

Performance & Quality



The quality of facility management has a direct impact on various stakeholders within an organization, including occupants, senior management, investors, government, regulators, and the community. These customers, both explicit and implicit in their expectations.



IFMA Facility Management Learning System

Book 5

Contents

Quality	5-1
Introduction	5-1
Chapter 1: Fundamentals in Quality Facility Management	5-5
Topic 1: The Evolution of Quality	5-5
Topic 2: Basic Quality Terms and Concepts	5-8
Topic 3: The Goal of Quality Facility Management	5-11
Chapter 2: Quality Measures for the Facility Organization	5-17
Topic 1: Measuring What Matters in Facility Management Services	5-18
Topic 2: Quality Data and Facility Performance	5-30
Topic 3: Service Specifications	5-67
Topic 4: Service Level Agreements	5-72
Topic 5: Key Performance Indicators	5-74
Chapter 3: Quality Assessment of Facility Management Services	5-80
Topic 1: Measuring Customer Satisfaction	5-81
Topic 2: Analyzing Customer Feedback and Communicating Results	5-101
Topic 3: Acting on Customer Feedback	5-106
Topic 4: Assessing Service Performance	5-112
Chapter 4: Improvement of Facility Management Work Processes	5-119
Topic 1: Assessing Workplace Productivity	5-119
Topic 2: Mapping Processes	5-121
Chapter 5: Compliance with Codes, Regulations, Policies and Standards	5-127
Topic 1: Internal Audits and Inspections	5-127



Real Estate and Property Management.....	5-133
Introduction	5-133
Chapter 1: Real Estate and Property Management Fundamentals.....	5-137
Topic 1: Internal Factors That Affect Real Estate Decisions.....	5-138
Topic 2: External Factors That Affect Real Estate Decisions.....	5-152
Chapter 2: Develop and Implement a Real Estate Master Plan	5-171
Topic 1: Strategic Alignment of a Master Plan.....	5-171
Topic 2: Components of a Master Plan.....	5-178
Topic 3: Participants in the Master Planning Process.....	5-184
Topic 4: Activities in the Master Planning Process	5-188
Chapter 3: Manage Real Estate Assets.....	5-194
Topic 1: Site and Space Management.....	5-194
Chapter 4: Acquisition and Divestiture of Real Estate	5-209
Topic 1: Due Diligence	5-210
Topic 2: Purchase versus Lease Decision	5-214
Topic 3: Leasing	5-220
Topic 4: Portfolio Management	5-237



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Quality

✦ Introduction

Role of facility managers as related to *Quality* competency

According to the IFMA global job task analysis:

Quality improvement programs start with facility managers having an understanding of customers, 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.

Quality defined

What exactly is quality? If you asked a sample of your professional colleagues or FM staff to describe the term, there is a high probability you would hear different renditions espousing improvement, excellence, fitness for intended use, the ability to satisfy stated or implied needs and other such terms to varying degrees. Quality tends to be a subjective term for which each person has his or her own interpretation.

Since quality is the focus of this competency, we offer the following definition in the context of FM performance and services:

Quality is the process of confirming customer expectations, establishing performance standards and metrics based on those expectations, measuring the degree to which current products and services meet the standards and metrics, and identifying and implementing improvements to satisfy the standards and metrics. Quality incorporates customer expectations and feedback, the use of standards and metrics, the act of measuring and a commitment to continuous improvement.

Facility managers are responsible for a vast array of activities. Those responsibilities may range from highly sophisticated and technical operations, such as overseeing new construction and developing energy management protocols, to more mundane and routine activities, like ensuring that employee wastepaper baskets are emptied and the glass doors of a building entry are clean and free of smudges and streaks. No matter what type of an organization you work for, as a facility manager you impact the level of quality delivered in nearly every FM task.

Benefits of quality in facility management

The level of quality in facility management affects all of an organization's customers. Customers include occupants and users of the facility, senior management, investors, government, regulators and the community.



