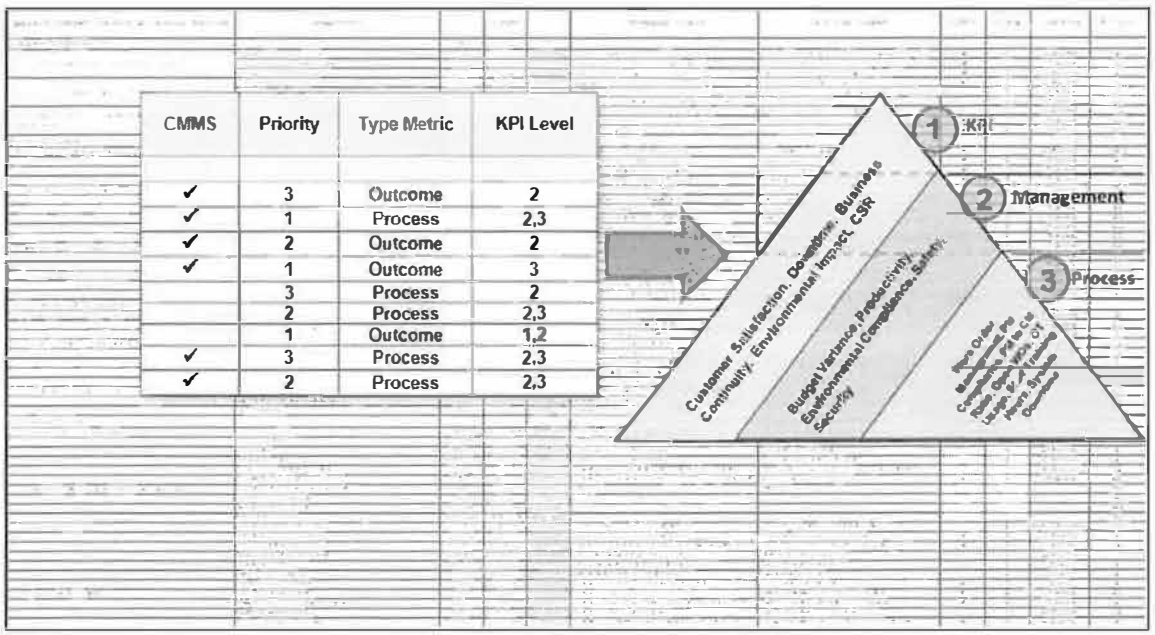

Figure 32 The KPI Level

KPI Metrics in Reporting

This type of management plan is used by a medium-to-large FM organization that has a large labor workforce where the cost of the workforce is high and workforce efficiency and effectiveness are important performance indicators for FM. The three-level pyramid used to describe the process management KPI level metrics is used by large FM organizations to organize data inputs, data management processes, and information outputs that fully describe the FM function in terms that clearly support the success of the organization.

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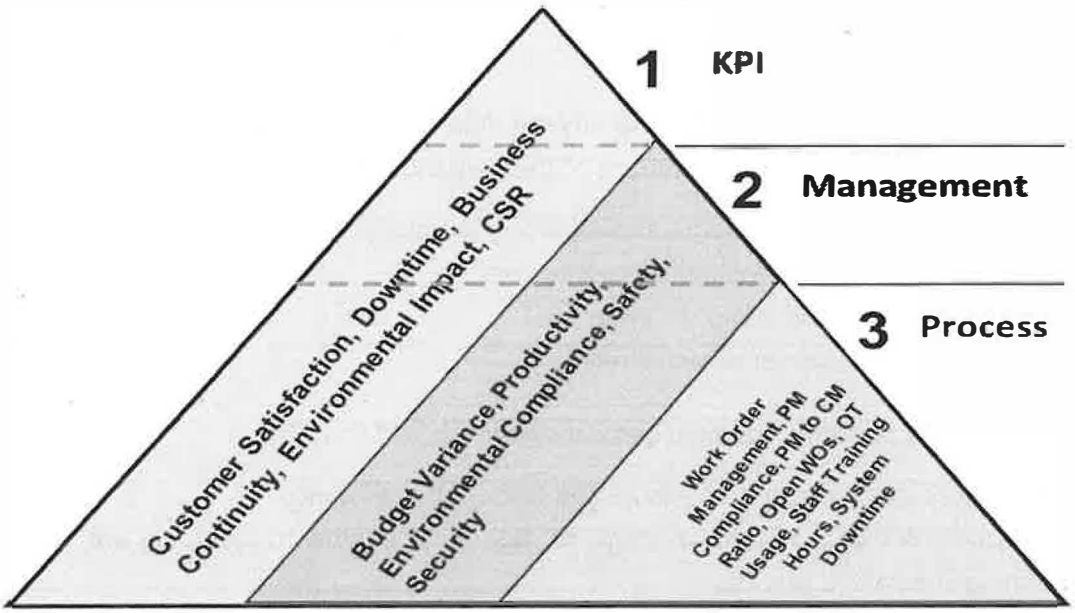

Figure 33 KPIs and Performance Measures

The FM organization should distinguish between KPIs and routine performance indicators. In FM it is important to be clear about what constitutes key performance for the demand organization and what constitutes key performance for the FM organization. These may not be the same thing; however, they should align. Both should be tracked and reported to appropriate levels of the organization.

KPIs should be focused on critical success factors. These are the factors that are directly relevant to the effectiveness of the organization's performance. An excessive number of KPIs will detract from efficient monitoring.

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Chapter 5: Progress Check

1. What are the most important things for a facility manager to understand to build a program to meet the needs and expectations of the demand organization?
    a. The demand organization's budget and reporting structures
    b. The demand organization's critical success factors
    c. The role of FM in the leadership structure
    d. The organization's customer service strategy

2. Metrics chosen for a performance management system should focus on:
    a. Those services that are easy to measure and track, for consistency
    b. The measures that help a facility manager to determine whether its resources are performing contracted services
    c. All the demand organization's Strategic Plan goals
    d. Those metrics that are focused on an organization's Critical Success Factors

3. What topics does a typical performance report include:
    a. Perspective, Objectives, Measures, Targets, Initiatives
    b. Perspective, Objectives, Target, Starting Score, Ending Score
    c. Perspective, FM Goals, FM Targets, Initiatives, Measures, Outputs
    d. Measures, Targets, Initiatives, Outcomes

4. What statement is true of KPIs?
    a. KPIs are focused on the organization's critical success factors
    b. KPIs are the same as Routine Performance Indicators
    c. KPIs for the demand organization and those for the FM organization are always the same thing
    d. KPIs are only developed and measured for process objectives

5. In the FM model, the four main elements that make up the life cycle of the facility are:
    a. Stakeholders, the Demand Organization, Places and Technology
    b. Stakeholders, Leadership, the FM Organization and Places
    c. People, Processes, Places and Technology
    d. Stakeholders, Means and Methods, Places and Technology

Chapter 6: Facility Management Quality Fundamentals

Introduction

When thinking about performance and quality, it can sometimes be difficult to make a distinction between the two. Although related, they are independent concepts that should both be monitored so we can continue to identify opportunities for improvement. In this chapter we will explore the evolution of Quality Management to get a glimpse of how standards have developed over time. This framework will help us to better understand how to continue to improve accuracy, standards, and customer satisfaction in regard to quality.

Lessons

- Objectives
- Lesson 1: The Evolution of Quality
- Lesson 2: The Goal of Quality Facility Management
- Lesson 3: Systems Thinking

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Objectives

Chapter 6: Objectives

On completion of this chapter, you will be able to:

- Describe the key events in the evolution of quality
- Understand the key goals and components of a quality management system
- Summarize the importance of Systems Thinking in quality facility management

Performance and Quality

When thinking about performance and quality, it can sometimes be difficult to make a distinction between the two. Although related, they are independent concepts that should both be monitored so we can continue to identify opportunities for improvement. In this chapter we will explore the evolution of Quality Management to get a glimpse of how standards have developed over time. This framework will help us to better understand how to continue to improve accuracy, standards, and customer satisfaction in regard to quality.

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Lesson 1: The Evolution of Quality

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Describe the key events in the evolution of quality

Timeline: Evolution of Quality

Origins of quality management systems can be traced back to ancient times. Before we go forward with the Facility Management Quality Management System discussion, scroll through the timeline of The Evolution of Quality Management below.

1450 BC

The Egyptian wall paintings showed evidence of measurement and inspections. Pyramid stones were cut with such precision that even today it is impossible to get a knife blade between the blocks. Their success was due to good design, consistent use of well-developed building methods and procedures and precise measuring devices.

1046 BC-256 BC "Zhou Dynasty"

During the Zhou Dynasty, specific governmental departments were created and given responsibility for production, inventory, and product distribution – today is known as supply chain management. They had departments for manufacturing where they formulated and executed to quality standards, supervision, and inspection.

5th to 15th Century "Middle Ages"

In Europe the craft guilds emerged to ensure crafts people were adequately trained. They consisted of masters, journeymen and apprentices. Every effort was made to ensure that quality was built into products by the people who produced them.

1760-1840 "Industrial Revolution"

July 8, 1785, Honoré Blanc (Woodbury, 1960) developed a system for manufacturing muskets to a standard pattern using interchangeable parts. In 1798 Thomas Jefferson brought the idea to America. Eli Whitley was awarded a two-year contract to supply 10,000 muskets to its armed forces. The project took ten years to complete because there was an underestimation in the effect of variation in production processes.

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1910-1920 "Industrial Revolution"

In 1910 Frederick Taylor introduced the principles of scientific management. Managers and engineers were given the task of planning while supervisors and workers were given the task of execution. Inspectors were given the task of quality assurance. The inspection was the primary means of quality control. In 1920, Walter Shewhart ushered in the era of using Statistical Process Control, SPC, and the use of control charts. Little use of SPC was made until 1940. Also, in the 1920s employees of Western Electric's inspection department were transferred to Bell Telephone Laboratories.

1944-1946

SPC (Statistical Process Control) became more widely known and gradually adopted throughout manufacturing industries. In 1944 the first professional journal, Industrial Quality Control was published. In 1946, The American Society for Quality Control, now called ASQ, was founded to develop, promote, and apply quality concepts. During this time frame, top management showed little interest in quality improvement or the prevention of defects and errors. They instead relied on mass inspection.

1950's "Post-World War Two"

Joseph Juran and Dr. W. Edwards Deming introduced SPC to Japan to aid in the Country's rebuilding efforts. Top managers supported integrated quality throughout their organizations and developed the culture of continuous improvement. The Japanese call this Kaizen. In 1951 the Union of Japanese Scientists and engineers initiated the Deming prize to reward individuals and organizations who met stringent criteria for quality management practice.

1960's

Because of higher quality levels, Japanese products started to exceed that of Western manufacturers. In a few short years, the Japanese made major inroads into a market previously dominated by American Companies. In 1979 Philip Crosby published the book "Quality is Free". One of his famous quotes is "It is now a gift, but it is free. What costs money are the un-quality things – all the actions that involve not doing jobs right the first time."

1981-1990

1984- The U.S. Government designated October as National Quality Month.
1985- NASA announced an Excellence Award for Quality and productivity.
1986- Motorola introduced the concept of Six Sigma.
1987- International Organization for Standardization (ISO) issued the first version of ISO 9000.
1988- National Institute of Standards and Technology (NIST) introduced the Malcolm Baldrige National Quality (MBNQ) award

1989- Florida Power & Light was the first non-Japanese company to be awarded the Deming Prize for quality.

1991-2018

1991- The European Foundation for Quality Management (EFQM) is founded to recognize industry leaders for their success in turning strategy into action and continuously improving their organization's performance.
1994- International Organization for Standardization (ISO) issued the second version of ISO 9001.
1999- Congress added non-profit education and health care sectors to the Baldrige Award.
2000- International Organization for Standardization issued the third version of ISO 9001.
2008- International Organization for Standardization issued the fourth version of ISO 9001.
2015- International Organization for Standardization issued the fifth version of ISO 9001.
2018- International Organization for Standardization issued the first standard for Facility Management-Management Systems. In this globally competitive environment, FM organizations and providers need to communicate among themselves and with interested parties using common principles, concepts, and terms. This includes the assessment and measurement of performance. ISO 41001 is intended to raise the standard of care and increase the levels of quality in FM to stimulate readiness, maturity, and competition for the delivery of FM.

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Lesson 2: The Goal of Quality Facility Management

Lesson 2: Objective

On completion of this lesson, you will be able to:

- Understand the key goals and components of a Quality Management

Introduction to Quality Management Components

One of the key goals of any Quality Management System is to improve the quality of products and services.

Quality in such a system has three components:

1. High level of accuracy,
2. Compliance with standards that apply to the organization and
3. High level of customer satisfaction.

This is no different than the goal of Quality for Facility Management. The basic terms and concepts reinforce the overarching goal of quality facility management to measure and improve the quality of FM services. Some general examples of how this goal is achieved are listed below.

Quality of FM services is measured by:

- Auditing FM operations, both internally and externally. This is done by third-party registrars if the demand organization is participating in the achievement of standards such as ISO
- Defining desired service levels as specified by customers
- Establishing baseline performance levels
- Assessing customer satisfaction
- Benchmarking processes and best practices

Quality of FM services is improved by:

- Implementing a systematic process improvement

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- Understanding customer needs and expectations
- Focusing on quality initiatives
- Delivering innovative services
- Utilizing best practices

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Lesson 3: Systems Thinking

Lesson 3: Objective

On completion of this lesson, you will be able to:

- Summarize the importance of Systems Thinking in quality facility management

Systems Thinking

At its broadest level, systems thinking includes a large and vague body of methods, tools, processes and principles all oriented to look at the inter-relatedness of forces (departments, people, power structures, etc.). Systems thinking is the thinking about how things interact with one another and to the benefit of the whole. Systems thinking is about patterns and relationships to gain insight into why systems behave the way they do based on those interactions. Systems thinking embodies the belief that an organization is more than the sum of its parts – it is an interrelated system that cannot be divided into independent parts. Everyone in the organization needs to work to improve the entire organization, rather than optimizing separate pieces at the cost of other parts of the organization.

System Functions

The biggest quality improvement opportunities lie within the system. FM is a part of a system network along with Finance, Human Resources, Information Technology, Manufacturing, Purchasing and other functional areas depending on how the demand organization is structured. Each functional area connects with each other. The organization is viewed holistically instead of as different functions across the organization, each a discrete unit.

Organizational systems that function at their optimal levels have the following management attributes in common:

- Management understands the relationships between system components. The efforts of components are not additive; rather, they are interdependent.
- Management clearly states the aim of the system so that all components pull in the same direction rather than working for the good of one component to the detriment of another.
- Management works to optimize the system over time, using resources in the most effective ways possible under specified conditions.

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- Every individual component contributes its best for the benefit of the entire system rather than for individual reward. Internal competition and a win-lose approach can hamper overall organizational performance and destroy the organization's ability to achieve goals.
- Management recognizes the effects of decisions on the entire system.

Systems Perspective

Facility Managers must work to ensure that FM activities are aligned with the overall aim of the system, or with the entire organization's vision, mission, and strategic plans. When applying a systems approach to management, facility managers must work to ensure that FM activities are aligned with the overall aim of the system – the entire organization's vision, mission, and strategic plans.

When managing from a systems perspective, the following are key points to remember:

- A system is a series of unified, purposeful functions or activities that work together for a single aim.
- All organizations are systems.
- Components of a system (such as functional areas in the entire organization) are interdependent and interrelated.
- Interdependencies within any system are often exceedingly complex and widely separated in time and space.
- Activities and changes in system components can positively or negatively impact the entire system.
- Optimizing separate pieces of a system or system processes may undermine the effectiveness of the whole.

Systems Thinking Challenges

For the facility management function to be linked to the entire organization, facility managers must be systems thinkers – people who see the interrelationships and the benefits of creating and maintaining them. Systems thinking, however, can be challenging because systems are nonlinear. If, for example, you consider the perpetual process of providing facility management services, it becomes apparent that the process has a recurring nature with ongoing inputs, throughputs, and outputs. FM systems take resources that exist in the environment (input) and transform them (throughput) into desired results (output).

For example, consider the FM process of managing work orders. The input of the process requests for services. The process to get the work order and transform it into the desired output involves the work order, the workers, tools, and supplies. The output could be the repairs and the level of stakeholder satisfaction.

Ideally, the facility manager will be a systems thinker. Systems thinking is a critical force for integrating and pulling the FM staff, projects, service providers, and other resources in a unified direction.

In quality FM, systems-thinking supports organization initiatives to:

- Differentiate products and services
- Close competitive gaps
- Gain a competitive advantage
- Improve value to customers
- Improve customer satisfaction
- Increase efficiency and effectiveness
- Reduce costs
- Increase profitability
- Talk the language of management

Systems Thinking in FM: Example

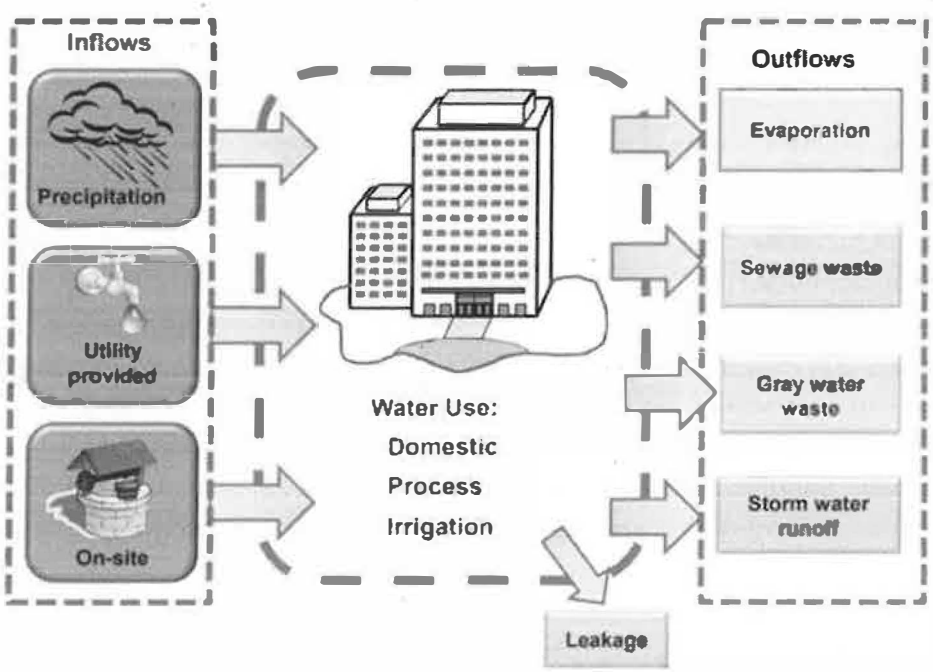

Figure 34 Water System in Buildings

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Term	FM Example in Water Use
Systems	Water comes to a facility from several sources. If the facility manager were to only consider water use from consumption of potable water from a municipal system, other important considerations may be missed. Is rainwater available for reuse? Are there environmental benefits to more efficient water use or reuse? Do laws allow for the reuse of rainwater? (Not all jurisdictions allow this.) Are there any onsite water sources? How is water used at the facility – domestic, process, irrigation? It is a holistic look at the water system, where it comes from, how it is used, and the potential for reusing it.
Systems Thinking	A systems-thinking approach would consider the sources of water, how it is used and whether there is a potential to reduce environmental impact, water consumption, or cost associated with the organization's water use. A systems-thinking approach would consider environmental impacts, local or regional environmental regulations, impact to occupants and the delivery of water for domestic use (potable water), process water (heating and cooling), and irrigation (landscaping). The potential for reuse of water in a systems-thinking environment would take all these factors into consideration and include factors such as retention methods, treatment methods and cost, water quality and water transport and delivery methods.

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Chapter 6: Progress Check

1. Which of the following is a key goal of any Quality Management System? (Select the best answer.)

   a. To identify defects in processes to improve profitability
   b. To improve the quality of products and services
   c. To apply opportunities for the facility management organization to excel
   d. To gather and report on performance metrics

2. In Systems-Thinking, the components of the systems are:

   a. Independent
   b. Unrelated
   c. Independent and unrelated
   d. Independent and interrelated

3. The quality of FM services is measured by:

   a. Estimating baseline performance levels
   b. Defining desired service levels as specified by customers
   c. Utilizing best practices
   d. Focusing on quality initiatives

4. In quality FM, systems-thinking supports the organization's initiatives to:

   a. Benchmark processes
   b. Close competitive gaps
   c. Use best practices
   d. Define service levels

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Chapter 7: Quality Measures for the Facility Organization

Introduction

Facilities run smoothly by making use of hundreds of resources and data. As a facility manager, one of your top priorities should be measuring, quantifying, and examining metrics. By doing this, you'll see what areas are performing at optimal capability and others that may need extra attention. In this chapter we will examine the importance of measuring what matters, standards, gathering quality data using various quality tools, and quantifying data in terms of service specifications and KPIs.