Customers have explicit and implicit requirements for what constitutes quality. However, they often have difficulty articulating what quality means to them or expressing it in technical or measurable terms. For example, if you were to ask your customers about what quality means to them, you might hear statements such as:

- Easy availability.
- User-friendly.
- Nice features.
- Lower costs.
- Manifest durability.
- Perceived value.
- Prompt delivery.
- Environment-friendly.
- Aesthetic appeal.
- Proven reliability.
- Simple maintainability.
- Good after-sales service.

FM, therefore, must ascertain quality needs and educate the customer about what is a reasonable level based on the key performance indicators (KPIs) and the resources allocated for the situation. Setting reasonable customer expectations is critical, because the customer's satisfaction level with FM products and services determines how successful FM has been in delivering quality.

Certainly, customers are the driving force in all FM quality activities. But balancing customer needs with operational costs is a key consideration. In the end, a facility management organization and its customers both benefit from strong quality performance, as shown in Exhibit 5-1 on the next page.

Overview of Quality competency

Quality is a complex discipline. The goal of this *Quality* competency is not to turn a facility manager into a quality expert but rather to provide critical insights that apply to quality-related FM practices, such as the ability to:

- Develop and manage/oversee the creation and application of standards for the facility organization.
- Measure the quality of services provided.
- Manage/oversee the improvement of work processes.
- Ensure and monitor compliance with codes, regulations, policies and standards.



Exhibit 5-1: Benefits of Quality

Benefits to FM Organization	Benefits to FM Customers
• Helps achieve the mission and goals of the entire organization • Facilitates efficient and effective operations • Reduces errors and the need for rework • Builds FM credibility within the organization • Enhances and supports the entire organization's brand and values • Promotes workforce motivation and retention • Reduces risk • Accelerates delivery of services • Enhances reliability of services • Fulfills compliance requirements • Provides long-term solutions (through root cause analysis) • Provides a consistent and quantifiable way of measuring performance • Helps to develop standards and benchmarks for comparison to other organizations • Provides timely and constructive feedback • Assists in identifying means for improvement • Improves and sustains high levels of customer satisfaction • Increases the confidence of FM team members	• Improves communication with the FM organization • Enhances customer satisfaction • Boosts confidence in the ability of FM to perform • Supports workplace productivity: • Ensures that the best working environment and workplace resources are available • Reduces nonproductive time • Reduces stress • Provides flexibility of working place, time and resources • Promotes work/life balance • Provides for a healthy and safe work environment • Provides cost savings

A snapshot of *Quality* competency content is shown in Exhibit 5-2 on the next page.

Many of the quality techniques and practices described in this competency have been around for years. The competency brings them together and provides a comprehensive quality toolbox specific for FM services.

As you read through the contents, consider how the insights provided here apply to your organization and how you can improve the facility management quality performance.



Exhibit 5-2: Overview of Quality Competency

Chapter	Content
1. Fundamentals in Quality Facility Management	• Overview of quality terminology and philosophies relevant to FM • Measurement and improvement in quality FM • Systems thinking in quality FM
2. Quality Measures for the Facility Organization	• Measurement guidelines for FM service quality • The importance of metrics and standards • Benchmarking and gap analysis • The seven quality control tools plus quality improvement tools • Statistical analysis plus trend analysis • Service specifications and service level agreements • Key performance indicators and best value practices
3. Quality Assessment of Facility Management Services	• Quantitative and qualitative measures • Reliability and validity • Customer measurement techniques: complaint management, interviews, focus groups, surveys, service response cards, walk-throughs and observations • Analyzing customer feedback and communicating results • Continuous improvement and variation • Assessing service provider performance
4. Improvement of Facility Management Work Processes	• Workplace productivity assessment • Process mapping
5. Compliance with Codes, Regulations, Policies and Standards	• FM audits and inspections • Compliance monitoring, documentation and communication

Keep in mind that quality is not a number of disconnected improvement initiatives. Rather, quality is a holistic discipline in which all the moving parts need to combine and connect in a seamless and coherent way. As a facility manager, you need to develop the ability to see how all the components of your facility relate to each other. This competency will help you to develop such a “systems thinking” perspective.



Chapter 1: Fundamentals in Quality Facility Management

After completing this chapter, students will be able to:

- Describe the key events in the evolution of quality.
 - Recognize key quality terms and concepts prevalent in facility management.
 - Describe the primary goal of quality facility management, including key activities that help to achieve the goal.
 - Summarize the importance of systems thinking in quality facility management.
-

✦ Topic 1: The Evolution of Quality

Quality is a great contributor to modern management practices and organizational improvements. In principle, however, the origins of quality can be traced back to ancient times. Before embarking on quality facility management competency content, we offer the following short history of the evolution of quality.

Historians perceive evidence of quality as far back as Hammurabi, a Babylonian king who united Mesopotamia and made Babylonia an important power. Roughly 4,000 years ago, references in the code of Hammurabi (one of the oldest written codes of laws) report: “The mason who builds a house which falls down and kills the inmate shall be put to death.” While a harsh sentence for poor quality, the intent may be construed as a quality-driven motive.

The Egyptian pyramids, ancient Greek and Roman architecture, Italian ship building in Venice, the Great Wall in China and many other global architectural and building achievements through the early centuries all show rudimentary applications of quality.

Fast-forward to the late 13th century. Craftsmen in medieval Europe began organizing into unions called guilds. The guilds were responsible for developing and enforcing strict rules for product and service quality.

Evidence of quality continues through the 19th century and throughout the factory system and the Industrial Revolution in Europe. Inspection took hold and persevered as the most common quality practice until the beginning of the 20th century.



The quality profession and process orientation in quality as we know it today began with Dr. Walter Shewhart in the 1920s. Shewhart, a statistician for Bell Laboratories, recognized that industrial processes yield data. He developed a system for measuring variance in production systems and laid the foundation of statistical process control and control charts (modern-day quality tools). Shewhart also created the Plan, Do, Check, Act (PDCA) cycle, which applies a systematic approach to improving work processes. (Note: We cover systems in the next topic. Statistical process control, control charts and the PDCA cycle are all discussed in Chapter 2.)

During World War II, Dr. W. Edwards Deming, a physicist and researcher, was hired by the U.S. War Department to teach statistical process control to the defense industry. Although quality control and statistical methods were credited as important factors in the successful U.S. war effort, most American companies abandoned the practices after the war.

At the other end of the spectrum, Japan adopted “high quality” as a major objective for rebuilding its industries following the devastation of World War II. Dr. Deming was invited to lecture and teach Japanese business leaders on statistical process control and quality. Over time, Japanese acceptance and use of Deming’s techniques had a profound positive effect on Japan’s economy and re-entry into the global marketplace.

In addition to Dr. Deming, two other Americans, Dr. Joseph Juran and Armand V. Feigenbaum, worked with Japanese. Deming and Juran enlarged Shewhart’s work and identified three fundamental management processes (planning, control and improvement) that could help to address system problems in manufacturing. They also introduced and promoted the importance of satisfying customer needs. Feigenbaum introduced and promulgated the concept of “total quality control,” stressing the importance of involving all departments in a company in quality initiatives.

Dr. Kaoru Ishikawa, a Japanese engineer and manager, expanded on Feigenbaum’s ideas. Beyond department managers, Ishikawa advocated including all employees (not just managers) in quality. Ishikawa’s efforts helped create quality circles (small teams of managers, supervisors and workers). Quality circles trained in statistical process control, the PDCA cycle and group problem-solving techniques resulted in organization-wide improvement ideas from everyone and generated a continuous stream of small performance improvements. (Quality circles are attributed as the forerunners of process improvement teams.) By the 1970s, Japanese companies went on to embrace



Ishikawa's ideas of company-wide quality control (CWQC). Other Japanese quality practitioners (such as Dr. Genichi Taguchi and Shigeo Shingo) made additional milestone contributions to Japan's quality movement.

The resurgence of the Japanese attributed to quality efforts spurred American organizations to once again champion quality. The teachings of all the aforementioned quality experts and others (Philip B. Crosby, Tom Peters and many more) helped organizations improve quality and customer satisfaction. Total quality management (TQM) was born and led to numerous other quality concepts and initiatives such as the voice of the customer (VOC), six sigma, management by walking around and performance improvement.