Lessons

- Objectives
- Lesson 1: The Importance of Metrics
- Lesson 2: Measuring What Matters
- Lesson 3: Standards
- Lesson 4: Distinctions between Standards, Codes, Practices, Best Practices and Protocols
- Lesson 5: Quality Data and Facility Performance
- Lesson 6: Quality Control Tools
- Lesson 7: Quality Management Processes
- Lesson 8: Basic Statistics
- Lesson 9: Leading and Lagging Indicators
- Lesson 10: FM Internal Audits
- Lesson 11: Service Specifications
- Lesson 12: Key Performance Indicators Defined

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Objectives

Chapter 7: Objectives

On completion of this chapter, you will be able to:

- Recognize the importance and types of metrics used to measure and improve FM Quality
- Explain the factors that should be considered to select appropriate metrics
- Identify and discuss conformance and consensus standards
- Differentiate between standards, codes, practices, best practices, and protocols
- Explain the various data collections tools, such as benchmarking, problem statements, gap analysis, and statistical analysis
- Identify the seven (7) basic quality tools
- Describe the various quality processes
- Explain the differences between the PDCA and DMAIC processes
- Identify the methods of data collection used in descriptive statistics
- Describe the difference between leading and lagging indicators
- Identify the purpose of internal audits in Facility Management
- Describe the various types of service specifications
- Identify the difference between metrics and KPIs

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Lesson 1: The Importance of Metrics

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Recognize the importance and types of metrics used to measure and improve FM Quality

Metrics

An overarching goal of quality facility management is to measure and improve the quality of FM services. Most facility managers have access to a wide variety of information. Many find that they are overwhelmed by the data available to them yet still somehow don't have the information they need. If the facility management organization does not know where it stands or what tools to use to find out, improving the quality of FM services can be a challenging goal. Metrics provide the basis of facility management efforts toward improved quality and make the goal attainable.

Consider this:
If you were dropped into a remote location and given a map of the region, you are going to need to figure out where you are starting, to use the map. An analogy pulled from the Facility Manager's Maintenance Handbook takes this a step further. If you were traveling blindfolded, even with a handful of tools for navigation and measurement, you might not know where you were, whether you were headed in the right direction, or how far you needed to travel to reach the destination. Even modern computerized map systems are known to occasionally misdirect travelers and require monitoring, verification, and confirmation.

Metrics are valuable in terms of knowing where you are going because:

- Measurement or specific indicators that are measured to assess an organization's impact.
- The development, understanding and use of appropriate metrics, both existing and newly developed, that will lead to improvements in FM quality.
- These same metrics are often the basis for justifying the performance of the facility management unit, a new piece of equipment requested, required staffing or the services of a contractor.

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Lesson 2: Measuring What Matters

Lesson 2: Objectives

On completion of this lesson, you will be able to:

- Explain the factors that should be considered to select appropriate metrics

Identifying and Measuring Metrics

The first step in improving the quality of facility management is to identify which metrics are needed, relevant, and useful. There is no one-size-fits-all solution, but the following guidelines can be applied regardless of the size or type of facility being managed to develop effective metrics. The key is to measure what matters, as shown below:

Stakeholder Needs

Base your measurements around stakeholder needs. The stakeholder is at the heart of quality FM. Stakeholders have certain expectations about FM services and perceptions about how FM delivers them. Negative service gaps exist when expectations exceed the perception of the ability to deliver. Stakeholder-driven measures help to ensure that the facilities organization understands stakeholder expectations and perceptions and to avoid negative gaps.

Improve performance

Measure what can help you improve performance or make better decisions. Many things can be done well without requiring formal data. When deciding what needs to be measured, ensure that the measures add value to the organization and will provide you with information you did not already know.

Relevance to Customers

Consider the relevance to customers of the intended measures when addressing their needs. Measures may be important but difficult to influence. Focus on measures that will have meaningful outputs for customers and outcomes that you can influence or control.

Assess Responsiveness of Services

Choose measures that evaluate the responsiveness of FM services. Responsiveness is a measure of timeliness. A precursor, of course, is the notion that you and your stakeholders share a common frame of reference for responsiveness. Not all service issues merit the same level of timely response. Only when FM and stakeholders share the same

understanding about realistic service response times will responsiveness measures be meaningful.

Align with Strategic Plan

Align measurements with the organizational strategic plan. There is much to be learned from past performance. Historical data about FM performance can help your organization to avoid repeating mistakes, but sole measures of past performance are typically not sufficiently robust when making decisions about the future. Strategic or future-focused measures are also necessary to help ensure that FM provides executive leadership with meaningful information that helps to advance the organization's mission, vision and goals.

Assess Efficiency of Services

Ensure that your measurements assess the efficiency of FM services. Efficiency relates to using the least amount of resources to achieve outcomes. Efficiency may be mathematical (such as square meters/feet per person) or numerous other internal management measures. Whatever efficiency measures you use should be meaningful for your organization.

Assess Effectiveness of Service

Plan your metrics to assess the effectiveness of FM services. In this context, effectiveness refers to achieving desired outcomes for the lowest cost (for example, striking the optimum balance of output quality and cost). Remember, however, the focus for effectiveness is not about how you rate the FM service. Some of the same measures of effectiveness may serve expectations of multiple customers (for instance facility management and the entire organization), but customers should drive the process.

Avoid the Data Trap

Avoid the trap of gathering data for its own sake. Just because something can be easily quantified does not mean it needs to be measured. It is easy to over-measure and end up with meaningless results, albeit objective data.

Metrics: Additional Considerations

In addition, metrics should:

- Be clear and understandable
- Be objectively demonstrable
- Reflect of those established for the FM profession as a whole as well as metrics related to the entire organization's business
- Be relevant to the scope of services provided by the FM organization
- Have targets or goals

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- Be supported by relevant FM data
- Provide adequate information to be useful
- Focus on *the vital few* and not *the trivial many*
- Consider the past, present and future
- Be reviewed or revised over time

Common metrics in FM quality include those related to accuracy (error-free), availability, capacity, completeness, consistency, costs, efficiency, reliability, responsiveness, satisfaction, speed and timeliness.

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Lesson 3: Standards

Lesson 3 Objective

On completion of this lesson, you will be able to:

- Identify and discuss conformance and consensus standards

Conformance and Consensus Standards

Standards are generally broken into two categories: 1) **Conformance** and 2) **Consensus.**

Conformance standards are used for external quality assurance to provide confidence to the customer that an organization's quality management system will provide a satisfactory product or service. Many conformance standards are market-driven and compulsory. In this case standards are developed by parties with relevant knowledge (such as representatives of government agencies, consumer organizations or academia).

Consensus standards are developed through an agreement among professionals regarding good practices to ensure widespread applicability. They are voluntarily adopted by an organization. Many common standards recognized in facility management are consensus standards and are described below.

ANSI standards

ANSI (the American National Standards Institute) has coordinated the U.S. private-sector voluntary standardization system for more than 90 years and works extensively with national, regional, and international standards bodies.

ANSI's membership in regional and international organizations permits U.S. delegations to participate in the development and content of regional and international standards and conformity assessment programs.

A key component of ANSI's mission is to coordinate the development of safe systems, processes, and products through standards development and conformity assessment programs.

ANSI does not develop standards; rather it establishes the consensus procedures that are the basis for the development of American National Standards (ANS). ANSI accredits standards-developing organizations that operate in accordance with these consensus

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procedures and approves draft standards if they are developed via this process. There are more than 220 ANSI-accredited standards developers, including ASHRAE and ASTM International (discussed next).

American National Standards are essential tools used in every industry. Today, there are some 9,500 American National Standards that have been developed and approved by ANSI. American National Standards are voluntary, but they serve interests well because all materially affected stakeholders can work together to create them. ANSI-approved standards become mandatory only when—and if—they are adopted or referenced by the government or when market forces make them imperative.

ANSI is not a government agency and has no regulatory authority. But ANSI does have a cooperative relationship with various segments of the U.S. government as well as consumer organizations. In this capacity, ANSI serves as a conduit for information exchange between the U.S. public and private sectors.

ASHRAE standards

ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) provides standards for both its members and others professionally concerned with the design and maintenance of indoor environments (e.g., heating, ventilation and air conditioning). Consensus standards are developed and published to define minimum values or acceptable performance. Other documents, such as design guides, may be developed and published to encourage enhanced performance. ASHRAE is accredited by the American National Standards Institute and follows ANSI's requirements for due process and standards development.

ASTM standards

ASTM International (formerly known as the American Society for Testing and Materials) is a globally recognized leader in the development and delivery of international voluntary consensus standards. ASTM standards are the tools of customer satisfaction and competitiveness for organizations across a wide range of markets. Through 141 technical standards-writing committees, ASTM serves diverse industries and innovative technologies. ASTM International standards are developed in accordance with the guiding principles of the World Trade Organization (WTO) for the development of international standards: coherence, consensus, development dimension, effectiveness, impartiality, openness, relevance, and transparency. ASTM Standards for Whole Building Functionality and Serviceability is particularly prominent in facility management.

British standards

The British Standards Institution (BSI) is the national standards body of the U.K., with a globally recognized reputation for independence, integrity, and innovation in the production of standards that promote best practice. It develops and sells standards and

standardization solutions to meet the needs of business and society. Founded in 1901 as the Engineering Standards Committee, BSI has grown into a leading global business services organization providing standards-based solutions in more than 150 countries. An independent, private, nonprofit distributing company, BSI helps organizations improve their quality and performance, reduce their risk, manage and protect their reputations and be more sustainable. BSI has pioneered management system standards. Specific to quality, BS (British Standard) 5750 was the forerunner to the ISO 9000 quality management series.

CEN standards

CEN (the European Committee for Standardization) is an international nonprofit association based in Brussels and a major provider of European Standards (ENs), technical specifications, and other consensus documents. CEN's mission is to foster the European economy in global trading, the welfare of European citizens and the environment.

CEN's national members (more than 30 at present) work together to develop voluntary European Standards. These ENs are recognized as national standards in each of the CEN member countries. This means that one common standard applies in all the participating countries and every conflicting national standard is withdrawn.

CEN's international counterpart is ISO. Partnering between CEN and ISO ensures technical cooperation through correspondence and at meetings. The same text is typically adopted as both an ISO standard and a European Standard.

The CEN collection includes standards ranging from administration, test and measurement, construction and civil engineering, electrical and mechanical engineering, transportation, aerospace, and telecommunications to process and manufacturing. CEN has several standards specific to real estate and facilities management, covering definitions, agreements, quality, taxonomy, processes, space, and benchmarking. (The benchmarking standard, EN 15221-7, is discussed further in Topic 2 of this chapter.)

Data exchange standards

Data exchange standard efforts are constantly evolving. There are many data exchange standards for specific applications. In FM, they involve standards from a variety of organizations and encompass the planning, design, construction, management, renovation, repurposing, decommissioning, and ultimate demolition of buildings, bridges, power stations, airports, highways, fuel storage facilities, refineries and ports. Many parties are involved in the consensus process dealing with the development and adoption of data exchange standards.

IFMA/BOMA standards

IFMA created its first area measurement standard in 1995 and the standard continues to evolve. The original intent of this standard was for planning, space management and

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internal chargeback of space. Utilizing the IFMA standard allows facility managers to compare and benchmark their "area" with the comparable "area" in another organization.

BOMA International (Building Owners and Managers Association) created its first floor-area measurement standard in 1915 and it, too, has continued to evolve. The BOMA standard helps tenants to effectively compare space and encourages landlords to compete more fairly for tenants.

For IFMA and BOMA standards to coexist in the industry and serve the industry well, they must be compatible:
Terms must have clear definitions (for example, one word or term cannot have a different meaning from one standard to the other).
The uniqueness of each standard (what makes each different) must be clear. The application of the standards must be provided.

The 2007 publication "A Unified Approach for Measuring Office Space for Use in Facility and Property Management" fulfills these points. The report provides a taxonomy (classification system) and procedure to measure floor areas in general-purpose office buildings. While the report does not purport to address other types of buildings (such as retail, manufacturing or residential buildings), some of the taxonomy and measurement procedures may be applicable to other types of buildings (or at least to portions of facilities designed to accommodate general office and administrative work).

The taxonomy and measurement procedures described in "A Unified Approach" provide a common methodology and common definition for the two area measurement standards used in North America by facility managers and by building owners and building managers.

ISO Standards

ISO, the International Organization for Standardization, is the world's largest developer and publisher of international standards. ISO is a nongovernmental organization made up of a network of the national standards institutes of 163 countries. It forms a bridge between the public and private sectors and enables a consensus to be reached on solutions that meet both the requirements of businesses and the broader needs of society. ISO publishes thousands of standards.

Pertaining to quality, ISO has developed a series of nonprescriptive quality management and assurance standards that are individual but interrelated. The ISO 9000 family of standards represents an international consensus on good quality management practices. It consists of standards and guidelines relating to quality management systems and related supporting standards. ISO 9001:2008 is the standard that provides a set of requirements for a quality management system, regardless of what the user organization does, its size, or

whether it is in the private or public sector. ISO 9001:2008 is the only standard in the family against which an organization can have its system audited by a specialized independent body, which then issues a certificate of conformity (although certification is not a compulsory requirement of the standard).

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Lesson 4: Distinctions between Standards, Codes, Practices, Best Practices and Protocols

Lesson 4: Objective

On completion of this lesson, you will be able to:

- Differentiate between standards, codes, practices, best practices, and protocols

Just as a facility manager has access to and needs to make sense of many sources of information, they need to understand the distinctions between Standards, Codes, Practices, Best Practices, and Protocols. The terms may be utilized slightly differently in different countries or jurisdictions, but the explanations of each term below should provide some clarity.

Additional examples of standards, codes, practices, best practices, and protocols can be found in the eLearning course folder called Study Resources.

Distinctions Between the Terms

Standards

A standard is a formal expression of rules, guidelines or characteristics for activities or their results. The standard may provide the basis to establish size, shape or capacity of a product, process or system, may specify performance of products or personnel, or may define terms to minimize risk of misunderstanding.

Codes

A code is a regulation that defines scoping requirements. It implies prescriptive requirements and is generally given statutory force.

A building code is an example of a code that specifies the minimum acceptable level of safety for constructed objects such as buildings. Once adopted by government regulation, this code is compulsory.

Practice

A practice is a general term that refers to the customary, habitual or expected procedure or way of doing something. A practice is not necessarily a requirement and has no force of

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law. The practice may be effective or not, good or bad. It is merely a description of performance.

In an organization making efforts toward energy efficiency, a good practice may be to turn out the lights in the office when leaving.

Best Practice

By definition, a best practice is a technique, approach or method of conducting business in a manner that has been widely recognized by peers and the industry as generally being the most effective and consistently providing the desired results.

A best practice is generally considered a superior method or innovative technique, approach or method that contributes to the improved performance of an organization. It has no force of law, but it is supported by subjective and objective data sources. It implies accumulating and applying knowledge about what is working and not working in different situations and contexts, including lessons learned and the continuing process of learning, feedback, reflection and analysis (what works, how and why) to work effectively and produce successful outcomes.

For example, al common janitorial best practice for organizations working toward sustainability goals is that green cleaning products are specified for all janitorial services and are widely stocked in janitorial areas of the facility.

Protocol

A protocol is an established code of procedure or behavior in any group, organization, or situation. Protocols describe how something must be done. In some situations, protocols are the customs and regulations dealing with diplomatic formality, precedence, and etiquette.

Most agencies have a protocol for the reporting structure and communications between facility manager and senior leadership. A facility condition assessment follows a protocol to ensure that all facilities are assessed utilizing the same process.

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Lesson 5: Quality Data and Facility Performance

Lesson 5: Objective

On completion of this lesson, you will be able to:

- Explain the various data collections tools, such as benchmarking, problem statements, gap analysis, and statistical analysis

A facility manager needs a variety of tools to assess the quality of the products and services they provide.

This lesson covers a variety of data collection tools including:

- Benchmarking
- A good problem statement
- Gap analysis
- Quality tools
- Basic statistical analysis

It is not meant to be all-inclusive. It is meant to provide you with a kit of tools and processes you can use to assess quality. Some of the tools we talked about in the performance management section. Here we will go a little deeper to show how to use the tool.

Data collected from these tools is a part of the tool kit. The value of the data lies in the analysis. Ask yourself: Can you turn the data into valuable information that can be used for decision making, further continuous improvement activity and operating cost savings? Quality tools are a prerequisite for FM services as well as performance management and improvement. As you review the tools, consider how the data facilitates decision making, problem solving and continuous improvement. We will start with benchmarking.

Benchmarking

Benchmarking is a method used to compare the performance of goods or services against similar practices across an organization or within organizations or industries. Those comparisons can be:

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Internal	Comparing practices to similar or peer operations within an organization.
External	Comparing practices to similar or peer operations outside the organization.
Competitive	Comparing an organization's product or service to a competing best-in-class organization's similar product or service or comparing services or products with industry leaders.
Generic	Comparing or looking at best practices from non-FM organizations and mining that information for practices that can be applied to the demand organization

Table 4 Benchmarking Comparisons

The Power of Benchmarking

The power of benchmarking is that it provides the opportunity to ask questions, seek reasons why current processes are in place and explore changes. The use of benchmarking provides an effective tool to identify, study and build to best practices. Those best practices are the methods and techniques that are recognized in the industry as generally being the most effective and consistently providing the desired results so they in turn lead to improvements in quality of facility management services. A facility manager with a strong quality improvement goal proactively looks for best practices the function can implement.

The graphic below demonstrates types of benchmarking processes that can be utilized in facility management quality.

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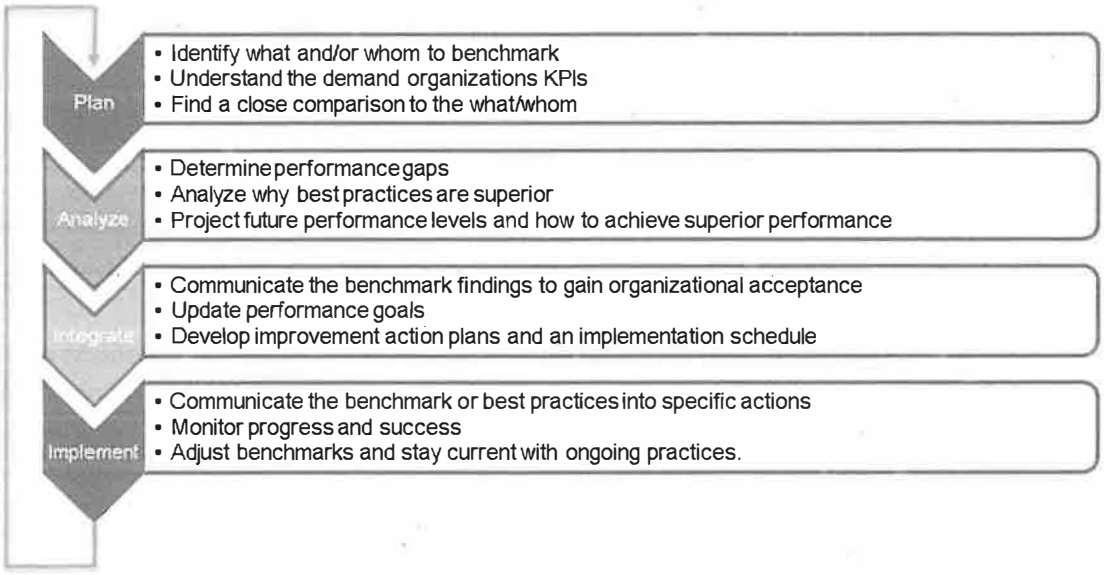
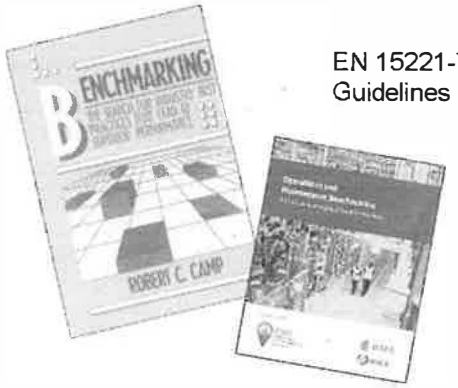


Figure 35 Benchmarking Processes

Benchmarking History and Resources

The benchmarking process was largely pioneered and popularized by Robert C. Camp in his book Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance and by Camp's work with Xerox Corporation. Camp's landmark text remains pertinent and worthwhile.

IFMA offers a Benchmarking for Facility Management Workbook. IFMA's Benchmarks Exchange (BEX) provides a Web site housing the association's benchmarking surveys and results, and the IFMA Publication entitled Operations and Maintenance Benchmarks.



EN 15221-7, "Facility Management—Guidelines for Performance Benchmarking

Other professional associations and organizations also offer a multitude of benchmarking insights.

International Facility Management Association (IFMA) lists numerous Operations and Maintenance benchmarks, from size of facilities and square footage per occupant to

sustainable operations and maintenance practices, utilities, cost of operations, janitorial practices and costs.

EN 15221-7, "Facility Management—Guidelines for Performance Benchmarking," provides guidelines for performance benchmarking. The standard contains clear terms and definitions as well as methods for benchmarking facility management products and services as well as facility management organizations and operations. In addition, the standard establishes a common basis for benchmarking facility management costs, floor areas, and environmental impacts as well as service quality, end-user satisfaction, and productivity.

Common Areas for Facility Management Benchmarking

The exhibits below provide additional suggestions for benchmarking in facility management.

EN 15221-7 Purposes of Benchmarking

- Identification of improvement options
- Resource allocation decisions
- Prioritization of problem areas
- Verification of legal compliance
- Identification of best practices
- Budget review and planning
- Alignment with corporate objectives
- Improvement of process effectiveness
- Assessment of property performance:
  - Assessment of cost effectiveness
  - Evaluation of floor space usage
  - Appraisal of environmental impacts
  - Assessment of quality shortfalls
  - Evaluation of end-user satisfaction
  - Appraisal of individual productivity

Table 5 EN 15221-7 Purposes for Benchmarking

Tool: A Good Problem Statement

A good problem statement is operationally defined so it means the same thing to anyone looking at it. When you consider that different functions have different languages or

common words that mean two different things, it only makes sense to operationally define what you are going to look at.