Quality is now a global discipline. While the use of the term TQM has faded somewhat, its practices continue. Many organizations still employ the original TQM techniques but give the initiatives unique titles to provide their own brand.

Our short review of quality ends here. As we have seen, the quality systems of today have evolved from the foundations of Shewhart, Deming, Juran, Feigenbaum, Ishikawa and other early practitioners. Over time, quality moved beyond its manufacturing roots into service, health care, education, government and nonprofit sectors.

All types of organizations can benefit from quality. Practicing quality helps to support long-term organizational success and enhance customer satisfaction.

Did You Know?

The quality experts discussed in this topic are often called "quality gurus." By definition, a guru is deemed to be a good person, a wise person and a teacher. The individuals noted here exude all these attributes, plus they have contributed quality concepts and approaches that have made major and lasting impacts.

When embarking on quality FM initiatives, or continuing along with them, it is helpful to understand the messages of these prominent quality gurus. There are many common features among them. Be aware, however, there are some contradictions across their approaches.

Whatever quality approach your organization takes, it is imperative that the approach is purposefully selected, built and customized to suit your organization, meets current requirements and accommodates future needs.



✦ Topic 2: Basic Quality Terms and Concepts

Quality has its own specialized terminology and philosophies. Definitions and brief descriptions of some key quality terms and concepts relevant to FM are presented in Exhibit 5-3. The terms are presented in alphabetical order, and the list is not intended to be all-inclusive. Some of these terms may be defined slightly differently across organizations or used interchangeably, so we offer a set of standardized definitions here.

Think of the list as a baseline reference of common quality terms. These terms will be discussed in more detail in subsequent competency content. Along the way, additional terms and concepts will be introduced.

Exhibit 5-3: Common Quality Terms for Facility Managers (continued on next page)

Term	Definition
Audit	A planned evidence-gathering process to assess whether agreed-upon requirements are being met to enhance the degree of confidence of intended users or parties involved.
Benchmarking	A method of comparing performance of commodities or services against comparable practices across an organization or with other organizations or industries.
Best practices	Techniques, approaches or methods 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.
Codes	Systems of regulations that define scoping requirements.
Common cause variation	A type of variation inherent within every process and repeated randomly within predictable limits. Sources of common cause variation in a process include chance causes, random causes, system causes and inherent causes.
Continuous improvement (CI)	The collective actions an organization takes to increase the effectiveness and efficiency of activities and processes in order to enhance its ability to meet requirements and provide added benefits to customers and the entire organization. A strategy for achieving total quality management, CI is directed at improving quality and customer satisfaction.
Customer focus	Seeking to determine the needs of customers and taking action to satisfy them.
Customer satisfaction	The end result of delivering a product or service that meets customer requirements, needs and expectations.
Customer segmentation	Aggregating or clustering customers into groups (e.g., internal or external customers) that have common needs and expectations for a product or service and will respond similarly to an organization's actions (such as the improvement of a given service). The differentiated groups that result from this process are customer segments and are relatively homogeneous groups of customers.



Exhibit 5-3: Common Quality Terms for Facility Managers (continued on next page)

Term	Definition
Customer service	Generally refers to various quality activities intended to answer customer questions and support services.
International Organization for Standardization (ISO)	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.
Key performance indicators (KPIs)	The most relevant metrics in determining whether the outcomes of an activity contribute to the goals of the entire organization and the aims of the activity.
Metrics	Standards of measurement; specific indicators that are measured in order to assess an organization's impact on the physical or social environment.
Plan, Do, Check, Act (PDCA) cycle	An iterative model that has four phases: Plan, Do, Check and Act. The output of each phase serves as the input to the next phase, and the cycle can be repeated numerous times to capture the results of changes and progressive elaboration.
Process	An activity or set of interrelated work activities that takes input, adds value to it and provides specific outputs to an internal or external customer. A process involves a planned and repetitive sequence of steps by which a product or service is delivered.
Process improvement	The application of quality improvement tools and models (such as the PDCA cycle and others) to effect positive improvement and better meet the needs and expectations of customers.
Process map	Any one of several kinds of visual illustrations of how work flows. Flowcharts are the most simple, basic and linear. Cross-functional process maps are more complex but still linear. Relationship maps are used for whole, complex organizations and are nonlinear.
Protocol	An established code of procedure or behavior in any group, organization or situation (for example, a safety protocol).
Quality awards	Prizes (or bonuses) awarded for some aspect of organizational quality performance, based on an assessment of the applicant's performance against certain criteria. Some awards measure the result of quality activities (such as customer satisfaction), some assess the effort involved in ensuring consistency of output and others assess conformity of output to customer requirements. Most awards are competitive, but some are assessments of an organization's performance with no limit to the number of winners. Awards are generally categorized in the following manner. • At international level (Deming Prize, European Quality Award, Asia-Pacific Area Golden Quality Award) • By national or local government (U.K. Quality Award, U.S. Malcolm Baldrige National Quality Award, Singapore's National Quality Award) • At regional level (Northern Ireland Quality Award, California Quality Award) • By trade, industry or professional bodies (U.S. Air Force Quality Award, Brewery Quality Performance Awards [German Agricultural Society]) • By other companies (Best in Class Manufacturing Awards [Asian continent], J. D. Power and Associates customer satisfaction and quality awards)



Exhibit 5-3: Common Quality Terms for Facility Managers (concluded)

Term	Definition
Quality management system	The organizational structure, procedures, processes and resources needed to implement quality. Designed primarily to satisfy the internal managerial needs of the organization in meeting the requirements of customers.
Service level agreement (SLA)	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.
Service specification	The description of service level acceptable to meet customer requirements. It also provides a framework for monitoring actual services. May be used as a benchmark to assess the standard and quality of service provided.
Six sigma	A process improvement approach encompassing a variety of techniques and tools focused on improving the capabilities of business processes. Key features are the use of data and statistical analysis and highly trained project leaders (known as Black Belt, Master Black Belt, Green Belt and Champion). Project selection is based on bottom-line results and has dramatic goals to reduce errors. The resulting decrease in process variation leads to reduced defects and improvements in profits, employee morale and quality.
Special cause variation	A type of variation resulting from special circumstances, not an inherent part of a process. Special causes of variation are factors that disrupt the usual flow of work and, therefore, must be identified, investigated and brought under control.
Standard	Describes the prescribed, accepted level of service and product performance. Standards apply to the facility itself (buildings, structures, interiors, exteriors and grounds), operations and maintenance and contractors and service providers (reception, cleaning and catering).
Survey/questionnaire	A structured series of questions covering a specific area of interest that are designed to elicit a predetermined range of responses. May be administered orally by a survey taker, by paper and pencil or electronically (e.g., by computer or smart devices or Web applications). Responses are tabulated and analyzed to assess customer satisfaction, areas for improvement and so forth.
System	A network of interrelated, interdependent parts, each of which, by its behavior, affects the behavior and performance of others.
Systems thinking	A management theory that views the organization as a unified, purposeful combination of interrelated parts. It requires managers to look at the organization as a whole and recognize that one activity affects other parts in the organization.
Total quality management (TQM)	A formal quality process that includes an intense focus on the customer, involvement of all stakeholders and quantitative continual improvement methods.
Trend	A variable's tendency over time to increase, decrease or remain unchanged.
Trend analysis	The charting of quantitative data over time to identify a tendency or direction.
Voice of the customer (VOC)	An organization's efforts to understand customers' expressed needs and expectations ("voice") and to provide products and services that meet those needs and expectations. VOC can be captured in many ways, such as one-on-one interviews, focus groups, written/Web-based surveys and scorecards. The results are reviewed and analyzed at regular intervals for action items.



✦ Topic 3: The Goal of Quality Facility Management

Measurement and improvement in quality FM

Collectively, the terms and concepts presented in Topic 1 reinforce an overarching goal of quality facility management—to measure and improve the quality of FM services. Exhibit 5-4 lists general examples of how this goal is achieved.