A good problem statement:

- Puts communicable meaning to a concept or generate a common understanding
- Enables stakeholders across different viewpoints to do business with one another because they are talking about the same thing
- Provides a definition that has the same meaning to a customer, to a vendor, and to the Facility Manager

Take the words "cycle time". For finance, it could be the standard of measure for processing the product or how long it takes to get from one point to another. For an engineer, cycle time could be the time it takes from when the product is logged into one station to the time it is logged out of a station. For purchasing, cycle time could be the time it takes from when the purchase order is generated to the time it takes the product to be brought in the door. For FM it could mean the time it takes in the evening to clean the office and common areas and remove the trash. It is necessary to be clear and specific when defining a problem. Without an operational definition, investigation of a problem will be costly, ineffective, and will be almost certain to lead to endless bickering and controversy.

Cycle Time Definition		
Finance	**Engineering**	**Purchasing**
A standard of measure for processing the product or how long it takes to get from one point to another	Cycle time is the time it takes from when the product is logged into one station to the time it is logged out of a station	Cycle time could be the time it takes from when the purchase order is generated to the time it takes the product to be brought in the door

Table 6 Cycle Time Definition

Note: One definition doesn't fit every function. Certain functions are specific to the situation.

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Tool: Gap Analysis

We discussed and provided instructions on how to conduct a gap analysis in the Performance Management module. A gap is the difference between the current state and the desired state or in the organization's own benchmark data compared with a benchmark partner's performance data. The gap analysis is simply the mathematical determination of the difference between the current state and the desired state.

Here is an example:

An organization's strategic objective is to retain building value and maintain facilities in good condition. A key metric is the facility condition index. The Facility Condition Index (FCI) is a measure of the value of all deferred maintenance divided by the current replacement value of the facility. The lower the FCI, the better the condition of the facility. The current state is a facility condition index (FCI) of 0.3. The desired state is to improve the facility to an FCI of .15. Doing the math, the performance gap is .15. The gap in the index is 50%. Being able to quantitatively show progress is the key to long-term success in improving any area of an organization. In this case, the gap of 0.15 might mean a significant level of investment in the building systems and other deficiencies that led to the high proportion of deferred maintenance (defects) to the value of the facility.

Objective	Current State	Desired State	Gap
Retain building value	FCI= 0.3	FCI= 0.15	0.15 or 50%

Gaps can be both positive and negative and can tell you if you are ahead, behind, or on par with your benchmarking partner. In benchmarking, a performance gap refers to the difference between your performance and best in class performance. Conducting a gap analysis may uncover performance gaps in outputs (facility services) and results (customer satisfaction).

Points to Remember

Gaps may result from a variety of reasons, causes or issues such as:

- Market demand fluctuations
- Customer demand fluctuations
- Process differences
- Specification differences
- Human factors

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Some of the typical performance analysis activities you can use to plan this transition are:

- Defining the gap through a comparison of internal operational data (or benchmark)
- Determining why the gap exists
- Evaluating the factors that contribute to the gap and to the best practices
- Developing recommendations, solutions and approaches to implement best practices

Performance gaps are not the outcome of benchmarking. Additional analysis is required to assess how your organization's given performance level measures up to the benchmark or best practice and why the gap exists. The next logical step is to transition to the desired performance level which must be defined.

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Lesson 6: Quality Control Tools

Lesson 6: Objective

On completion of this lesson, you will be able to:

- Identify the seven (7) basic quality tools

Quality Control Tools

Quality Control tools have been around for a long time. The seven quality control tools (also referred to as the seven basic tools for problem-solving) include the Pareto chart, Flowchart, data collection tools, the Ishikawa diagram (more commonly known as the Fishbone Diagram), the Scatter Plot and the Histogram. Also included in this toolset are Statistical Process Control (SPC) tools such as Control Charts.

These tools are usually used in combination with each other to better understand what the data is telling us. Data collection tools give us the data to make a Pareto chart or a histogram. Histograms give us a picture of how the data is distributed over a process.

These tools may be used to:

- Gather more data about a service problem before devising a solution
- Organize ideas on how to improve a process
- Convert concepts into action plans

Visual representation using the tools is one way of presenting the data in a way that helps interpret the data. Think of it as a picture. A picture is worth 1000 words!

Pareto Chart

Background

The Pareto chart first came about in Italy, where Alfredo Pareto, an Italian economist, discovered that 80% of the wealth came from 20% of the population. A Pareto chart is used to graphically rank causes from the most significant to the least significant.

Consider this. A Pareto chart is a method to identify the "vital few" and sort them from the "trivial many". In this case, 20% of the population is considered the "vital few". Said differently, it states that the situation and the problems a facility manager may be faced

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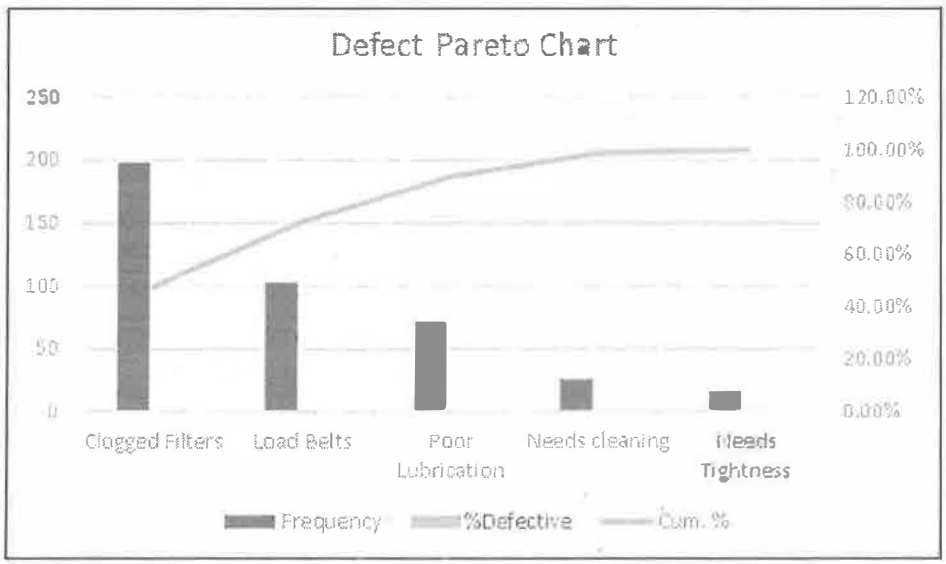
with do not have equal importance. Using a Pareto chart allows a user to prioritize based on data and gives the means to compare causes or categories across shifts, times, locations, and or equipment. It is considered a very helpful tool because it identifies and prioritizes major causes or categories and allows a facility manager to concentrate improvement efforts on high payback areas. It is also more effective than written information alone in highlighting areas for improvement.

Common Use of Pareto Charts

- Separate out the few major problems from the many possible problems to focus on improvement efforts
- Arrange data according to priority or importance
- Compare before and after data when evaluating improvement
- Communicate with others about your data in a format that is easily understood



Some examples from Juran's "Quality Control Handbook" can be seen below:

- Marketing: 20% of customers account for 80% of the sales
- Purchasing: A few percent of the purchase orders account for the bulk of dollars of purchase
- Inventory: A few percent of the items account for most of the dollars of inventory
- Quality: The bulk of the failures, down time, shop scrap or rework are traceable to the vital few field failure modes, shop defects, products, components, processes, contractors, vendors etc.
- In FM: A few pieces of equipment in an HVAC system can account for 80% of the service calls.

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Caution: A Pareto chart can be misleading if cost or some other weighting factor is not considered.

Pareto Layout & Construction

Bars in a Pareto Chart are arranged in descending order of height, from left to right. Bars on the left have the highest significance or impact on an organization in terms of frequency, costs, time, and so forth. This means that categories represented by the bars on the left are relatively more important than those on the right. An exception might be categories containing the fewest items or a miscellaneous category, which always appears at the far right. On the right side of the chart is a cumulative percentage line which shows the cumulative percent of the items on the chart.

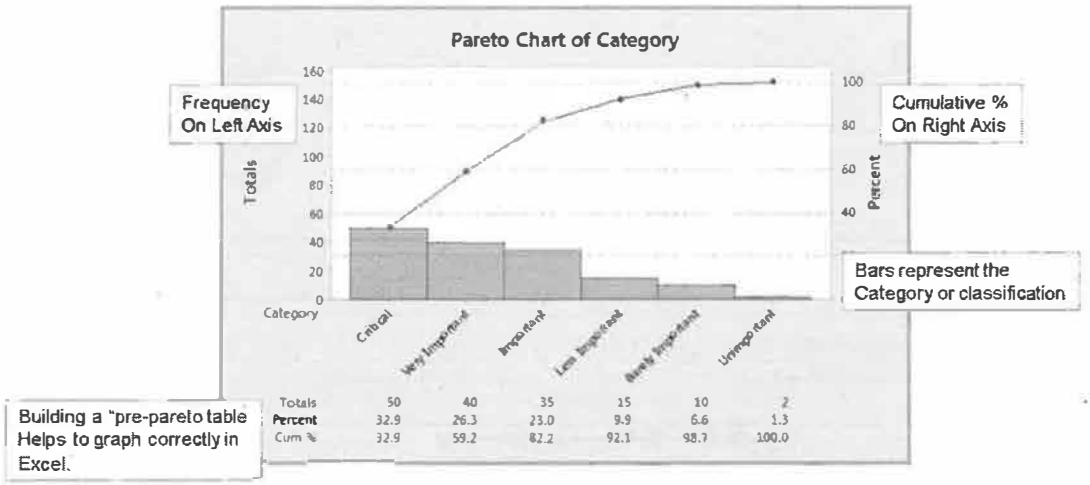

Figure 36 Pareto Layout

Build a Pareto Chart

1 **Use Excel or some other tool to create a Pre-Pareto table, and sort the relevant column in descending order.**

Build a Pre-Pareto table			
Defect	**Frequency**	**%Defective**	**Cum. %**
Caulking	198	47.6%	47.6%

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Build a Pre-Pareto table			
Connecting	103	24.8%	72.4%
Gapping	75	17.3%	89.7%
Fitting	26	6.3%	95. 9%
Totals	416	100%	100%

Table 7 Pre-Pareto Table

The table gives us the information on defects from a HVAC process. All the defects are categories of repairs required because of service calls. We take the data from the table and create a Pareto Chart.

2 **Create a chart from the Pre-Pareto table:**

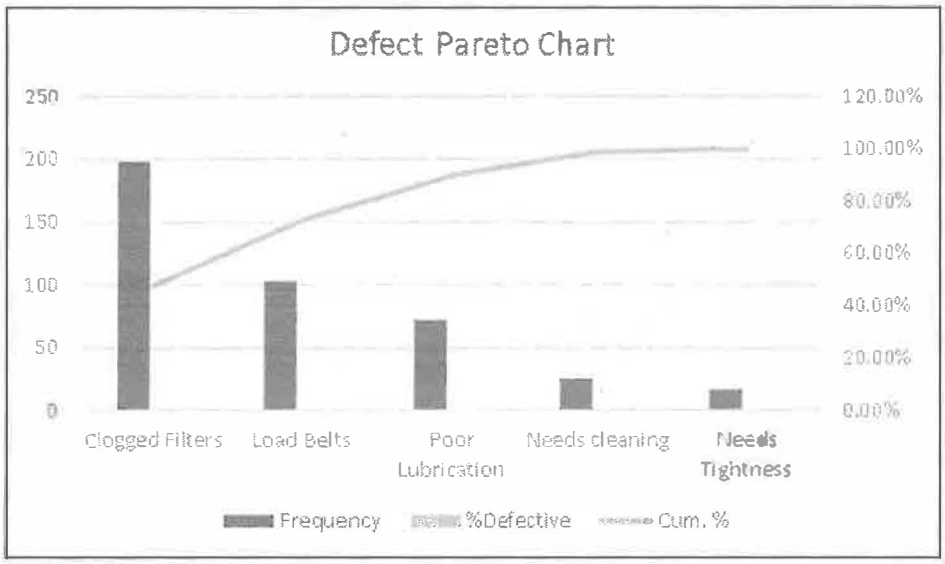

Figure 37 Pareto Chart Example

It is easiest when assembling a Pareto chart to create what may be called a pre-Pareto table to list out the items, the # of defects, the % of defects and the % distribution of the defectives. The table (Table 7) above gives an example of a Pre-Pareto chart.

Benefits & Example

Using a Pareto chart you can:

- Separate out the few major causes of performance from the many possible problems to focus on improvement efforts
- Arrange data according to priority or importance

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- Compare before and after data when evaluating improvement
- Communicate with others about your data in a format that is easily understood

One noteworthy caution: A Pareto chart can be misleading if cost or some other weighting factor is not considered.

For example:
Five hundred errors in one category on a Pareto chart may have a cost impact of 65 Mexican pesos (MXN) per error, or MXN 32,500 total, while 50 errors in another category may have a cost impact of MXN 2,600 per error or MXN 130,00 total. If the Pareto chart is not weighted for the Mexican peso impact of the error, efforts would be applied to the 500-error category first and the result be significantly less cost savings.

A way to mitigate this if you do not know the weighting is to make two different Pareto charts. One for cost, one for the defects to get a clearer picture of what the data is saying and to make a better decision.

Check Sheet

Overview & Uses

Statistical quality control, which we will learn more about later, depends on fully utilizing developed techniques as well as the data resulting from the implementation of those techniques.

The word statistical implies data, and data reflect facts. For a situation to be correctly analyzed and control to be realized, data must be collected carefully and accurately. The intent and purpose of collecting the data should always be clear. To accomplish this, the data must be easy to obtain and to use, which is why check sheets are commonly used.

Check sheets are a type of data collection sheets. It is also known as a tally sheet. The check sheet is designed to collect data with the minimum amount of effort in an organized way that can easily be converted into meaningful information with more analysis.

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Check sheets have the following main functions:

- Production process distribution checks
- Defective item checks
- Defect location checks
- Defective cause checks
- Check-up confirmation

Check sheets are a type of data collection sheet designed to:

- Collect a minimum amount of information to make it easy for the user to fill out
- Organized in a way for easy conversion into useful information

Check Sheet Construction

As the name implies, a Check Sheet visual element such as a checkmark, an "x" and / or a tick mark is recorded on a sheet. The data categories should be clear, unique, and unambiguous. The most desirable characteristic of the check sheet is that the tool makes it easy to record data such as the frequency of occurrence of an event. The format displays data that reveals underlying patterns without requiring complex calculations.

	Day of the week					
Priority Classification	Mon.	Tues.	Wed.	Thurs.	Fri.	Total
Emergency	x	x	x	xx	xxx	8
Urgent	xx	xxxx	xx	x	xxx	12
Routine	xxxxxx	xxxxxx	xx	xxxxxxx	xxxxxxx	28
Total	9	11	5	10	13	48

Figure 38 Sample Check Sheet

Check sheets most often are built as tables to collect data. We have also seen check sheets with images of equipment that map where a failure occurs. For example, to collect data on damage to concrete and or asphalt in a parking lot, the check sheet might include a sketch or picture of the parking lot where the people collecting the data could place an X to show the approximate location of the damage. Clusters indicating the biggest problem area would become apparent.

Flowcharts

Introduction

One of the best ways to understand a process is to draw a picture of it. The flowchart is a graphical representation of the flow of a process, which maps the sequence of the steps

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and identifies the decision steps within the process. People from many backgrounds and with widely varying experience levels can easily read and understand the representation of a flowchart.

Before a process can be improved, the details about how the process currently works must be understood. A flowchart of the current process helps to provide a complete picture of what is happening in the process from the start to the end of the process. Attempting to change or improve a process before it is fully understood is unwise and can create more problems.

A flowchart is nothing more than a set of connecting symbols that show steps in the process, labeled with a short-written statement of the step. ISO, ANSI and other regulatory agencies have established flowchart standards. Many people often deviate from them to suit their own needs.

Convention should not hamper your creativity when making a flow chart. If you come up with a simple symbol that clearly reflects an activity you should use it if most readers understand it. There is really no right or wrong way to make a flowchart if those who create it can use and understand it.

Types

There are different types of flowcharts and they range from simple to quite complex. Each type of flowchart can be used to highlight different aspects of a process or task. Use the flowchart that best suits the process you intend to define. Take care to accurately document the actual process and avoid unnecessary complexity. Remember that users must have a common understanding of the symbols in Figure 39 .

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Symbol-Name	Description of Use
 Rounded corner rectangle used for the beginning and ending of a process.	Shows the first and the last step in the process flowchart. The symbol may be labelled with start, begin, stop or end.
 Rectangle is used for a step within the process or an activity in the process.	Shows a single step or activity in a process, including a brief description of the step or activity inside the rectangle.
 A diamond is used for a Decision within the process or an activity in the process.	Indicates a point where an outcome of a decision determines what the next step will be. The path taken depends on the answer to the question. There can be multiple outcomes. Often there are just "yes" or "no" paths.
 A parralellogram is used for a data symbol or input/output shape.	Indicates that information is coming into the process from outside or leaving the process. For example, customer database records.
 This is a stored data symbol.	Shows a step that results in information being stored.
 Document Symbol	Represents any type of hard-copy input or output that results in a document such as a report or a record.
 Connectors	These lines connect the steps in the activities and show the direction of the process flow in sequence. The arrowhead represents the direction.
 The circle represent a connector Symbol.	A small circle indicates the next or previous step is somewhere else on the drawing. This is useful in large flowcharts were there is a need to break a flow line to continue elsewhere. Reference page numbers may be included for easy location of connectors if the flowchart is on multiple pages.

Figure 39 Standard Flow charting Symbols

Custom flowcharts can provide useful information for FM such as:

- A clear picture of how an FM process works by illustrating the relationship of the various steps
- The FM organization's relationships with internal customers and external service providers
- A common reference point and a standard language for talking about an existing product or service
- A starting point for process improvement activities

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Create

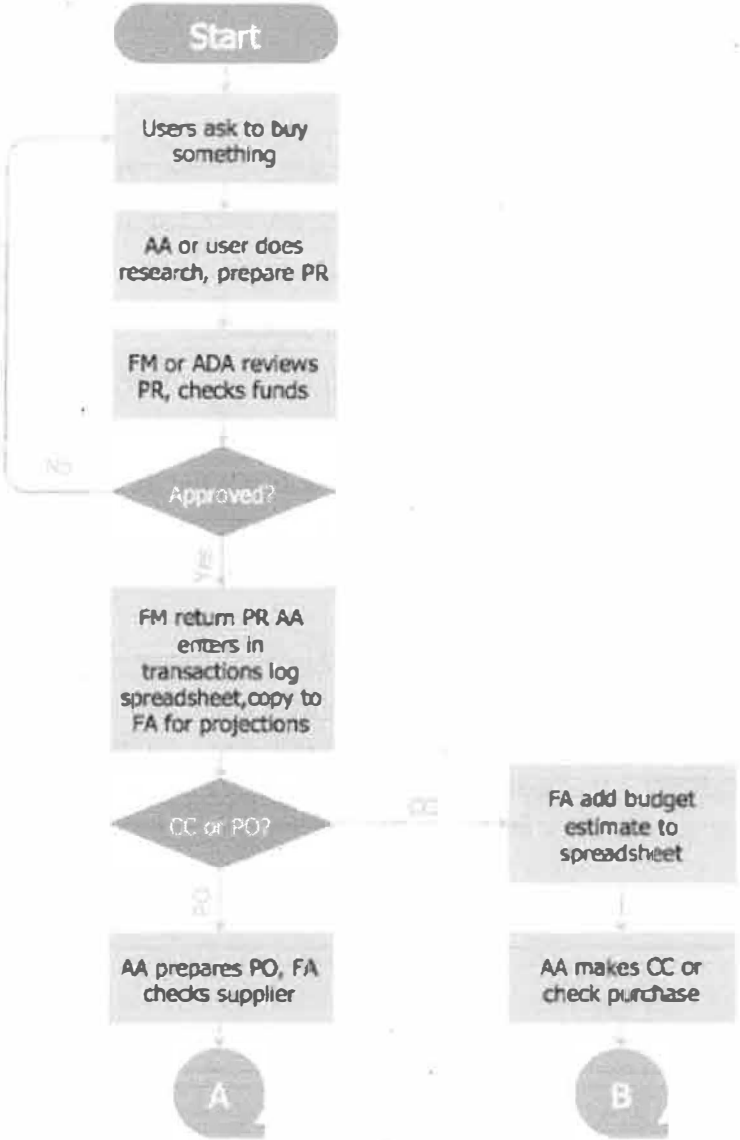

Figure 40 Flowchart Example

An easy way to make a flow chart is to follow these steps.

1. Identify the process or item you want to flowchart. Define the purpose, scope, inputs and outputs.
2. Identify the steps in the process and who owns the steps.
3. List the steps in the order they are performed
4. Add the symbols

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5. Add arrows to show the direction of flow
6. Check the flow against your objectives

Interpret

To Interpret a Flowchart

- Look for areas where there may be a communication breakdown
- Look for steps that you might skip or possibly consolidate. Do the steps add value?
- Do you need to replace or add a step?
- Are the tasks assigned to the correct function or people?
- How can you make the process function more quickly and more effectively?