Exhibit 5-4: Measuring and Improving the Quality of FM Services

Quality of FM Services Is Measured by ...	Quality of FM services Is Improved by ...
• Auditing FM operations • Defining desired service levels • Establishing baseline performance levels • Assessing customer satisfaction • Benchmarking	• Implementing systematic process improvement • Understanding customer needs and expectations • Focusing on quality initiatives • Delivering innovative services • Utilizing best practices

Content throughout the remainder of the competency will examine each of these elements (such as auditing, customer satisfaction and process improvement) in more detail.

The importance of systems thinking in quality FM

Recall the definitions of system and systems thinking presented in Topic 2:

A system is a network of interrelated, interdependent parts, each of which, by its behavior, affects the behavior and performance of others.

Systems thinking is a management theory that views the organization as a unified, purposeful combination of interrelated parts. It requires managers to look at the organization as a whole and recognize that one activity affects other parts in the organization.

Systems thinking embodies the belief that an organization is more than the sum of the parts—it is an interrelated system that cannot be divided into independent parts. Everyone in the organization needs to work together to optimize the system as a whole, not seek to optimize separate pieces. The biggest opportunities lie in the system.

In the context of the entire organization, facility management is a part of a system network along with finance, technology, human resources, production or other functional areas (depending on the nature of the organization). Each functional area connects with all the others. Instead of viewing the various functions across an organization as discrete, the systems approach views the organization as a whole.



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

- Management understands the relationships among 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 can 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.
- Any individual component contributes its best to the entire system for the benefit of the system—not for selfish reward. Internal competition and a win-lose approach can suboptimize overall organizational performance and destroy the organization's ability to achieve goals.
- Management recognizes the effects of decisions on the entire system.

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:

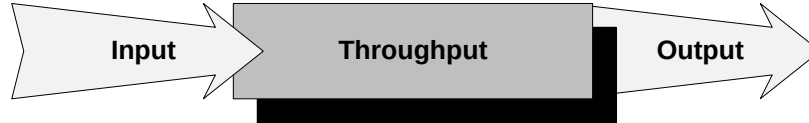
- A system is a series of unified, purposeful functions or activities that work together for a single aim.
- All organizations are considered to be systems.
- Components of a system (such as functional areas in the entire organization) are interdependent and interrelated.
- Interdependencies within any 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 process may undermine the effectiveness of the whole.

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 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). Exhibit 5-5 visualizes this systems concept.

Exhibit 5-5: A System That Transforms Inputs to Outputs



Consider the standard process of managing FM work orders as an example.

Input	Throughput	Output
• Requests for service	• Work orders • Maintenance workers • Tools • Supplies	• Repairs • Customer satisfaction

For a larger-scale example, think of the IFMA facility management competencies (shown below in alphabetical order) as a system.

Input	Throughput	Output
Includes: • People • Place • Process/business requirements • Capital investments	The effective implementation of IFMA competencies: • Communication • Emergency Preparedness and Business Continuity • Environmental Stewardship and Sustainability • Finance and Business • Human Factors • Leadership and Strategy • Operations and Maintenance • Project Management • Quality • Real Estate and Property Management • Technology	Measures include: • Facilities performance • Human comfort • Safe environment • Performance against standards • Regulatory compliance • Return on assets • Capital asset value • Effective budgets • Total operating cost • Site specific services (such as janitorial service and food service) and their results measured against standards

Systems thinking can pertain to many types of systems. Here our focus is quality facility management. Systems thinking is important in quality facility

management because it looks at the interrelated entirety of the FM function, including the connections between FM competencies and their linkages to the entire organization.

Systems thinking is a critical force for integrating and pulling FM staff, projects, service providers and other resources into a unified and purposeful direction. Systems thinking in quality FM can also support organizational initiatives to:

- Help 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.



Progress Check Questions

Directions: Read each question and respond in the space provided. Answers and page references follow the questions.

Match each term with its application.

- | | |
|-----------------------------------|---|
| 1. _____ Audit | a. Consecutive points that show a nonrandom pattern |
| 2. _____ Customer segmentation | b. A metric against which the outputs of a process are compared and declared acceptable or unacceptable |
| 3. _____ Standard | c. The inspection and examination of an FM process to ensure compliance to requirements |
| 4. _____ Total quality management | d. The design of a service process to satisfy the needs and expectations of one homogeneous group |
| 5. _____ Trend | e. Collective principles that have the ultimate goal of customer satisfaction through continual improvement |
-
6. A disciplined methodology with the objective of meeting or exceeding customer desires **best** describes
- () a. benchmarking.
 - () b. continuous improvement.
 - () c. PDCA model.
 - () d. trend analysis.
7. Systems thinking in quality FM is characterized by
- () a. bringing together functional resources to improve independent processes.
 - () b. motivating employee performance and maintaining good interpersonal relationships.
 - () c. striving for incremental performance improvements instead of breakthroughs (big jumps).
 - () d. satisfying the needs of the entire organization and not only customer-defined requirements.
8. True or false? In the absence of a systems approach, steps taken to optimize specific processes may be detrimental to the entire system.
- () a. True
 - () b. False



Progress check answers

1. c (p. 5-8)
2. d (p. 5-8)
3. b (p. 5-10)
4. e (p. 5-10)
5. a (p. 5-10)
6. b (p. 5-8)
7. d (p. 5-11)
8. a (p. 5-12)



Chapter 2: Quality Measures for the Facility Organization

After completing this chapter, students will be able to:

- Develop and apply performance metrics appropriate for the facility organization.
 - Recognize various standards that help to ensure that FM services or systems meet fixed specifications or quality benchmarks.
 - Describe how to select, interpret and apply various quality measurement tools in facility management.
 - Establish and maintain service specifications.
 - Establish key performance indicators.
-

There are many analogies used to position the importance of measurement in assessing quality performance. A simple one we can all relate to is offered in the *Facility Manager's Maintenance Handbook*: traveling blindfolded. To do so, you do not know where you are, how close you are to a destination or even if you are heading in the right direction. How could you know if FM quality is meeting customer requirements without measurement?

But just as important as the act of measuring is using proper measurements. Measuring everything can be more damaging than measuring nothing. And wrong measures can lead people to misguided and/or disruptive behaviors. Conversely, developing appropriate measures, making better use of existing measures and improving measurement systems can lead to improvements in FM quality. And that is what you will learn about in this chapter.

We begin with a general discussion of measuring what matters to establish a baseline of where you are. The relevance of metrics and standards is covered. Content goes on to examine a variety of quality tools used for measurement, quality control and process improvement. Statistical analysis and trend analysis are also covered. How service specifications, service level agreements, key performance indicators and best value practices impact FM quality is discussed.



✦ Topic 1: Measuring What Matters in Facility Management Services

Before FM quality can be managed or performance improved, a facility manager must determine what will be measured and to what extent. Many variables can impact FM performance. Typically, there are multiple interactions between the different variables.

Moving targets

Measurement tends to conjure thoughts of dimensions, quantity, capacity and so forth. Measurement of FM performance, however, is not an exact science with hard rules and predictable relationships. That is why we use the metaphor of moving targets to describe the facility manager's challenge.

The challenges in FM performance measures are numerous. A principal one is that you are dealing with people. Human nature is often inherently unpredictable. Being in step with your customers at any given moment in time is often just that—a snapshot in time. A quality measure that made perfect sense at one point can easily become irrelevant. Customer needs can be circumstantial; they can also be fragile and fleeting. Your mission as a facility manager is to ensure that the methods you use to ascertain customer needs and the measurements you use to assess FM performance in meeting those needs are both appropriate and in sync with customer requirements.

Furthermore, no one measurement technique works with all customers. For example, how you assess the needs and measure FM performance with facility occupants or visitors would likely be very different from how you approach the task with organizational executives or the board of directors. Quantitative data collection and analysis or surveys may be helpful in some scenarios, but walking around and observing, one-on-one exchanges or other qualitative techniques may be necessary in other situations. Often, you will need multiple methods (both quantitative and qualitative) in combination to ensure that you fully understand the expectations and perceptions of all your customers.