Tips

A key point about the flowchart is that it must accurately depict the sequence of the events and use symbols that are understood. An easy way to ensure that the representation is accurate is to either gather input from all the appropriate stakeholders involved in the process and or have them check the final flowchart.

Also, note that if your flowchart is complex there is a good probability that the process may not have been well-thought-out or designed to start with. It could also be that steps were added as the process grew and overtime to deal with problems or symptoms of the problems. One last possibility is that extra steps were added due to poor quality. Any of these causes suggests an opportunity for process improvement once the analysis has been completed.

Histograms

Overview

To discuss histograms, we need to back up a minute to discuss data. Most data will be dispersed or have variation. When we look at a certain amount of data we can expect and detect an amount of variation.

For instance, most of us commute to work every day, take the same route, drive the same vehicle, and leave at the same time to get to work. We usually find that some days the trip is shorter and some days longer. When we look at a certain amount of data, we can expect dispersion or variances. We live in a world of dispersion. Consider the life of an electrical appliance. Even though the life on the average is long if there is much dispersion some of the appliances will wear out faster than others. This implies a loss in the reliability of the product. One criterion for judging the quality of products is whether, on the average, the life is relatively long and at the same time the dispersion or variation is small.

- Values in a set of data almost always show variation.
- Variation displays a pattern
  - Patterns of variation are called distributions.
- Displays the distribution of measurement data rather than characteristics.
- The shape of the distribution in a histogram reveals the amount of variation within a process.

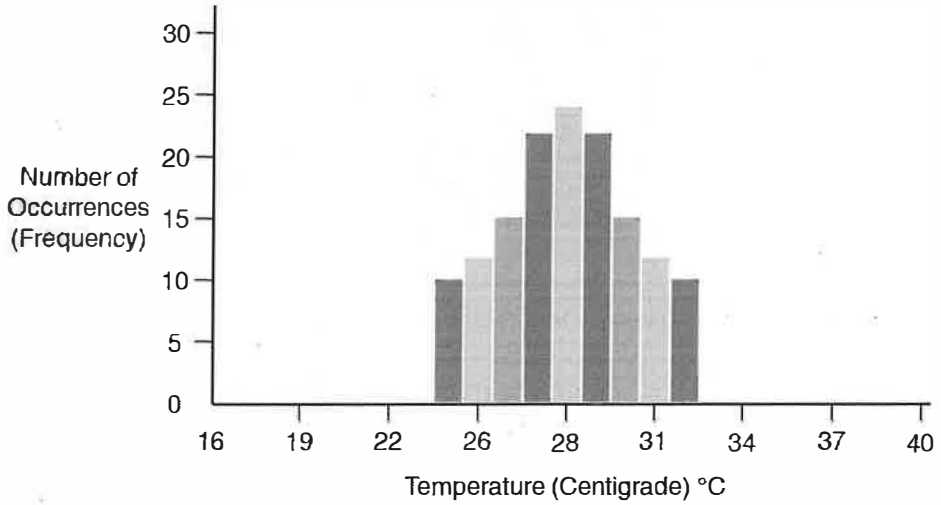

Figure 41 Histogram

A histogram illustrates the frequency distribution of the data. Unlike the Pareto chart, the histogram displays the distribution of measurement data rather than characteristics. The shape of the distribution in a histogram reveals the amount of variation within a process.

The Bell Curve

A "bell shape" represents the normal distribution of data from a process. The most frequently appearing value (mode) is centered, and data appears equally on either side. Points are as likely to occur on one side of the curve as the other. We will discuss the normal distribution more when we discuss basic statistical control.

An example of a histogram with a "normal distribution" is shown below. The bell shape curve has been superimposed over the data set to help display the distribution of the data.

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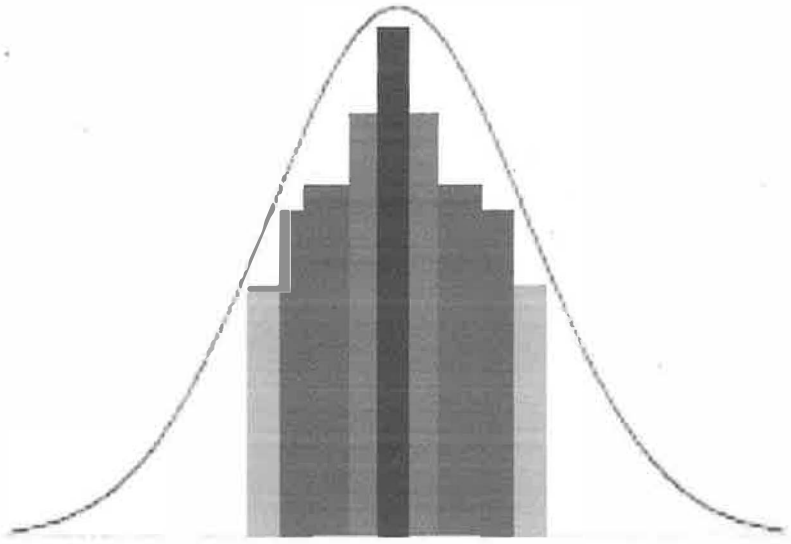

Figure 42 The Bell Curve (Normal Distribution)

The shape of the distribution in a histogram reveals the amount of variation within a process. In addition to the bell-shaped curve, there are seven other common histogram patterns. While all the different types are beyond this discussion, the point to understand is that deviations from a normal bell shape should be investigated, but they are not necessarily bad and do not necessarily mean there is something wrong with the process. For example, many processes may have natural limits on one side or another.

Histograms can be useful to:

- Provide a clearer and more complete picture of data patterns – to see if a change has occurred over time.
- Analyze and visually communicate information about variation in process behavior.
- Make decisions about where to focus improvement efforts – to see if the output of a process has a distribution that might need to be studied.

Cause-and-Effect Diagram

After collecting the data and creating the histogram, the histogram can reveal that items that are produced in the same way can turn out differently. In many cases, the variation occurs because there are differences in raw materials, tools, equipment, the work method or process, and the measurement. The casual factors of variation point to the cause-and-effect relationship. This is where a cause-and-effect diagram can help.

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The cause-and-effect diagram is also called the Ishikawa diagram after its developer, Kaoru Ishikawa, who in 1943 first used it to explain to engineers how various factors could be sorted and related. It is also referred to as a Fishbone diagram because its elements resemble the skeleton of a fish.

A fishbone diagram is a visual method that shows the many different causes that may contribute to a problem by mapping out a list of factors (the causes that are thought to cause the problem).

Here is an example of a cause-and-effect diagram:

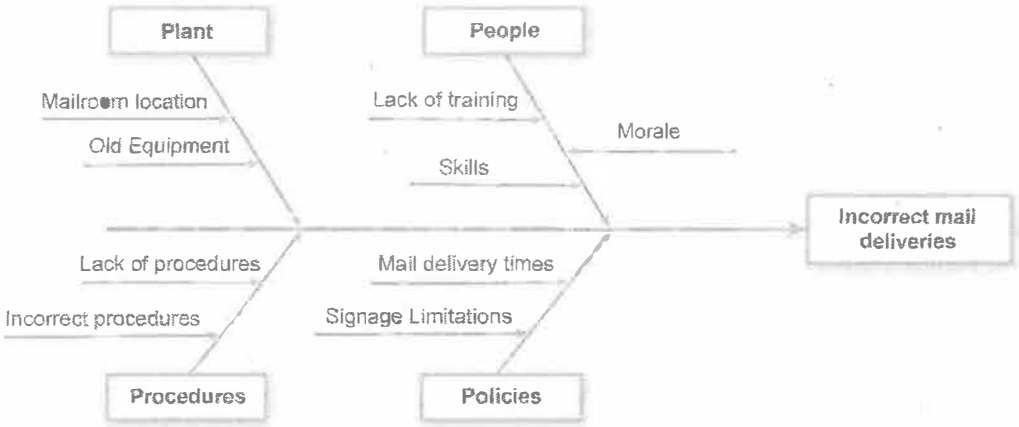

Figure 43 Cause-and-Effect Diagram

Based on the cause-and-effect diagram above, you can see the problem is incorrect mail deliveries. The major categories for consideration are procedures, policies, plant, and people.

Causal Factors

When considering cause and effect the major categories for consideration are procedures, policies, plant and people. Relevant to FM services, common causal factors for the major categories are generally related to influences from what we call the four P's.

People	the human influences
Plant	the space and equipment
Policies	the rules for decisions
Procedures	the steps in the tasks

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There are no formal rules about the name and the number of categories. Ultimately the categories should fit the problem being examined.

Five Whys

Another tool that is very useful when building a cause-and-effect diagram is called the five whys. Some people refer to it as a process rather than a tool. Either way, it is a very effective tool to use with the cause-and-effect diagram to get to a root cause of an issue. Here is how the tool works, using the diagram above.

In the discussion, someone comes up with people as a potential cause of the problem. Asking why might bring the response that skills are causing incorrect mail deliveries. Asking why skills are causing incorrect mail deliveries we may learn that we are hiring employees without skills to work in the mail room. By repeating the question "why" five times, you can peel away the layers of information to lead to the root cause of a problem. Very often the perceived reason for a problem will lead you to a question.

Why five times? There is no specific reason, it is just a rule of thumb. You may find the need to ask the question fewer or more than five times before you find the issue related to the problem.

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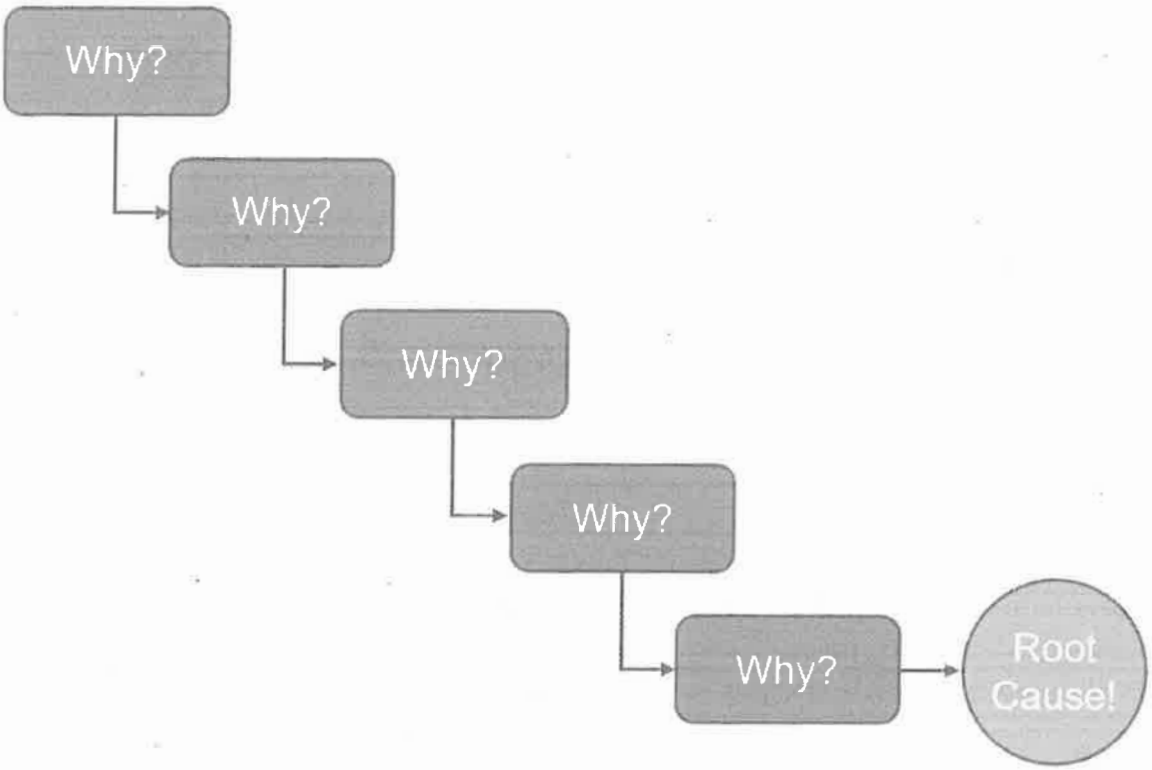

Figure 44 Five Why's Diagram

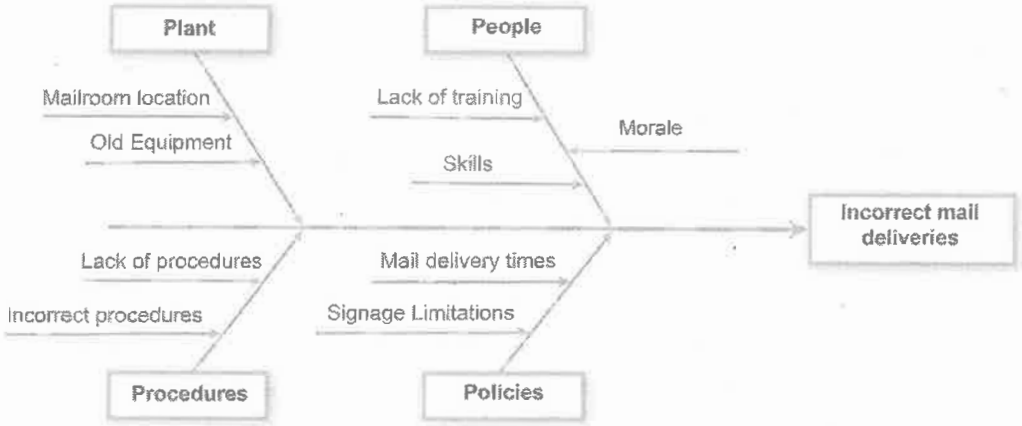

Figure 45 Fishbone: Cause & Effect Diagram

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Lesson 7: Quality Management Processes

Lesson 7: Objectives

On completion of this lesson, you will be able to:

- Describe the various quality processes
- Explain the differences between the PDCA and DMAIC processes

Review: Quality Management Processes

The evolution of quality that we discussed in Chapter 1 shows that the quality revolution in Japan gave birth to the concept of total quality management, TQM. This method placed emphasis on statistics and approaches that embraced the entire organization. Shewhart's Plan-Do-Check-Act process and Kaizen were originally a part of TQM.

ISO Adopts PDCA

Late in the 20th century, many independent organizations began to create other processes and systems. In 1980 Motorola developed Six Sigma which gave us the Define, Measure, Analyze, Implement and Control (DMAIC) process and the concept of different levels of practice known as "Black, Yellow or Green Belts". Other unique systems, such as Lean Manufacturing, began to emerge under the term Quality Management System (QMS) which led to the development of standards for Quality such as ISO 9000.

Quality management systems as prescribed in the standards remain timeless. The ISO Standard for FM ISO 41001 has incorporated Shewhart's Plan-Do-Check-Act and is considered the process approach methodology. Remember this ISO standard is a quality management framework. It is not telling you how to do FM, it defines a quality management framework for FM.

PDCA Process

We covered the PDCA cycle in the Performance Management Section, but it bears repeating. PDCA is a repetitive four-stage process used to achieve continuous improvement. The stages formed the basis for TQM and more recently the ISO standards. The following elements should be considered in each stage:

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The ISO 411001 FM System

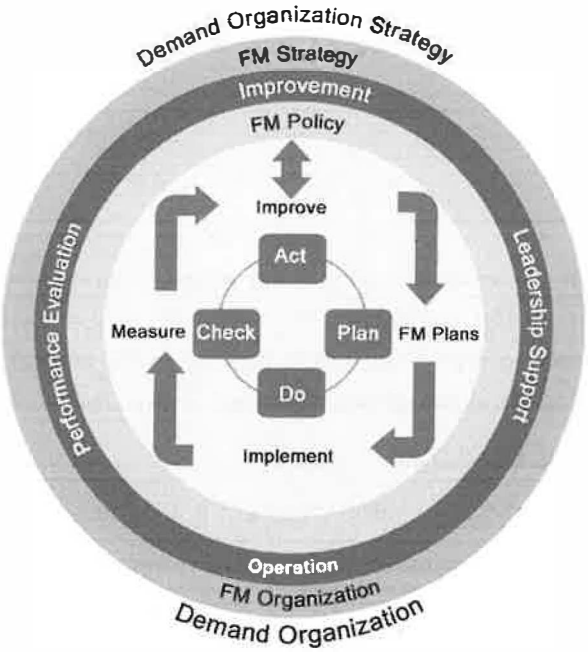

Figure 46 PDCA Process

Plan

This is the beginning of the process. FM should take necessary initiatives to understand the nature of the current inefficiencies in the process and the need for changes. In this stage, it is also important to ask questions such as "What are the best ways to bring about the change?" and "What are the costs and benefits of doing the same?"

Do

This is the implementation stage of the planned improvements. The support of the employees who are affected by the change is vital, thus first, they should be clearly informed regarding the changes and why they should be implemented. Following this, the changes can be implemented as planned. If any type of resistance from the employees develops even after proper communication, the decision-makers should be able to implement suitable remedies.

Check

In the Check stage, the decision-makers evaluate whether the intended outcome has been achieved. To 'check', the actual results must be compared against the expected results.

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Act

The procedure for the Act stage depends on the findings in the Check stage. If the Check stage proved that the process improvements were achieved during the Do stage, then the company should proceed in acting upon the new processes.

DMAIC Process

Overview

DMAIC refers to a data-driven improvement cycle used for improving, enhancing, and stabilizing business processes. DMAIC contains 5 steps that are sequential in nature: Define, Measure, Analyze, Improve, and Control. The DMAIC process is the central tool used to drive six sigma projects. The table below defines the steps in the DMAIC Process.

The key difference between PDCA and DMAIC is that:

- PDCA is used to achieve continuous improvement in business process management
- DMAIC is a data-driven improvement cycle used for improving, enhancing and stabilizing business processes containing the 5 stages.

Define

Identifying the problem along with why improvement is needed. Decision-makers specify clear goals in the define stage.

Measure

Quantifying the issue identified in the define stage. Here you baseline how the process is running and or establish metrics to monitor progress.

Analyze

This stage is dedicated to understanding the root cause of the problem or the main contributor to the current problem. Once this is identified, it becomes easy to understand the other factors that affect the problem due to the root cause.

Improve

This is the stage planned improvements are implemented. Change management skills are important here to clearly communicate with the employees who are affected by the change.

Control

The improved process is evaluated and controlled through monitoring and standardization.

Summary

The intent of discussing the quality management processes is not to say one is better than the other. Both the PDCA and DMAIC when coupled with statistical process control help to minimize both common cause variation and special cause variation. These two terms will be discussed in the next lesson, statistical process control.

Given the nature of the organization you work with, the extent of its involvement with Six Sigma and the DMAIC process, you may choose to complete Six Sigma training. Regardless of the process your organization uses for continual improvement, statistics will play a key role in analyzing the data.

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Lesson 8: Basic Statistics

Lesson 8: Objectives

On completion of this lesson, you will be able to:

- Identify the methods of data collection used in descriptive statistics

Basic Statistics

Descriptive Statistics

Up to this point, the focus has been on data collection, tools, and different types of charts and graphs. To a certain extent, these tools have helped in interpreting the data. Sometimes, however, we need more than quality tools and charts. This is where understanding basic statistics will help give a more accurate picture of what the data is saying.

A descriptive statistic is a summary statistic that quantitatively describes or summarizes a collection of information. Descriptive statistics is the process of using and analyzing those statistics. Said differently, descriptive statistics are used to condense and summarize large quantities of data. They are helpful in reducing the amount of data you must interpret and can point out specific issues that may be more important than others.

The intent of this lesson is not to make you an expert in statistics. The intent is to give you enough knowledge about statistics to help you understand the bigger picture of analysis.

We will consider:

- Measures of central tendency
- Measures of variation
- Statistical process control, SPC
- Measures of association/correlation

But first, let's discuss the concept of Central Tendency.

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Measures of Central Tendency

Central tendency is a descriptive summary of a whole set of data that reflects the center of the data distribution. The center point of the data will lead you to the amount of dispersion or variability within a product, process or service, and is one of the core concepts in statistics. It does not provide information about the individual values in the dataset, but it delivers a comprehensive summary of all the datasets.

The three measures of central tendency are Mean, Median and Mode. You may be familiar with these terms.

Mean Mean is the sum of all the values in a dataset divided by the total number of values. You know this to be an average and it is represented by an **X** with a bar over it.

Median Median is the middle value in the dataset that is arranged in ascending order from the smallest to the largest number. If the dataset contains an even number of values, the median of the dataset is the mean of the two middle values.

Mode Mode is the most frequently occurring value in a dataset. In some cases, a dataset can contain multiple modes while some datasets may not have any mode at all.

The Mean is probably the most common measure of central tendency; it is calculated by adding all the data values and then dividing by the number of values. While the mean is simple to calculate, it can be problematic if there are too few data values or if there is a large range of differences in the values.

For example, if four occupants rated a FM service as 1 (indicating poor) and one rated it as 10 (excellent), the mean rating would be 2.8. This may not be the best measure of perception of the service.

In this case, the Mode, or the value that occurs most frequently, might tell us more. But what would happen if we had many data points and there were some extreme scores? In our FM service example, let us say that we have 50 assessments, not five, and, while most evaluations show total scores around 7 on our 10-point scale, some are very high and a few are very low.

The three measures of central tendency are Mean, Median, and Mode. You may be familiar with these terms, so match the terms for measures of central tendency with the correct definition below.

Exercise

Calculate the Mean, Median, and Mode

Instructions:

Use the dataset below to calculate the Mean, Median, and Mode:

Dataset:

4	6	6	8	10	10	10	12	12	12	12	12	13	13	13	14

Participant Work Sheet

1. **Calculate the sum of all the values in the dataset**
   a Sum =
2. **Calculate the total number of values**
   a Total =
3. **Calculate the Mean**
   a **Mean =**
4. **Calculate the Median**
   a **Median =**
5. **Calculate the Mode**
   a **Mode =**

Solution:

Mean (average) = 10.4

Median= 11 (point above and below the 50% line)

Mode = 12 (Most frequently occurring score)

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Range & Standard Deviation

The **Standard Deviation** shows the distribution (variation) around the mean or center point

The **Range** is the area of variation between the upper (high value) and lower (low value) on a scale. For example, the cost is thought to be in the range of $1 million to $8 million per day.

A **normal distribution** of data means that most of the examples are close to the average and relatively few tend to be one extreme or the other. Normally distributed data will have graphs that look like the bell curve.

Most spreadsheets (Figure 47) and data management tools have a standard deviation function on them for easy calculation.

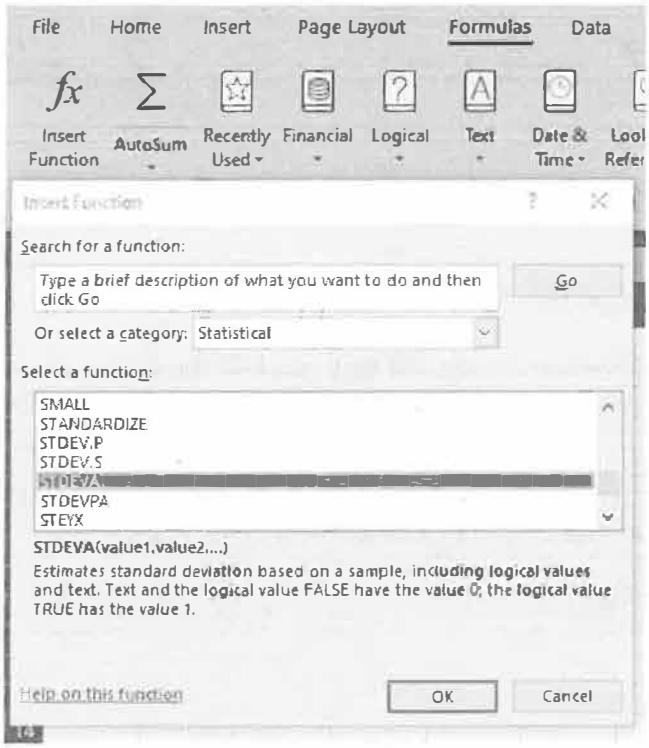

Figure 47 Excel includes function to calculate Standard Deviation

It is not important for you to know how to calculate the standard deviation, but it is important that you know that:

- 68% of the distribution (values) fall on either side of the mean or average value. (1-Standard Deviation)

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- 95% of the distribution (values) fall on either side of the mean value (2-Standard Deviation)
- 100% of the distribution (values) fall all on either side of the mean. (3-Standard Deviation)

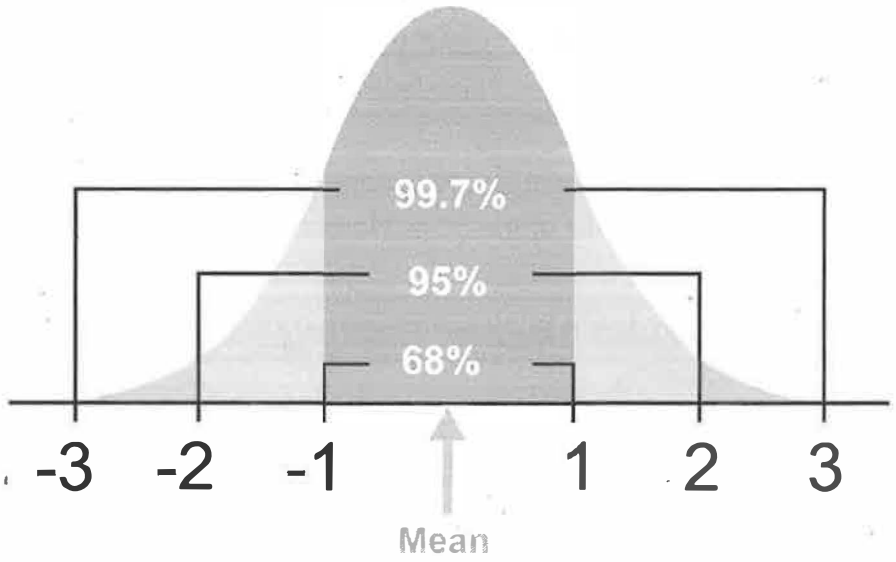

Figure 48 Deviation

What the Standard Deviation Tells You

- A large Standard Deviation (Figure 49) tells you that the data is diverse, while a small standard deviation tells you that the data is tightly bunched together.
- Statistical Process Control (SPC) helps the FM utilize the standard deviation to monitor and control a process by looking at the distribution of data from a process. We will look at Statistical Process Control (SPC) in the next section.

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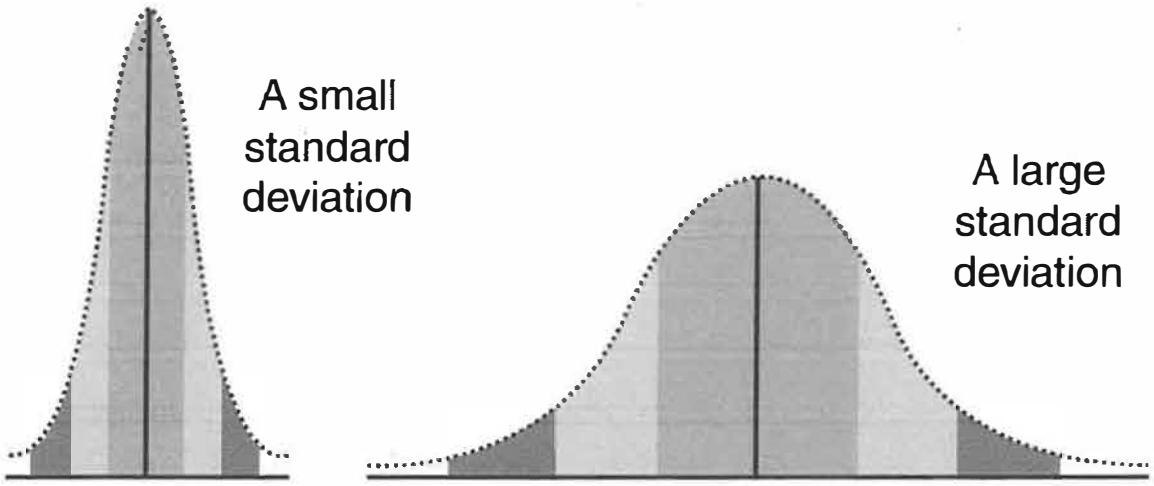

Figure 49 Standard Deviation

Statistical Process Control (SPC)

Statistical process control (SPC) is a method of quality control that uses statistical methods to monitor and control a process. SPC is the application of techniques to measure and analyze variation in the process. This helps to ensure that the process operates efficiently, producing more specification-conforming products with less waste. It is mostly used in manufacturing operations; however, it can be used in FM as well.

SPC uses basic charts for trend analysis and control charts. Once a trend has been established and a process or service is considered stable, control limits can be added to chart to monitor how well the process or service is doing. Since this course is not intended to teach statistics, we will only discuss the trend chart which is the start of the control chart.

Trend Analysis

We discussed trend analysis in Performance Management. A trend describes a variable's tendency over time to increase, decrease or remain unchanged. Trend analysis is the charting of trend data to identify, interpret and respond to patterns. The desired trend might be upward, downward, or sustained.

Some examples are:

- A continuous upward trend in customer satisfaction ratings
- A continuous downward trend in FM administrative costs
- A sustained level of performance in compliance with industry standards

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Run Chart

A run chart (Figure 50) is a line graph that reveals patterns in data over time. The chart typically plots measurement or count data on the vertical (Y) axis and time or sequence data on the horizontal (X) axis. A reference line is usually added to show the average of data.

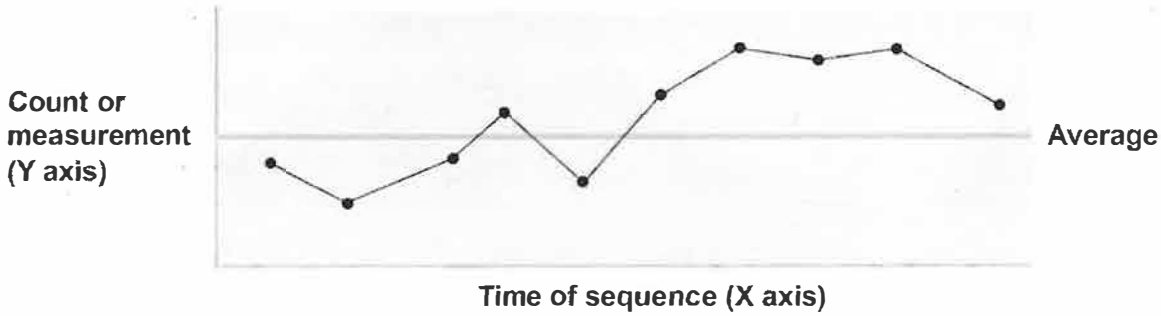

Figure 50 Run Chart

The run chart above has the mean or average drawn as the centerline of the chart. You can see the distribution as the points above and below the centerline. A run chart shows data points plotted in the order in which they occur.

The simple picture portrayed over time:

- Reveals shifts, patterns and trends over time with the data
- Shows the variation
- Identifies decline or improvement.

Trend analysis helps to identify patterns in FM performance, whether favorable or unfavorable, as compared to identified indicators such as goals, standards or past performance. In addition, trend analysis helps to assess the effects of corrective and preventive action and ensure that improvement gains are sustained over time.

Once you have FM measurement results you can look to see what needs improvement. Trends are the key to doing this. In practice, finding a trend is really just basic pattern recognition. Measurement data will show what is happening and allow you to make informed decisions. Being able to make decisions based on accurate, insightful information is the path to create improvements.

Correlation Analysis

Correlation is a statistical measure of the relationship between two variables. The correlation coefficient is measured on a scale that varies from +1 through 0 to –1.

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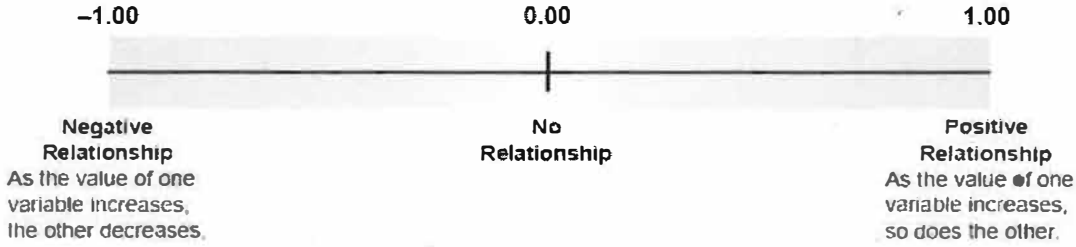
Complete correlation between two variables is expressed by either +1 or –1. When one variable increases as the other increases, the correlation is positive (at some value between 0 and +1); when one increases as the other decreases, the correlation is negative (at some value between 0 and –1). The complete absence of correlation is represented by 0.

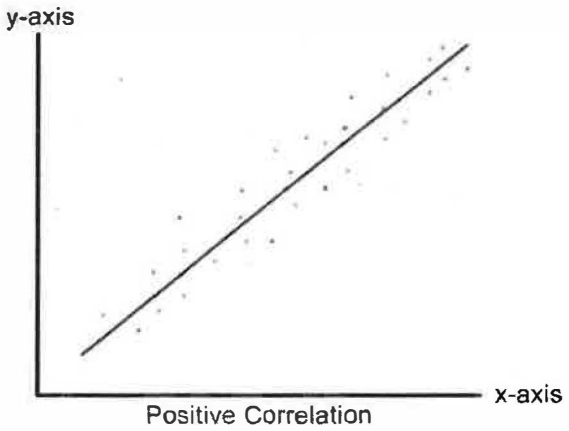


For example, if we are looking at the variables of training and time, a negative relationship might be that many months of FM staff training have no impact on the number of customer complaints. Using the same two variables of training and time, a positive relationship might mean as FM staff training increases, there are fewer customer complaints.

A correlation coefficient, a number between −1 and +1 calculated to represent the linear dependence of two variables or sets of data shows the strength or weakness of the relationship.

Positive Correlation

A correlation coefficient of 1.0 or more shows a **positive** relationship between the variables and is depicted in the graph.



Negative Correlation

A correlation coefficient of -1.0 or more shows a **negative** relationship between the variables and is depicted in the graph.

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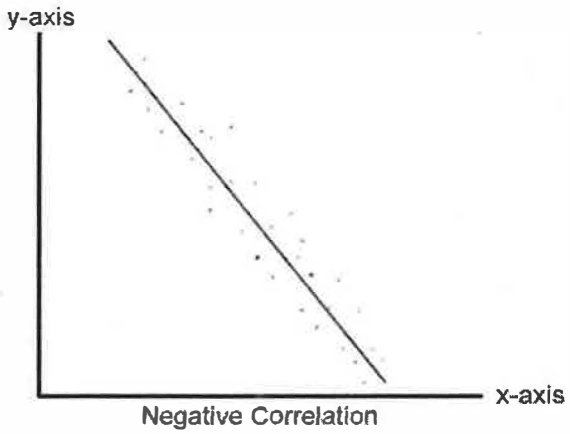
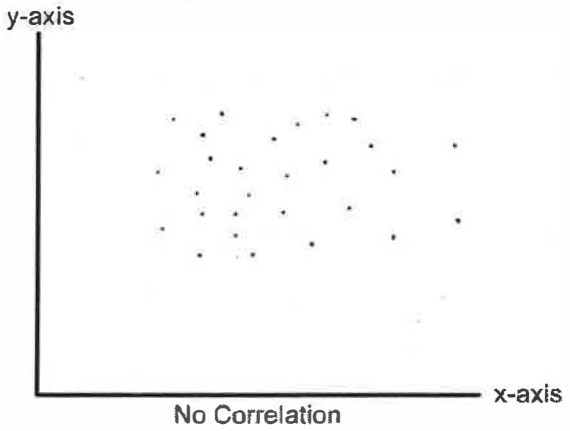


No Correlation

A correlation coefficient of 0 (zero) shows a **NO** relationship between the variables and is depicted in the graph.



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Lesson 9: Leading and Lagging Indicators

Lesson 9: Objective

On completion of this lesson, you will be able to:

- Describe the difference between leading and lagging indicators

Measurement Review

In Performance Management, we talked about the different types of measures. There are three types of metrics to be concerned with:

M1 = The metric that measures at the performer level. This is internal to a sub-process
M2 = The metric between the sub-processes that measures queue time or wait time
M3 = The output metric

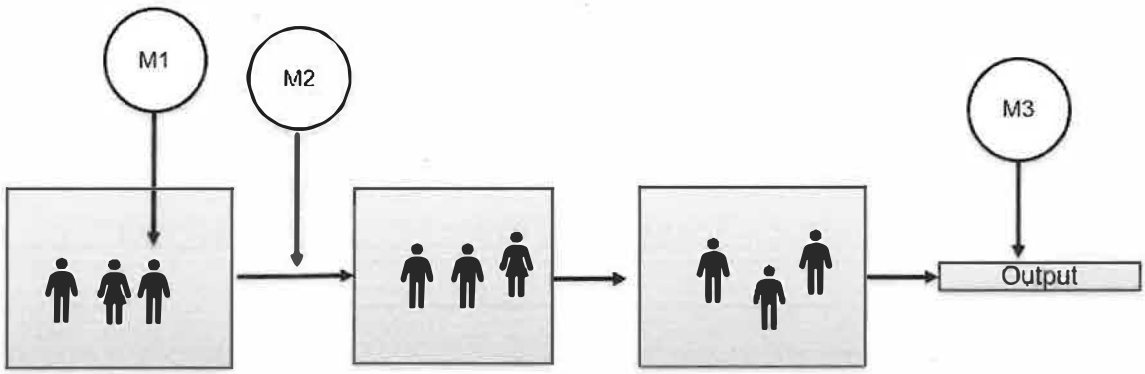

Figure 51 Types of Metrics

These measures fall into the categories of leading and lagging indicators. The term "indicator" generally refers to a metric whose main task is to point toward a certain situation/aspect. In quality (as in other areas of FM), there are both lagging indicators and leading indicators. In practice, both types are a part of trend analysis.

Lagging Indicators

A lagging indicator is a metric that mainly refers to past developments, effects and results. It shows actual trends against performance levels. In other words, a lagging indicator reflects history and final outcomes of certain actions and processes. Many lagging

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indicators are associated with regulatory compliance issues and warranties. M1 and M3 measures are usually lagging indicators. An example of a lagging indicator is the budget spent on equipment repair in the last fiscal year.

Although useful in many ways, lagging indicators often do not provide enough information to guide future actions and ensure overall FM quality. They have been humorously described as doing "less of a bad thing." In that regard, a lagging indicator may put the quality emphasis on the wrong thing. There are several reasons why lagging indicators may not be enough to sustain quality FM:

- There is often a time delay in the data. As the name implies, lagging indicators are just that. They may provide information too late for FM to respond to issues that can arise.
- The data may be inconclusive. Performance outcomes may be the result of many factors. Should this be the case, lagging indicators can tell you how well you are doing but may not offer useful information about what is causing the results. It can be difficult to know exactly how to further improve performance. Or lagging indicators may fail to reveal developing problems that can result in severe performance issues.
- The data leads people to react. Lagging indicators may provide a basis for corrective action if the results deviate from the outcomes that are expected. However, this manifests itself as a reactive approach; corrective action begins after the "bad" results have been noted.

In contrast, leading indicators tend to foster a more proactive and preventive approach to quality FM.

Leading Indicators

A leading indicator is a metric that provides measures that can be used to predict the outcome of future events based on the analysis of past and current results. It provides the ability to influence and improve future performance by guiding current actions.

Leading indicators are valuable metrics to support FM quality and performance improvements because they:

- Provide information that allows FM to respond to changing circumstances and act to either achieve desired outcomes or avoid unwanted outcomes.
- Give advance warning of any developing weaknesses before problems appear.
- Promote action that corrects potential service weaknesses without waiting for service failures.
- Identify performance metrics that may warrant further investigation.

Both leading and lagging indicators are useful. And they can be used in conjunction with each other. For example, by measuring the degree to which best practices are being followed, leading performance indicators can complement the use of lagging indicators and compensate for some of their shortcomings.

Here are some examples:

- One of the desired outcomes of FM services is promoting human comfort, safety, and health balanced with the need to be efficient and effective for the demand organization. Measuring the air quality daily is a leading indicator. An FM can take action to adjust the air quality and prevent health issues from occurring.
- Think of predictive maintenance where FM does infrared testing of electrical connectors to determine the potential for failure. Collecting the data over time on a run chart is a leading indicator that an FM can look at to determine if the electrical connectors can be put into a system and work.
- Using Estimated Useful Life, EUL, of a mechanical system as a predictor of a need to replace FCI is a leading indicator.

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Lesson 10: FM Internal Audits

Lesson 10: Objectives

On completion of this lesson, you will be able to:

- Identify the purpose of internal audits in Facility Management

FM is the Guardian

Facility management is the guardian of an organization's physical assets. In fulfilling this role, a facility manager's objective is to minimize risks to the organization. Internal audits and inspections help to provide assurance that facilities are following laws and regulations, organizational policies, and standards.

The responsibility for planning and conducting internal audits and inspections for an organization's full range of operations can be daunting. It is a significant responsibility added to an already long list of FM roles and responsibilities.

The act of auditing is generally described as a methodical examination and review. There are many types of audits in facility management. There are safety audits, environmental audits, business continuity audits, and more.

Audits may be performed on a product, service, process, or system. The audit process gathers evidence and helps to evaluate how well audit criteria are being met. FM audits must be objective and impartial, and the audit process must be documented. In general, the audit provides the "as is" state. Once we know this, gaps can be identified, and improvements can be made as to the outcome of the audit.

The following are examples of FM internal audits:

- A facilities audit examines the existing physical condition and functional performance of buildings and infrastructure, including deficiencies.
- A space audit (often part of a full facilities audit) determines existing space allocation and looks for ways to optimize space use.
- A financial audit examines annual FM expenditures, project accounting, and other financial records.
- An energy audit examines a single building or campus and identifies its use of energy.

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FM Audits and Practice

Introduction

An audit is about finding facts and establishing objective evidence. FM often conducts self-audits of operations (and that is the focus of our discussion). But FM may also be audited by other parties in an organization, outside of FM.

An effective audit depends heavily on the quality of the FM audit system. As well as providing overall coordination of the audit activities, the audit must be planned, documented, scheduled and conducted to assure all quality aspects are covered.

There are four basic steps to doing an FM audit:

1. Prepare and Plan
2. Conduct the audit
3. Report the finding
4. Take corrective and preventative actions

Figure 52 Steps in an Audit

Within each of the four steps are specific tasks and actions. We will review each one in detail in the next section.

Steps to Conduct an Audit

Communicate to those stakeholders and internal customers that the audit is going to be conducted. Put your audit team together, determine who will take the lead in the audit, and brief the team with the developed plan. Note in some cases you will develop the plan with the audit team.

Step 1: Prepare & Plan

The first step is to prepare and plan for the audit. You need to define the purpose, goals and objectives and scope out what you want to accomplish with the audit. Determine all the logistics that will be involved in the audit. Time, location, who will be affected by the audit etc.

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An essential part of planning and preparation is to develop checklists to use during the audit. The checklist should include what questions to ask, the detailed evaluation criteria. Ideally, the checklist shows the relationship between the question and the requirements.

Consider these areas for checklist development:

- List of equipment and facilities
- Operating procedures and or specifications
- Outside audit findings, corrective action requests
- Any failure reports
- Purchase Orders
- Engineering changes

Step 2: Conduct the audit

While conducting the audit, stick to the audit plan and the prepared checklists as closely as possible. Dig deeper when auditee responses indicate any weaknesses or non-conformances in an area.

Obtain facts that answer the audit questions and document those facts. List the reviewed documents. Attach applicable paperwork to your checklists. Every item must be traceable, re-constructible and objective evidence must be made available.

When conducting the audit remember your people skills. Learn as much as possible about the auditee. Recognize that the audit teams' presence may be an imposition or could be intimidating. Know your subject material before you go out. Be positive and always maintain control of the interview. Be a good listener. Be professional and keep your questions short and to the point.

Step 3: Report your findings

Proper presentation to the auditee is a vital factor in achieving understanding and acceptance of the thinking in non-conformances and in obtaining commitments for corrective actions.

The findings meeting should be presented as soon as possible after the audit has been completed and after the lead auditor has once again reviewed all non-conformances and prepared an agenda. The meeting should allow adequate time to fully cover all the non-conformances, pertinent feedback from the audience and proposed corrective action.

Step 4: Issue Resolution

When the audit is completed, document and communicate deficiencies and areas of non-compliance in a formal audit report. Follow up on the items issued to evaluate the actions that have been taken and to correct the deficiencies in a timely manner. Follow up with

both employees and customers. After verification and the action items have been resolved, close out the audit process.

A corporate audit may be done on relatively short notice (e.g., two weeks). In such a scenario, the auditors generally do not request any preparation by the FM. The audit starts from process and procedure reviews, followed by operational practices audited against the processes and procedures. Findings stated in an audit report often include a score, for example, a ranking of Excellent (0–3), Satisfactory (4–6), Pass (7–9) and Failure (>10).

Auditors discuss the findings and any required corrective actions with the FM organization, including a time frame for completion. For failure scores, corporate auditors typically return within six months to conduct a second round (follow-up) to ensure that all findings have been addressed, the recommended action plan has been implemented and corrective actions are appropriate.

Benefits of Conducting an FM Audit

The benefits of FM audits are straightforward and strong. Depending on the type of audit, unbiased facts help to:

- Verify compliance.
- Minimize exposure to risk and fines.
- Understand costs.
- Determine current capabilities.
- Measure operational effectiveness and efficiency.
- Assess quality.
- Identify opportunities for improvement.
- Support informed management decisions.
- Ensure that executive management and demand organization requirements are satisfied.

Caution

Given the benefits of audits for the entire organization, one would think employees and service providers would embrace the process and that audit performance is easily achieved. However, various factors can hinder or potentially derail the audit process and undermine the benefits. Be mindful of the following cautions.

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Faults & Irregularities

An audit should not be conducted for the sole purpose of finding irregularities and faults. During an audit, evidence may uncover deficiencies and the need for improvement, but the audit should establish whether processes are effective.

Inspection

An audit should not be used as an inspection.

Communication

An auditor needs to practice effective communication.

Scope

The purpose and scope of an audit must be clearly defined. If purpose and scope are inadequately defined, the audit results may be worthless.

Lesson 11: Service Specifications

Lesson 11: Objectives

On completion of this lesson, you will be able to:

- Describe the various types of service specifications

Service Specifications

Service specifications are defined as the description of service level acceptable to meet customer requirements. It also provides a framework for monitoring actual services and may be used as a benchmark to assess the standard and quality of service provided.

These specifications are an essential key to a facility manager's ability to manage the quality of facility management services, either in-house or contract since they provide a core metric – what the service is to look like or to do. They are the basis of key performance metrics.

Service specifications cover many elements of a facility manager's work. For example:

Internal standards

Relevant organizational or FM standards and/or standards that may have been a part of previous service provider contracts. External standards – conformance to regulatory requirements, international or industry standards, health and safety laws and regulations, manufacturer recommendations.

Procedures

Specifications for what the service provider or facility management staff must do to fulfill required technical standards.

Types of Service Specifications

The level of detail to be provided in a service specification will vary based on the type of specification:

- Prescriptive
- Performance-based, or
- Output-based

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The type selected will depend on the complexity and importance of the service as well as the knowledge, skills, and resources of the facility organization.

The progression from prescriptive to performance and output-based service specifications allows the outsourced service provider greater latitude to develop and apply the best service solution. Let's take a closer look at the three types of services specifications above.

Examples: Service Specifications

Prescriptive

Prescriptive specifications state exactly what will be done, often how and when and by whom. They are typically quite restrictive and leave no room for doubt or negotiation. Any deviation from the prescriptive standard can be considered a failure to perform.

Such a specification is typically used for service of high importance, specialty, or complexity or service with a low tolerance for deviation to ensure conformity to standards, regulations, risk priorities, or other requirements.

Prescriptive Example # 1: The service provider shall conduct a thorough site survey to identify all areas and conditions attractive or susceptible to pest ingress and activity (for example, gaps under exit doors where rodents may enter the building or areas that may pose a potential hygiene problem), structure a pest prevention action plan and devise solutions that create and sustain a pest-free environment, avoid problems such as contamination of product and damage to property, and comply with legislation. The service calls must be performed outside normal business hours by no fewer than two technicians at weekly intervals and findings reported on every visit.

Prescriptive Example # 2: Contractor to provide staffing to the facility by 3:00 a.m. to evaluate conditions and call in needed crews any time accumulation of greater than 1 inch of snow or if an ice event is predicted by the US Weather Service. For a snow event during business hours of 6:00 a.m. to 5:00 p.m. 7 days per week, contractor to plow when 5.08 centimeters/2 inches of snow have accumulated. This is measured by the contractor at the pavement, not to include drifts. After-hours snowfalls to be cleared prior to 6:00 a.m., 7 days per week including holidays. Additional accumulations of 2" or more are to be cleared at least hourly between the hours of 6:00 a.m. and 5:00 p.m. Final accumulation to be cleared within 1 hour of the time the snowfall stops. Environmentally safe deicing materials (to be approved by the owner in advance) are to be applied to all public walks, stairways, handicapped access ramp areas, emergency exit pathways, and parking lot pedestrian paths. Aprons with excess snow after snowplowing will be cleared. If snow stacking needs exceed capacity, the Contractor to notify the facility manager for approval to arrange for snow removal to an alternate site. Additional specifications may apply, such as location of snow aprons, whether and where on-site sand/salt may be stored, equipment or other

obstructions in parking lot, plus provisions for repair of site amenities damaged by snow removal.

Performance-Based

Performance-based specifications typically set quality-related targets that allow some flexibility in determining the most appropriate response. The focus is more on the outputs of the service, allowing the service provider to determine the means and methods.

The following example is the same situation as the prescriptive pest control exercise above, rewritten as a performance specification:

Performance Example #1: The service provider shall identify all areas and conditions attractive or susceptible to pest ingress and activity, structure a pest prevention action plan and devise solutions that create and sustain a pest-free environment, avoid problems such as contamination of product and damage to property, and comply with legislation.

Output-Based

An output-based specification indicates what service is required, not how it should be provided. The focus is on the deliverable, not how they are delivered. This specification is useful where facility management can clearly define what their key business terms are and allows the service provider to perform its obligations with a minimum of constraints.

Output Example # 1: The service provider will sustain a pest-free environment, avoid problems such as contamination of product and damage to property, and comply with legislation.

Summary

Type	Characteristics
Prescriptive	• States exactly what is to be done, how it will be done and the frequency • Specifies inputs • For subcontracted or outsourced services, usually cannot be modified once the contract is running
Performance-Based	• Typically set quality related targets that allow some flexibility in determining the most appropriate response • Focused more on outputs as compared to prescriptive specifications

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Type	Characteristics
Output-Based	• Notes what service is required, not how it should be provided • Focus on what the deliverable is in business terms rather than how it should be delivered • For subcontracted or outsourced services, require FM to clearly define what their key business terms are and allow the service provider to perform its obligations with the minimum of constraints

Selecting the Type of Specification for the Service

The choice of specification type will depend on a range of factors including the following:

Value of Service

The lower the value, the less detailed the specification. If the expertise of the service provider is a part of the service being provided (for example in cleaning services), it would be unnecessary or perhaps detrimental to specify the materials and methodologies.

Relevant Regulations and Statutes

If regulations and statues exist and are to be adhered to, a reference to those regulations and statutes, "as amended", will suffice. There is no sense in repeating the specific text. Reference to the regulations and statues themselves also serves the purpose of allowing for the application of revised versions of those texts.

Maturity of Supply Chain

The ability of a supply chain to understand and deliver against performance-based or out-based specifications may vary. Supply chain maturity may be much lower in emerging economies than in well-developed, established nations and regions. A lower level of maturity may require a higher level of specification.

Technical Nature of Assets Services

The technical nature of the assets and the services can determine the type of specification. Catering is difficult to specify, for example. A catering contract is more than a discussion of food, beverages, and décor. Catering service specifications must accommodate numerous expectations of food service, procedures, fees, liability concerns, dates of delivery, and more.

Impact of Service Failure

The higher the risk, the more prescriptive the specification.

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Measuring Activities and Outputs

The ease (or difficulty) of measuring precise activities and outputs. For example, are there specific quality measures and tools that can help measure or quantify activities or outputs, or are the measures more qualitative and subjective?

FM Role in Service Specifications

When working with service providers, the responsibility to provide adequate service falls upon both parties.

Service Provider Responsibilities

Service providers need to ensure that they are clear about client requirements and secure client input at every point in the service delivery process. The service provider must also take the initiative to ensure that communication is clear, consistent, and is provided in a method that meets the needs of the FM organization.

FM Responsibilities

FM must clearly define what their outputs and key business terms are and should also be prepared to undertake a more "hands-off" approach. That "hands-off" approach does not mean, however, that FM should be deprived of key performance information or progress updates, so the expectations regarding this communication should be discussed and agreed upon.

Service Level Agreements

A customer has specific expectations about the level of service a service provider should deliver. Those expectations are conveyed as service specifications (covered in the previous topic). Before the relationship between FM and the service provider begins, a Service Level Agreement is drafted to translate customer expectations into formal requirements and targets and to create a mutual understanding of the service to be provided.

A service level agreement (SLA) is the part of a service contract where the service expectations are formally defined. SLAs are terms negotiated between the service provider and the facility representative (such as the facility manager). The service provider may be internal staff or outside contractors who perform any delivered service such as operations and maintenance of the facility and its systems as well as occupant services such as custodial, food service, waste management, and so forth.

The facility organization may negotiate an internal service level agreement with the demand organization to establish expectations for response time to service requests, non-

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emergency support hours or even to support the demand organization's sustainability efforts through energy and waste reduction. It may negotiate an external service level agreement with a contractor/service provider to maintain landscape to a certain level, to perform carpet and upholstery cleaning or to maintain and keep operational the HVAC equipment in the facility.

SLA Elements & Content Examples

The table below identifies and provides examples of core elements found in *most* SLAs. The specific details of an SLA will vary depending on the nature of the services to be provided and how formal or informal the relationship is between the parties. SLAs:

- Describe the service to be provided to the customer.
- Describe how and when the customer can access that service.
- Include a statement of the resources available to deliver.
- State how (if at all) routine service delivery costs are to be recovered from the customer team.
- Discuss how conflicting resource requests will be resolved.
- Explain how to obtain (and pay for) additional resources.
- Describe provisions of a complaint-handling process.

SLA Element	Content Examples
Scope of work/Service specifications	Standard services Nonstandard services Terms of the services to be provided (where and frequency) Change provisions Delays Warranties
Performance tracking and reporting	Key personnel How services will be monitored Benchmarks, targets, and metrics to be utilized Service level reporting
Other administrative elements	Service review meetings Description of service to be provided to customer Description of how and when customer can access that service

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	Statement of resources available to deliver How routine service delivery costs are to be recovered from the customer team (if applicable) Discussion of how conflicting resource requests will be resolved Explanation of how to obtain and pay for additional resources
Quality Measures	Description of provisions for a complaint-handling process Means to incorporate customer feedback to assess performance Tracking of performance indicators Mutually derived performance metrics and standards Commitment to continuous improvement Best practices relevant to the service in question

Table 8 SLA Elements & Examples
**The conventions used to name the SLA elements and how the contents are organized across the sections can differ. Also, the examples shown may not be necessary inclusions in every SLA. However, some SLAs may require more detail.*

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Lesson 12: Key Performance Indicators Defined

Lesson 12: Objectives

On completion of this lesson, you will be able to:

- Identify the difference between metrics and KPIs

Metrics and KPIs for Service Level Definition and Measurement

Improving decision-making, especially in an environment that is budget-competitive, requires careful consideration of business drivers. This evaluation will start with a determination of KPIs that exist for the demand organization.

These may be related to:

- Profitability
- Stakeholder satisfaction or customer retention
- Corporate objectives, such as sustainability or social responsibility
- Business continuity, defined as the maintenance and/or recovery of business operations during and after conditions of duress (a disaster)
- Employee retention

From these demand organizational KPIs, facility management can focus on those KPIs that it can directly impact. Metrics chosen should be within the sphere of FM influence, be aligned with the entire organization's business strategy and support the development of KPIs. They should guide FM staff and external service providers but still allow reasonable latitude for experience and expertise during implementation to achieve the goals.

We discussed the difference between KPIs and metrics in Performance Management.

The FM organization should distinguish between KPIs and routine performance indicators. In FM, it is important to be clear about what constitutes key performance for the demand organization, and what constitutes key performance for the FM organization. These may not be the same thing, but they should align. Both should be tracked and reported to appropriate levels of the organization.

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KPIs should be focused on critical success factors. These are the factors that are directly relevant to the effectiveness of the organization's performance. An excessive number will detract from efficient monitoring.

Summary: Choosing the Right Metrics

Just as there is no universal approach to managing a facility, there is no single solution for developing FM KPIs for your organization. In *Managing Facilities and Real Estate*, Michel Theriault promotes a step-by-step framework using the following activities:

1. Establish and quantify FM objectives that support the success of the entire organization
2. Identify appropriate metrics that reflect what you need to know
3. Identify key deliverables that impact the FM organization's success
4. Establish the mechanism to measure and report the performance results

How metrics are stated also varies by organization. Not all can be stated in accounting terms, such as percent reduction in a specific measure. In general, FM metrics should:

- Be understandable
- Clearly communicate priorities, targets and results required to FM staff and external service providers
- Encourage the right behavior
- Lead to fast action if trend lines change
- Ideally, be aligned across an organization and enable a facility manager to continually learn about and improve FM services.

KPIs should be outcome or result-based measures that are linked to FM needs and that support the entire organization's success. There is no universal rule or guide for determining the number of KPIs to utilize but limiting them to those critical success factors implies that they are relatively few.

Various technology and information systems are accessible to most facility managers to facilitate monitoring and metrics. Digital dashboards help to turn the data into relevant and timeline information and support the KPIs.

Chapter 7 Progress Check

1. DMAIC is

   a. A data-driven improvement cycle used for improving, enhancing and stabilizing business processes.
   b. A consensus standard for provision of quality FM Services
   c. A method used to develop and utilize basic service specifications for FM
   d. A quality management process originated for FM work by BOMA

2. Internal audits and inspections are performed for what primary purpose?

   a. To ensure that they are providing maximum efficiency in their efforts to support the demand organization
   b. To find ways to improve facility management operations to reduce costs
   c. Internal audits keep staff aware of the need to constantly perform
   d. To provide assurance that facilities are following laws and regulations, organizational policies and standards.

3. Pareto Charts, Histograms and Flow Charts are examples of:

   a. Quality Management Processes
   b. Quality Management Tools
   c. Quality Benchmarking Documents
   d. Quality Performance Metrics

4. Providing detailed financial records, including measurement against a budgeted and planned spending profile is an example of:

   a. Benchmark
   b. Service Level Agreement
   c. Key Performance Indicator
   d. Performance/service Specification

5. The fishbone diagram popularized in the 1960's by Ishikawa is most frequently utilized to:

   a. Determine Cause and Effect
   b. Provide an outline for iterative quality processes
   c. Demonstrate sequential events
   d. Compare one quality measure against another

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6. The fishbone diagram popularized in the 1960's by Ishikawa is most frequently utilized to:

   a. Determine Cause and Effect
   b. Provide an outline for iterative quality processes
   c. Demonstrate sequential events
   d. Compare one quality measure against another

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Chapter 8: Quality Assessment of Facility Management Services

Introduction

In this chapter we will examine use of qualitative and quantitative data in assisting a facility manager with a comprehensive assessment of customer satisfaction. Utilizing a complaint management system can be a valuable way to collect good qualitative and quantitative data. Being open to complaints and constructive criticism can give a Facility Manager invaluable information that can positively impact the bottom line.

Lessons

- Objectives
- Lesson 1: Measuring Customer Satisfaction
- Lesson 2: Analyzing Customer Feedback

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Objectives

Chapter 8: Objectives

On completion of this chapter, you will be able to:

- Utilize various qualitative and quantitative methods to assess facility management services
- Describe methods to analyze customer feedback

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Lesson 1: Measuring Customer Satisfaction

Lesson 1: Objective

On completion of this lesson, you will be able to:

- Utilize various qualitative and quantitative methods to assess facility management services

Qualitative and Quantitative Measures

Earlier in this course, we reviewed several primary quality tools, including Quantitative Tools used for organizing and communicating numerical data:

- Pareto chart
- Check sheet
- Control chart
- Histogram

Qualitative Tools used to process information for decision making:

- Flowchart
- Cause-and-effect diagram

Simultaneous use of qualitative and quantitative data provides a facility manager with a full, well-rounded, and comprehensive assessment of customer satisfaction.

Qualitative Tools	Quantitative Tools
Flow Chart	Pareto chart
Cause and Effect Diagram	Check sheet
Surveys	Control Chart
Focus Groups	Histogram
Interviews	Basic Statistical Tools

Table 9 Qualitative vs. Quantitative Measures

Qualitative data is based on research that supplies non-numeric data, for example, using interviews, focus groups, open-ended survey questions, observations, or other methods that gather expression of attitudes, opinions, and feelings. As these measures focus on

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discovering underlying perceptions and motivations instead of more concrete, objective (quantitative) criteria, they are sometimes referred to as "soft" or even "subjective" measures. It is often necessary to use qualitative measures because objective criteria are not always applicable when assessing FM quality and customer satisfaction.

Quantitative data is based on numeric data that is analyzed with statistical methods. Quantitative data consists of "hard" measures that can be readily averaged and analyzed. Sources of quantitative data include surveys, trends, benchmarking, and scorecards. Common statistical methods for averaging data and analyzing patterns in the data include Mean, Median, Mode, Range, Standard deviation, Correlation analysis (all discussed in Chapter 7).

Reliability and Validity

Whatever type of measurement is used, the challenge is to ensure that the data is reliable (in the context of customer service satisfaction measurement) and valid. A reliable instrument or method is not necessarily valid, but a valid instrument is always reliable.

Reliability is the ability of an instrument to measure consistently when used under the same conditions with the same subjects. In other words, reliability is a measure of the repeatability of the data.

Validity is the ability of an instrument to measure what it is intended to measure, or the strength of its conclusions, inferences, or propositions. Validity is a measure of the accuracy of the data.

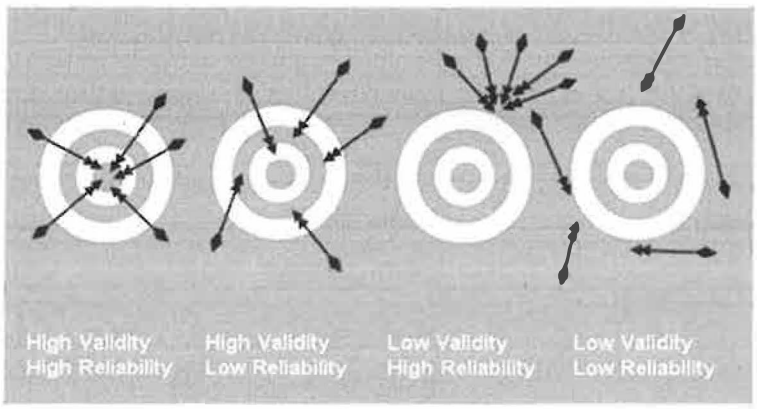

Figure 53 Validity versus Reliability

Validity answers two questions:

- What does the instrument measure?

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- How well does the instrument measure it?

Validity and reliability are particularly relevant to survey research applications. With surveys, validity is the ability of survey questions to accurately determine respondent attitudes, behaviors or beliefs. The wording of questions is critical because all respondents must perceive each question's intent in the same way. Reliability refers to a survey's repeatability and is often expressed in terms of sample error or precision.

Complaint Management

A complaint management system is one of the most valuable ways to collect good qualitative and quantitative data in a customer-focused organization. Making it easy for the stakeholders to complain or provide you with input gives you greater opportunity to correct and improve FM services and encourages continued communication.

This also means that by welcoming complaints, the FM organization is leveraging the potential to reduce costs and improve the bottom line. Best-in-class organizations make it easy for stakeholders to complain; they even encourage complaints. They then make significant efforts to set things right and make changes so that future customers do not experience similar problems.

Characteristics of an effective complaint management system

An effective complaint-handling system proactively encourages stakeholders to provide feedback and facilitates prompt and courteous complaint resolution. Features that generally characterize effective complaint management systems are shown below:

Process orientation	A process map is instrumental in complaint handling. Even a simple flowchart can demonstrate what is going on and identify the gaps between the goal of stakeholder satisfaction and the current state.
Organizational commitment	Top management must demonstrate a commitment to dealing with complaints through written policies and procedures, employee accountability, and financial resources. They must also support a regular review of the complaint management system.
Customer/Stakeholder and service provider input	Developing an effective complaint process solicits input from both customers and service providers (both FM staff and

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	external providers). For example, a face-to-face follow-up process with a stakeholder to ensure satisfaction and/or understanding of the actions taken can reduce or eliminate recurring problems.
Ease of access	Stakeholders should be able to express complaints easily. They should have multiple avenues to express complaints (e.g., the organization's Web site, a customer service hotline number and so on).
Timeliness	Timeliness standards vary based on organizational specifics, complexity of the service and other factors, but there is always a strong focus on resolution (e.g., first-call resolution or resolution on the first contact). Certainly, some situations will take longer, but there is a commitment to the customer or other stakeholder and complaint resolution, and the customer is kept informed of the progress regarding the resolution.
Empowered service providers	Point-of-contact service providers understand the processes for handling complaints and are empowered to resolve problems. They are knowledgeable and are trained in dealing with difficult and angry customers.
Complaint tracking and analysis	A process or mechanism such as a computer complaint tracking system (discussed next) is in place so that all employees can access and enter a customer complaint or compliment at any time. Complaints are tracked and regularly analyzed for patterns and trends.
Key performance measures	A variety of performance measures are used to assess the performance of the complaint-handling systems.
Continuous Improvement	Performance measures are monitored to identify gaps that could lead to opportunities to make things better. Feedback from both stakeholders and employees and reevaluation based on satisfaction measurement ensure continuous improvement.

Stakeholder Satisfaction	Quality and stakeholder satisfaction is a priority, and a variety of measures are used to track the performance of the complaint-handling system from the customer's perspective. Overall levels of satisfaction with how a complaint was handled are often tracked using survey responses from customers who have made complaints. Other qualitative characteristics are measured, such as whether the customers understood the way the complaint was handled, and if they felt that they had been treated fairly. Whatever the measures used, there is continual monitoring of customer expectations and satisfaction with their complaint resolution.

Table 10 Characteristics of an effective complaint management system

Technology and Complaint Handling

Technology has become so widely available that it makes the use of technology in complaint handling feasible for nearly all organizations. The use of technology can greatly streamline and facilitate the process of complaint handling. There are many complaint management software solutions available to choose from. In real time, customer complaint software enables FM to track each complaint through its life cycle, from recording and initiation to investigation, reporting and closure, following the appropriate process to ensure that nothing slips through the cracks. Powerful analytics and reporting capabilities with graphical dashboards help facility managers perform trend analysis, spot recurring complaint problems and drive root cause analysis in a timely manner. Based on a complaint, facility managers can also initiate continuous improvement processes.

Benefits and Cautions of Complaint Management

Benefits	Cautions
Complaint management establishes a proactive business attitude for the FM group.	Complaint management requires top management commitment. Complaint system should be quantitative and endorsed by all.
Complaint management provides a way to measure improvement of the FM department in relation to customer service.	Complaints should be monitored (tracked and regularly analyzed).
Complaint management offer FM an opportunity to make amends with dissatisfied customers and restore	Service providers should be trained and empowered.

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Benefits	Cautions
goodwill.	
Complaint management curbs "word-of-mouth" negative publicity that can affect other customers.	Those individuals receiving/processing complaints should be well-trained in customer service techniques.
Complaint management resolves recurring problems to reduce similar complaints in the future.	Be careful not to overpromise and underdeliver due to resource constraints. Complaints need to be followed up and acted on to demonstrate that the process is more responsive to customer feedback.
Identify areas for service improvement.	Time-intensive to get adequate sample size and analyze data.

Table 11 Benefits and Cautions of Complaint Management

Despite the many benefits of complaint management, there are several cautions that will advise FM in the development of a complaint management program. Treated properly, complaints are opportunities for service and quality improvements, and will pay high-quality dividends.

Interviews

Introduction

Interviews provide qualitative information and may yield additional insights through probing questions. They are an important technique that FM can use to eliminate internal bias and identify reasonably objective service attributes important to customers.

Properly designed and executed, interviews can yield valuable customer perceptions about service attributes.

Interviews involve asking a carefully planned, structured series of questions. They may be conducted face-to-face or virtually using voice and video technology. The purpose of an interview is to solicit an unbiased view from a stakeholder or stakeholder group and to ensure that the organization has considered all major issues. This qualitative information can be explored further through a focus group or quantified by a survey.

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The effectiveness of interviews is enhanced through careful planning. For instance: Whoever asks the questions, be it the facility manager, FM staff or a third party, must conduct the interview without preconceptions about the outcome.

The interviewer should probe for additional information as necessary and summarize throughout but must use caution not to bias responses through his or her reactions or by providing non-scripted clarifications. The interviewer may need to adapt his or her personal style to fit a customer's preferences to very quickly establish rapport.

Benefits and Cautions of Interviews

Benefits and cautions for interviews are summarized in the table below.

Benefits	Cautions
Interviews can demonstrate a serious commitment to improvement.	Method of selecting willing participants is difficult to manage objectively to get well-rounded feedback.
Interviews are flexible.	Interviewees may use time as an opportunity to vent.
Interviews allow for probing to collect more in-depth information.	Interviewers should be careful not to ask leading questions.
Structured interviews can yield quantitative data.	Interviewees may answer with what they think is "right."

Table 12 Benefits and Cautions of Interviews

Focus Groups

Introduction to Focus Groups

A focus group is a structured but informal technique to assess stakeholder needs and impressions. A small group of stakeholders (normally six to 12) is invited to participate in a discussion led by a facilitator. A focus group session usually lasts two to three hours.

For participants, the session should feel free-flowing and relatively unstructured. In reality, the facilitator needs to follow a pre-planned script and maintain the group's focus. A good facilitator practices active listening and is adept at conflict resolution (if differences in opinions arise). Being knowledgeable about the topics and having a reasonable measure of enthusiasm for the session is also important, since that enthusiasm can be contagious in a

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group setting. (Note: The Communication competency explains active listening. Both the Communication and Leadership and Strategy competencies discuss conflict resolution.)

A common use of focus groups is in the contemplation of a new product or service for a business. For example: An insurance company considering the launch of a new benefit may conduct several focus groups to determine potential stakeholder demand for the new benefit as well as cost tolerance.

Participant lists must be carefully developed to ensure broad coverage of demographics. When selecting internal focus group participants, stratifying or grouping them by personnel levels (e.g., administrative support staff, technical personnel, management and so forth) typically fosters a comfortable peer environment and encourages participants to open up more than if they were in a mixed group.

A two- to three-hour session does not allow for deep discussions, especially when there is a large group. The facilitator needs to keep the discussion on track but not inhibit the dialogue. He or she must engage all the participants in discussions and avoid letting any one person's opinions dominate.

Benefits and Cautions of Focus Groups

The table below lists focus group benefits and cautions.

Benefits	Cautions
Focus Groups provide a relatively comfortable forum for obtaining feedback.	Focus Groups require competent facilitation.
Focus Groups are completed relatively quickly.	Outputs are difficult to capture if the same person tries to facilitate and scribe; these responsibilities should be split between two people—one to facilitate and one to summarize the discussion in writing.
Focus Groups identify emerging trends in customer expectations (e.g., early warning signs of shifting customer preferences).	What others say can influence participants and make them gravitate to "groupthink" (conformity).
Focus Groups allow for group discussion and prioritization.	Participants need to be representative of the customer base or results may be skewed.
Focus Groups allow for "champions" to be identified (as a future reference).	

Table 13 Benefits and Cautions of Focus Groups

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Survey

Introduction

Assessing customer satisfaction with a survey is a valuable FM management tool. Surveys (questionnaires) are commonly utilized tools that involve asking a series of prepared questions to collect data about opinions, behavior or knowledge. They are frequently used with customers to discover needs and assess satisfaction. Surveys can be conducted face-to-face, over the telephone, by e-mail, or electronically.

Sampling and survey design are both critical in gathering meaningful data and merit additional discussion. In practice, principles of effective sampling and survey design are the same regardless of the survey medium.

In facility management, surveys are predominately conducted online using any number of available software applications. Many popular maintenance management or facility management systems can be programmed to generate a survey to a requester automatically when service has been completed.

Compared with the other survey formats, e-surveys can be administered quickly and at a lower cost. They also provide almost instant analysis. Due to the convenience for users to respond, they often get a higher response rate than telephone or mail surveys.

Sampling

Sampling is the process of selecting several stakeholders to survey in such a way that they represent the larger group (the population) from which they are selected. Stated another way, it allows you to study a part of your stakeholder base to understand and generalize about the entire stakeholder population. Sampling is often used when surveying the entire population is too unwieldy or costly.

There are many scientific sampling methods to choose from, and various research tools can help you draw a valid and representative survey sample. The point here is not to make you a statistician, but simply to reinforce the importance of sampling and provide an overview of four basic methods.

Example of a population:
All employees in a building example of a sample: 20 of 100 employees in the building, selected to represent various pertinent demographics.

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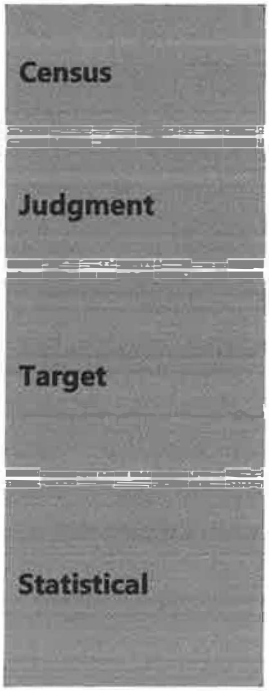
Sample and population are classified as inferential statistics. **Inferential statistics** allow for forming a conclusion about a characteristic of a population by studying a representative sample taken from that population.

Sample size influences survey validity. It must be large enough and sufficiently representative to produce valid survey results. Sampling must also be unbiased to avoid a distorted (skewed) view of customer satisfaction measures.



In a census sample, all stakeholders are selected. It is representative of the entire population because it is the population. Census sampling is used when feedback from all stakeholders is important.

Judgment sampling uses a subset based on the surveyor's knowledge and discretion. While easy to conduct, the degree to which results can be generalized or are valid is questionable.

As the name implies, target sampling selects individuals based on a specific group (for example, internal department managers or external service providers). In target sampling, (also called purposive sampling), the sample is selected with a purpose in mind and includes one or more specific predefined groups.

Statistical sampling uses a subset of customers based on chance. There are different statistical sampling techniques (simple random sampling, stratified random sampling, and cluster sampling) that can be used. A major advantage of statistical sampling is the ability to generalize your results to the larger group from which they are selected.

Designing a Survey

The design of your survey questions and rating scales will determine the data you get back and greatly influence your analysis and conclusions. The type of information that you collect, the question format and word choice will all determine outcome.

Design starts with identifying the type of information desired from the respondents. These types include attitudes, beliefs, behaviors and attributes. A description and example of each is included in the Exhibit below.

Type	Description
Attitudes	Require people to indicate how they feel about something (e.g., whether they have positive or negative feelings)

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	Example: On a scale of 1 to 5, how strongly do you agree or disagree with the statement "Customer complaint software allows me to quickly register a service complaint."
Beliefs	Assess what a person believes to be true or false, correct or incorrect **Example:** Has the new automated complaint management system reduced the amount of time it takes to register a service complaint?
Behaviors	Inquire as to what people do **Example:** Have you used the automated complaint management system in the past three months?
Attributes	Generally referred to as personal or demographic information **Example:** What is your occupation?

Table 14 Types of Information Collected in Surveys

Survey Questions

Survey questions have two formats:

1. Open-Ended
2. Close-Ended

Open-ended questions are questions that have no answer categories. The respondent is asked to state his/her own opinion so they can result in a richer understanding of stakeholder attitudes and thought processes. These should be judiciously used since they require more time to complete (respondents may provide short, terse comments or not respond at all) and they take more time to summarize and analyze.

Because open-ended questions take more time to answer and many respondents are unlikely to write meaningful answers, most surveys predominantly consist of close-ended questions. The close-ended format presents discrete choices to the respondent to elicit a simple response. The yes/no response is a variation of a close-ended question. Using this format, the stakeholder simply responds with a yes or no answer. In addition to the close-ended question format shown below, an example of a yes/no variation is "Have you used the fitness center within the last month?"

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Open-Ended Question	Close-Ended Question
Which facility amenity do you use most frequently and why?	Which of the following facility amenities do you use most frequently? a. Vending areas b. Cafeteria c. Fitness center d. Automated teller machine, ATM

Likert Scale

What is a Likert Scale?

We have previously addressed the concepts of qualitative vs quantitative results. In brief, qualitative results are non-numerical, of a more narrative nature, and can be considered more subjective. Quantitative results are numeric and can be counted or placed on a scale.

The five-point Likert scale (named after R. A. Likert) gives customers the opportunity to respond in varying degrees. The high end represents a positive response, while the low end represents a negative response. Service quality can be measured by the strength of response toward each satisfaction item.

The Likert Scale is a statistical tool that bridges the gap, giving quantitative meaning to qualitative data in which a numerical value is assigned to each potential choice in a closed-ended survey. This allows quantitative analysis of the results. The Likert Scale is the most popular ranking tool.

As an example, allowing a range of responses such as (1) Very Dissatisfied, (2) Dissatisfied, (3) Neither Dissatisfied nor Satisfied, (4) Satisfied and (5) Very Satisfied provides a numerical value for each response (shown above in parenthesis). The same example could apply to "Disagree Completely" to "Agree Completely", to "Greatly Exceeds to "Fails to Meet" or to any range applicable to the product or survey that is the subject of the question.

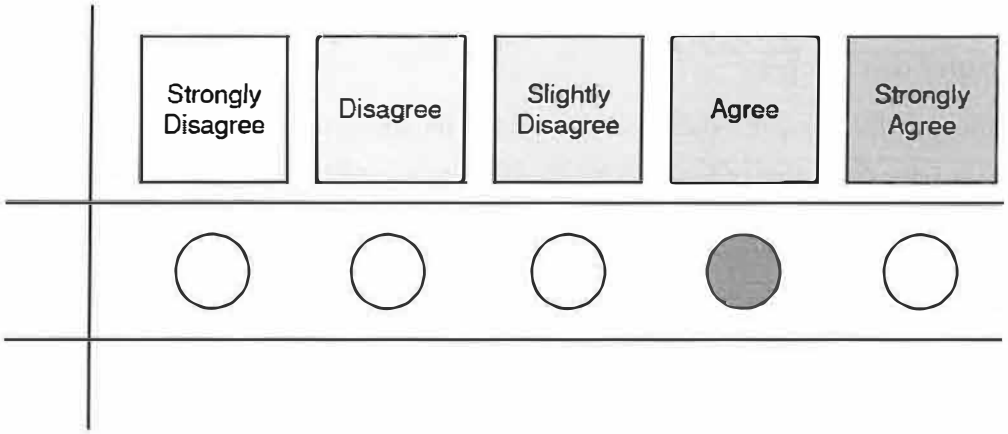

Figure 54 The Likert Scale

Variations on the five-point response scales are common. For instance, "On a scale 1 to 10, with 1 being "Disagree Completely" and 10 being "Agree Completely", rate each of the following statements." In designing the questions, it is important to recognize that given an odd number (1 to 7), the central number will be neutral or undecided. Given an even number there is no neutral or undecided choice, forcing the respondent to decide whether they lean more toward the agree or disagree end of the scale. "Not applicable" or "Don't know" may be an added choice so that the outcome is not biased by an uninformed response.

In designing the survey, it is important to be clear about what you are evaluating. If you are evaluating service response times, you may illustrate the current standard but the question you are asking is likely to be about their satisfaction with those response times. Similarly, you may state that office temperature standards maintain spaces between 68 and 72 degrees Fahrenheit during business hours, but the questions are likely to be about whether this is comfortable to occupants, how frequently they feel too hot or too cold in their space, or whether they feel that they are impacted by drafts or lack of air movement.

In addition to open- and close-ended questions and scales, other question formats exist. These include structured questions with multiple-choice answers and "Select all that apply."

As we noted at the start of the survey content, e-surveys have different templates and customization features. We have looked at and illustrated fundamental principles behind item construction. The specific look of your surveys will depend on software features and capabilities.

A final note regarding the design of survey language. There are many ways to say the same thing. This simple axiom applies to question writing as well. Questions need to be asked in

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a way that stakeholders can answer. Questions must be concise and unambiguous and must contain only one thought.

Notice that the questions in the exhibit ask people to talk about temperature and maintenance in their work area. Using the scales, people can respond to those questions based on direct, firsthand experience. It would be difficult for most people to respond to a statement such as "Maintenance service is performed according to prescribed standards." To ask people to share their opinions on this statement assumes people know the prescribed standards. Depending on the audience, that assumption is highly problematic and potentially erroneous.

In general, the temperature in my work area:	Strongly Disagree		Agree		Strongly Agree	Do not know
1. Is comfortable to me	①	②	③	④	⑤	☐
2. Is warm enough during cold weather	①	②	③	④	⑤	☐
3. Is cool enough in hot weather	①	②	③	④	⑤	☐
In general, maintenance people in my work area:	Strongly Disagree		Agree		Strongly Agree	
1. Come within 10 minutes of when I call them	①	②	③	④	⑤	☐
2. Are considerate of my work time	①	②	③	④	⑤	☐
3. Are courteous and respectful	①	②	③	④	⑤	☐

Figure 55 Question Items Using Likert Scale

Order Ranking

Rank ordering is another numerical ranking tool, in which respondents are asked to rank a series of service attributes according to their perceived importance to the respondent. While there is no official limit of attributes you can ask customers to rank, five or six items is optimal. (Studies have shown that 10 items are more difficult for most respondents to rank than five or six.)

While rank ordering accurately captures perceived order of importance, it does not provide information about the degree of difference between attributes or whether the real difference is small or large. If degree of difference is important to know, forced allocation is often a better scale to use.

Forced allocation requires respondents to assign points across categories. This type of scale can be used to identify the importance of different service features. An example of a forced

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allocation to help determine which outdoor recreation features are most important to customers is presented in the exhibit below.

Given 100 points, how would you allocate them across the following outdoor recreation areas? Allocate points based on how important the area is to you. Total points should add up to 100.	
	Points
1. Walking trails	
2. Bicycling paths	
3. Jogging paths	
4. Sports courts	
Total	100 points

Table 15 Forced Allocation Scale Example

Response Rates

Response rate, as the name implies, is the percentage of people who respond to a survey. No surprise that, in general, the goal is to have the largest number of people possible respond. A high response rate is important to help ensure that survey results are representative of the target population and that they produce accurate and useful survey results.

The basic calculation for response rate is to divide the number of completed surveys by the number of people contacted, as shown in the formula format below.

$$Response\ rate\ = \frac{Number\ of\ completed\ surveys}{Number\ of\ people\ contacted}$$

Example: If you asked 210 employees to complete a survey and 75 responded, the response rate is 75/210 or 35.7 percent.

Several factors contribute to an acceptable survey response rate such as (but not limited to):

- **Survey purpose**.
  If the survey intent is to measure effects or make generalizations to a larger population, a higher response rate is more important than for a survey intended only to gain insight. Survey design should consider in advance the minimum

acceptable response rate and means of increasing survey response rate to the acceptable population if needed.

- **Statistical Analysis**.
  If sophisticated statistical analysis is planned, the minimum sample size is required and associated requirements for response rate are important to provide meaningful results. This is another instance where survey design should consider minimum acceptable response rate and anticipate means of increasing survey response rate.
- **Anonymity**.
  Making a survey anonymous may boost response rates. You can still include demographic response questions that will help during analysis, but people may be more inclined to respond and to be more candid if they know they will not be directly identified.

Appropriate and Timely Follow-Up

Response rates with surveys are always a challenge. One writer recently noted 7 separate surveys in her e-mail inbox, all received within the past 10 days. With so many surveys being conducted, potential respondents need to know why their input is important. Careful wording in the invitation to participate may trigger a response. As noted previously, incentives to complete the survey can help. Common incentives are to offer free or discounted registration for a paid event, a guarantee to receive a copy of the outcome of the study (if an object, such as a benchmark study, that otherwise would cost the respondent a fee in the future), or a chance to win a gift card, mobile device, or something in exchange for participating in the survey.

It is also a good idea to send follow-up reminders as the survey deadline approaches. Those reminders should include a link to the original survey to make it easier for the respondent to participate.

Surveys can efficiently measure customer satisfaction and dissatisfaction with FM services. You can segment questions according to types of services, service providers, general facility conditions, and so forth. Survey data can help you track trends and identify major improvement efforts. Careful attention to the number of questions and avoiding overuse of those surveys will help this to remain a valuable quality measurement technique.

Benefits and cautions of using e-surveys are highlighted in the exhibit below:

Benefits	Cautions
• Relatively inexpensive	• Less flexible than focus groups or interviews

Benefits	Cautions
• Offer a variety of design options • Standard data collection • Convenient for respondents • An expedient way to have customers quantify their reactions	• Respondents may misinterpret the questions; no way to ensure that questions are interpreted properly • Respondents may "self-select" and the vast number of responses, for example, may come from people who complain because they are the most motivated to complete the survey • May not be effective in work environments with high e-mail traffic; electronic surveys may be deleted • May necessitate incentives and follow-up. Low response rates may yield little data

Table 16 Benefits and Cautions of e-Surveys

Service Response Cards

A service response card is an abbreviated form of a survey. You likely have found a service response card hanging from the mirror of your vehicle after having your vehicle serviced at a dealership. The service response cards have been mostly replaced by automated work management systems that automatically generate email surveys through their Computerized Maintenance Management System (CMMS).

Because these response cards are brief and immediate, they are sometimes called transaction surveys, comment cards or suggestion cards.

Service response cards are short and concise, and they take little time and effort to complete. They are, however, helpful and effective for the following reasons:

- You can use them often.
- You can modify them frequently and with relative ease.
- They can be used for a variety of FM services (from housekeeping and space planning to maintenance, security and more).

Benefits and Cautions in use of Response Cards

Traditionally, service response cards were paper-based. Today, many paper cards are giving way to electronic formats and even auto-respond formats, where the electronic card is automatically sent after service completion, generated by the FM computer system.

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Regardless of the format, these short, simple, to-the-point service response cards give stakeholders a way to easily communicate with FM on a regular basis.

Benefits	Cautions
• Inexpensive • Flexible • Quick and convenient for customers to complete • Provide timely data	• Little or no depth of information • If service providers are not empowered to resolve problems on the spot, customers may perceive FM as lacking real commitment about service quality issues.

Table 17 Benefits and Cautions of Service Response Cards

Walk-through and Observation

Walk-throughs and observations are a relatively easy way to better understand a stakeholder's viewpoint, or even better, to anticipate and correct an issue that would impact a stakeholder before it is reported. In fact, there is nothing better than a bit of field research to give you a firsthand appreciation of FM services and FM quality from the stakeholder's perspective.

In Managing Facilities and Real Estate, Michel Theriault names this process the "Walk of the VIP." Theriault provides a simple but straightforward method that involves:

- Choosing a VIP (very important person).
- Accompanying the VIP on a visit to the facility.
- Recording observations.
- Planning action and implementing improvements.

Walk-through and observation, conducted with service providers (internal or external) can also be a relationship-building activity, allowing the manager and the provider to see the facility through the same lens and collaboratively working toward positive stakeholder perception.

FM walk-throughs and observations are really an adaptation of a participative management approach known as management by walking around (MBWA). Walk-throughs and observations can be no more complex than periodically roaming throughout a facility and talking with occupants and service providers, listening, and looking for improvements. They may involve routinely accompanying a service provider on a call, or they may be a bit more structured.

Benefits and cautions of walk-throughs and observations are listed in exhibit below.

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Benefits	Cautions
• Collect direct observations from customers. • Provide a fresh view. • Identify items missed by FM daily. • Create goodwill.	• Requires an open mind. • Requires some knowledge of the facility in case of questions. • Can be seen as "airing your dirty laundry." • Can be time-consuming. • Requires action and follow-up to be meaningful.

Table 18 Benefits and Cautions of Walk-throughs

Analyzing Stakeholder Feedback and Communicating Results

Stakeholder feedback is the foundation for improving FM performance. The stakeholder satisfaction measures described in Topic 1 allow the FM to collect feedback regarding the efficiency and effectiveness of FM facilities and services. A logical progression after measuring satisfaction is to analyze the feedback, communicate the results to stakeholders and then plan appropriate actions. These steps are a mix of art and science.

Analyzing the stakeholder feedback is largely the science part. The good news is that by the time data analysis is conducted, most of the really difficult work has been done. If measurements have been planned and implemented well, data analysis is usually a straightforward task of applying statistical tools that:

- Reduce the amount of detail in the data
- Summarize the data
- Make the most important facts and relationships apparent

Communicating the results to customers is more an art component. This involves the fundamental communication principle of knowing your audience and determining the most effective way to communicate the results to them in terms they will understand. A facility manager must be able to translate the results into terms that a variety of disciplines can comprehend. Some messages may need to be tailored to specific audiences.

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Lesson 2: Analyzing Customer Feedback

Lesson 2: Objectives

On completion of this lesson, you will be able to:

- Describe methods to analyze customer feedback

Introduction to Survey Data

Survey data is generally the most challenging area of customer satisfaction data analysis simply because of the amount of data generated. For this reason, the focus of much of the rest of this section (except where specifically noted) pertains to survey results. Using this information as your baseline, you should be able to determine how to best analyze customer satisfaction data collected with other measurement techniques.

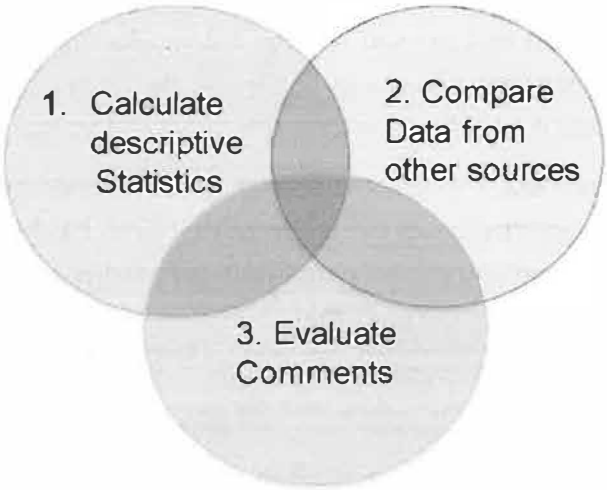

Figure 56 Survey Data

Survey Data

Survey Data Analysis

Survey data analysis involves the three major areas shown in the exhibit below, done roughly in the order presented.

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Step	Description
Data Preparation	Cleaning and organizing the data for analysis

Example: Entering the data into the computer (if not an e-survey); checking the data for accuracy; developing and documenting a spreadsheet that integrates the various measures.

Step	Description
Descriptive statistics	Simple summaries describing the data – what it is and what the data shows

Example: Using measures of central tendency, measures of variation/statistical process control (SPC), and measures of association/correlation to describe the basic features of the data; using simple graphical analysis in conjunction with the descriptive data to describe what is going on with the data.

Step	Description
Inferential statistics	Making inferences from the data to more general conditions

Example: Making conclusions from the immediate data that extend beyond the data; trying to infer from the sample data what the population thinks; making judgments of the probability that an observed difference between groups is a dependable one or one that might have happened by chance.

Analyzing Raw Data

When analyzing raw data:

- Compute mean, median, mode, range, and standard deviation for each question and each category/topic of questions.
- Go back and review raw data (and data entry process) if ranges are large to check for errors.
- Rank findings in order of high to low outcomes.
- Examine individual survey items and those used to measure relationships between two variables.
- Look for correlation and regression between questions.
- Cross-tabulate by satisfaction rating (customers who are really happy and those who are not happy).

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- Segregate data based on demographic differences in population.

Communicating Results

Once you have compiled and analyzed stakeholder satisfaction data, you will need to communicate the results with recommendations for actions to resolve the identified weaknesses. This demonstrates that you are listening to your stakeholders and tells them what changes and improvements you intend to make, even (or particularly) if they may take an extended time to implement. Communication must be open and honest. Reporting on FM successes is a pleasure to do. Reporting on areas of weakness and plans to resolve them is just as important and shows your dedication to quality services.

Keeping your audience in mind, carefully select and organize the data. You may need to compile a formal report of the results and analysis for senior management or a board of directors. In those scenarios, the body of the report should be concise. Include all the raw data and responses to the open-ended questions in report appendices. If reports for other groups are necessary, assess what is important to them.

Reports will differ considerably depending on whether the audience will want or require technical detail, statistical evidence, only a summary of results or some other information. Present the results with the appropriate level of detail for the audience. If you present too much detail when you share the information with stakeholders, they may miss the key points.

Summary tables and graphs should show only the most relevant or important information. Graphs are generally better than tables for communicating results. To analyze open-ended responses, cluster the comments and report on the themes and any apparent relationships.

Certainly, if anonymity was promised to respondents, you must maintain that confidentiality. In a formal report, you should mask any responses that reveal the respondents' identity or refer to individuals.

Keep the big picture in mind when you communicate stakeholder satisfaction results. Even short surveys can be intense and arduous. You may have obsessed or worried about validity and reliability, sampling, survey design, item construction, response rates, and data analysis. Now is the time to step back from those details.

Acting on Customer Feedback

It is great to have collected stakeholder satisfaction data, but that is only useful if there is a process in place to implement action plans. The data may be extremely insightful and well worth the time, effort and cost invested in collecting it, but it must be acted upon.

A facility manager will need to analyze the distribution of survey items and their relationships to one another to identify any gaps between what customers expect of FM and what is delivered. In addition, survey analysis often reveals key areas that require improvement and change.

Timely data that is reliable and valid, tied with actionable recommendations, can help you to:

- Evaluate the current level of service
- Recognize and reward exemplary performance
- Draft future service level agreements
- Set performance goals
- Identify processes that need improvement

A common practice with customer satisfaction survey data is to develop an action plan that targets a small number of issues first. In Managing Facilities and Real Estate, Michel Theriault recommends a focus on the areas of highest impact and questions that have the lowest satisfaction ratings. The approach is like prioritizing risk, where the goal is to address those issues with the highest impact and highest potential for occurring (in this case the lowest satisfaction ratings) first.

Different organizations use different improvement tools and models to implement FM action plans. Chapter 7 discussed some of the basic ones, including:

- Root cause analysis
- Plan, Do, Check, Act (PDCA) cycle
- Six sigma DMAIC model
- The Five Whys

Continuous Improvement

The whole basis of quality management in facilities is the notion of continuous improvement. In Chapter 1 we defined continuous improvement (CI) as "The collective actions an organization takes to increase the effectiveness and efficiency of activities and processes to enhance its ability to meet requirements and provide added benefits to

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customers and the entire organization. A strategy for achieving total quality management, CI is directed at improving quality and customer satisfaction."

In this topic we examine the concept of continuous improvement and add a general process improvement methodology to your FM quality tool kit.

A continuous improvement process is a disciplined approach. CI analyzes capabilities and processes and improves them repeatedly to achieve the objective of customer satisfaction.

A generic model for continuous improvement is helpful to illustrate what is involved in the process.

Step	Typical Activities
Select the process to improve	Analyze feedback from stakeholders Identify those processes critical to improvement Establish a well-defined improvement objective
Define the As-Is State	Flowchart the current process, mapping activities, actions and decisions that occur between starting and ending points of the process
Evaluate current performance	Review current performance measures to ensure that they are adequate and appropriate Identify redundant or unnecessary activities Compare current performance measures to customer expectations and needs
Identify improvement needs or opportunities	Assess whether the process is stable and capable of meeting its desired objective Identify root causes that prevent the process from meeting the objective Identify areas of the process where improvement would be most beneficial
Develop a plan for improvement	Determine what could be changed to improve the process (based on the possible reasons identified by the root cause analysis)
Test the changed process	Pilot the process change on a small scale Collect & evaluate the data Make changes on the process Determine whether additional improvements are feasible, or monitoring will suffice until further improvement becomes necessary
Implement the changes	Institutionalize the process improvement so everyone is using the new standard process correctly Document the changes Monitor the data
Reflect on the process	Document lessons learned Recognize accomplishments

Figure 57 Example of a Continuous Improvement Process Model

For example: At the onset, in the "Select the process to improve" step, customer feedback is considered. During the subsequent "Review current performance" step, a comparison of current performance measures to customer expectations and needs maintains customer focus.

During the "Define the current process" step, a flowchart may be the first time some of the people involved in the CI improvement have seen the process in its entirety. This better prepares them to carry out subsequent activities.

During the "Identify improvement needs or opportunities" step, examining the process prevents jumping to conclusions before first understanding the root causes.

As you review the example in the exhibit below, keep in mind the steps listed are general. The model is not intended as a prescriptive step-by-step approach but rather things to consider in continuous improvement processes. Steps in the generic CI model are

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presented to help you ask questions, gather information, and take actions effectively and efficiently. This is meant to provide a framework that guides you from the initial improvement challenge to continuous improvement success.

Following the steps or methodology outlined here greatly enhances the probability of improvement success, but there are other factors that need to be accounted for, such as:

- Leadership support and commitment
- Alignment to organizational strategies and bottom-line improvements
- Stakeholder focus (consideration of stakeholder feedback, needs and potential impact)
- Enough resources (the right team, time, money and materials)
- Extent to which the process is data-driven

Another benefit of the generic CI model is that it lends itself to different applications and can be used in any time frame. The model can help work through a complex problem, but it is also useful for situations where continuous improvement ideas must be generated quickly.

The result should be a process that meets or exceeds requirements. Actions taken should prevent process problems from occurring or reoccurring.

If your FM function already has an official continuous improvement process in place, specific words and the number of steps may vary from the generic example shown in the exhibit above. Conceptually, you should be able to cross-reference the elements. For example, the steps shown here can be roughly matched to the Six Sigma DMAIC model or the PDCA cycle.

Assessing Service Performance

Recall how the role of facility managers in quality was described in the competency introduction:

Quality improvement programs start with facility managers understanding stakeholders, their needs and expectations of the facility and the facility's services. In addition, facility managers must understand and document the processes used to deliver these services. They must be able to measure the performance of the facility organization and service providers to make continuous improvements.

Content throughout this competency has provided a road map and a tool kit for how you as a facility manager can identify customer needs, determine at what levels those needs should be met, and deliver FM services. This final section of the Quality topic will tie the

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pieces together to demonstrate how to measure the performance of the facility organization and service providers to make continuous improvements.

Performance & Quality Effective Practice

A significant amount of research has been conducted on service management. Books, articles and training on effective practices abound. Timeworn core principles about assessing and managing service performance that are applicable in facility management include:

- Define superior service based on customer expectations of quality.
- Set standards and metrics.
- Select, train and empower service providers (internal staff, subcontracted or outsourced) to work on behalf of the stakeholder.
- Measure performance.
- Recognize and reward accomplishments.

Most FM organizations are a mix of in-house, out-tasked, and outsourced service providers. From concept to action, achieving quality FM is a team process between facility leadership and service providers.

As highlighted in the Performance and the Quality content, getting results and making improvements require performance monitoring and measuring.

In "Total Facilities Management", Atkin and Brooks (2000) discuss the tangible and intangible aspects of service quality from a customer's point of view:

- **Tangible factors** – those factors that can be objectively measured (such as service response time)
- **Intangible factors** – those factors that are more subjective in nature (such as courtesy of the service provider)

Atkin and Brooks note that both are important to measure and monitor. The authors caution against too many or overly demanding measures or excessive monitoring.

In discussing the measurement guidelines, we emphasized that measurements must encourage the right behaviors to support FM service quality and the entire organization's strategic goals. There is no one-size-fits-all approach to monitoring and measuring that we can offer here.

Consistently meeting requirements and addressing future needs and expectations can pose a challenge for any FM organization, especially in this increasingly dynamic and complex

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environment. We have given you processes and tools to enable you, as a Facility Manager, to set up a QMS for your organization.

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Chapter 8 Progress Check

1. Which of the following types of survey question responses is likely to produce a richer understanding of stakeholder attitudes and thought processes?

   a. Rank Ordering
   b. Likert Scale
   c. Forced Allocation Scales
   d. Open-Ended

2. Qualitative Tools include:

   a. Flowcharts, focus groups, interviews
   b. Pareto Charts, Check sheets
   c. Bar charts
   d. SPC

3. Which of the following are all Qualitative measures for evaluating performance?

   a. Interviews, Focus Groups, Open-Ended Surveys and Observation
   b. Interviews, Scorecard Measures, Benchmarks, Trends
   c. Interviews, Focus Groups, Benchmarks and Observation
   d. Interviews, Observation, Benchmarks, Trends

4. What term refers to the ability of an instrument to measure consistently when used under the same conditions with the same subjects?

   a. Validity
   b. Repeatability
   c. Reliability
   d. Consistency

5. What term refers to the ability of an instrument to measure what it is intended to measure, or the strength of its conclusions, inferences or propositions.

   a. Repeatability
   b. Reliability
   c. Validity
   d. Consistency

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Progress Check Question Answer Key

Chapter 1: Setting the Strategic Direction

Objectives

1. d
2. a
3. d
4. b
5. a

Chapter 2: Identifying Performance Improvement Opportunities

Objectives

1. c
2. b
3. c
4. d
5. a

Chapter 3: Metrics

Objectives

1. b
2. a
3. c
4. b
5. c
6. e
7. c

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Chapter 4: Measuring and Monitoring

Objectives

1. b
2. a
3. d

Chapter 5: Performance Reporting

Objectives

1. b
2. d
3. a
4. a
5. c

Chapter 6: Facility Management Quality Fundamentals

Objectives

1. c
2. c
3. b
4. b

Chapter 7: Quality Measures for the Facility Organization

Objectives

1. a
2. d
3. b
4. c

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5. a
6. a

Chapter 8: Quality Assessment of Facility Management Services

Objectives

1. d
2. a
3. a
4. c
5. c

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Appendix

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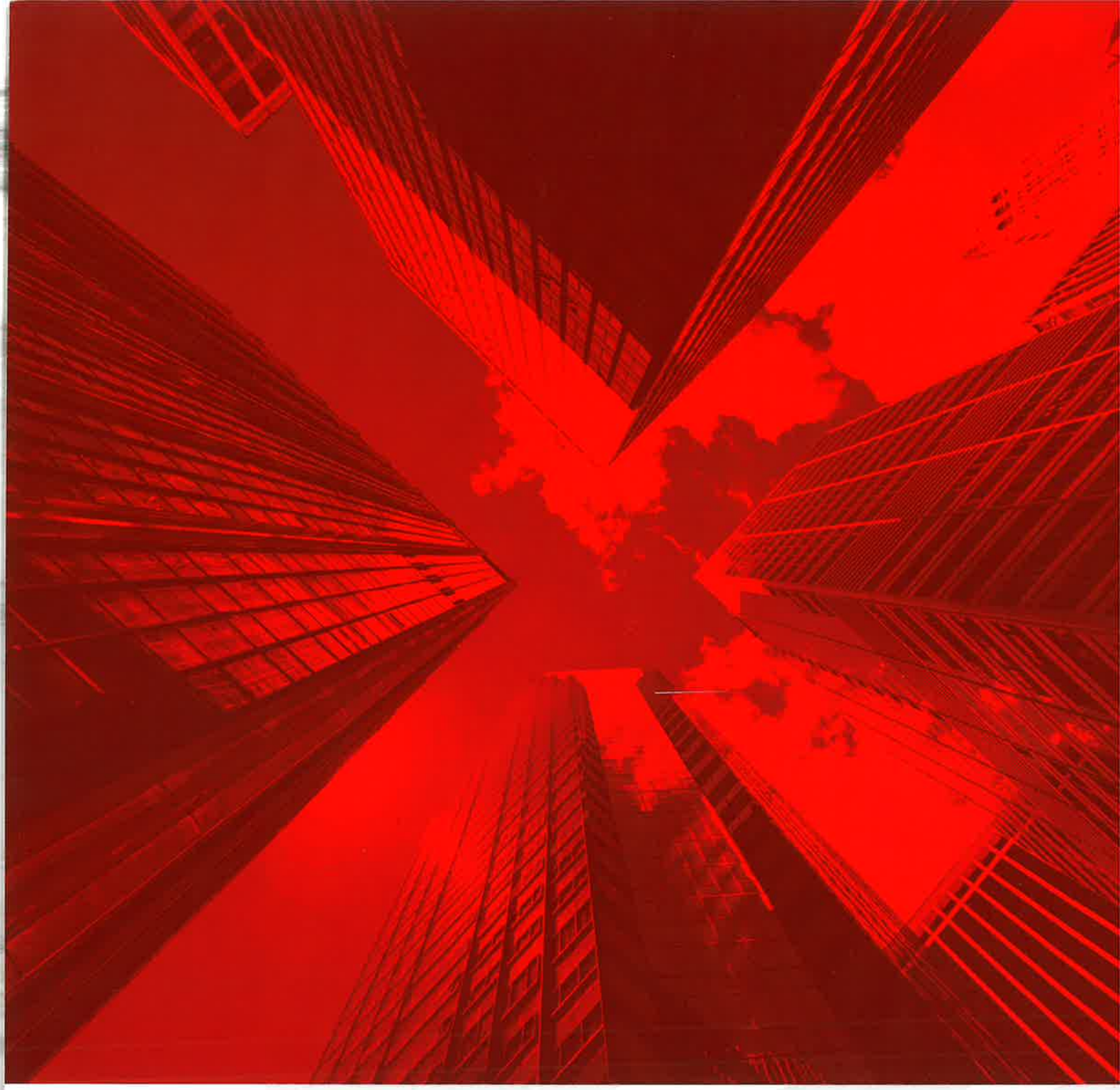

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