Given the various challenges of moving targets, we offer general guidelines in Exhibit 5-6 that can help to support the measurement of FM service quality. Regardless of whether you are in the public or private sector, are managing large or small facilities, multiple or single venues or leased space or owned, or are part of an in-house FM function or a contracted firm, these guidelines have relevance for you.



Exhibit 5-6: Measurement Guidelines for FM Service Quality

- **Measurements should be based around customer needs.** The customer is at the heart of quality FM. Customers 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. Customer-driven measures help to ensure that you understand customer expectations and perceptions and avoid negative gaps.
- **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.
- **Consider the relevance of the intended measures to customers in 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.
- **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 overmeasure and end up with meaningless results, albeit objective data.
- **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 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 quality of output and cost). Remember, however, the focus is not about how you rate the FM service. Some of the same measures of effectiveness may serve expectations of multiple customers, facility management and the entire organization, but customers should drive the process.
- **Evaluate the responsiveness of FM services.** Responsiveness is a measure of timeliness. A precursor, of course, is that you and your customers share a common frame of reference for responsiveness. Not all services issues merit the same level of timely response. Only when FM and customers share the same understanding about realistic service response times will responsiveness measures be meaningful.
- **Align measurements to the organizational strategic plan.** There's much to be learned from past performance. Historical data about FM performance can help 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.



A take-away from Exhibit 5-6 is that measuring *the right variables* has a lot to do with measurement success. Case in point, think about medical procedures. Blood work and other diagnostic tests often help doctors to foretell and manage health issues before they spiral out of control. In FM, incorporating valid and reliable metrics and standards can help a facility manager not only ascertain customer requirements but also predict and control problems before they get out of hand. Simply stated: Metrics and standards, when on target, greatly help to assess and sustain FM quality.

The importance of metrics

Recall the Topic 1 definition of metrics:

Standards of measurement; specific indicators that are measured in order to assess an organization's impact on the physical or social environment.

Metrics help you to make your decisions based on fact rather than intuition. Exhibit 5-7 lists key considerations that help to ensure that FM metrics are meaningful. (Note how many of these points about metrics reinforce the general measurement guidelines shown in Exhibit 5-6.)

Exhibit 5-7: Best Practices for FM Service Quality Metrics

Effective metrics:

- ✓ Are linked to customer needs.
- ✓ Are clear and understandable.
- ✓ Are objectively demonstrable.
- ✓ Reflect those established for the FM profession as a whole as well as metrics related to the entire organization's business.
- ✓ Are relevant to the scope of services provided by the FM organization.
- ✓ Have targets or goals.
- ✓ Are 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 (not just the past).
- ✓ Are not static (as necessary, they are reviewed/revised over time).

Most likely, your FM department is already using metrics to measure operational and process performance. The big questions are:

- Are they the correct ones?
- Are the metrics providing you with the information and insight to make informed decisions?
- What are you doing with the information you are gathering?

You should gather only what you intend to use to improve your operations.



Metrics may be simple or complex.

Examples:

- Performance metrics—how your customers assess your service performance
- Service metrics—how you measure people providing services (internal staff and external suppliers)

Regardless of whether you have an internal customer or an external customer, the goal is to keep them happy and meet their expectations. Metrics provide real-time data that can facilitate decisions and goal setting. Strong metrics allow you to understand where you are today in order to create the road map for tomorrow. In Topic 2 we will examine specific measurement tools.

The importance of standards

Content thus far has reinforced that customer satisfaction is essential in facility management. Standards help you to ensure that FM services or systems meet fixed specifications or quality benchmarks.

As defined in Topic 1, standards:

Describe the prescribed, accepted level of service and product performance. Standards apply to the facility itself (buildings, structures, interiors, exteriors and grounds), operations and maintenance and contractors and service providers (reception, cleaning and catering).

Standards are often classified as conformance or 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.
- **Consensus standards** are developed through agreement among professionals regarding good practices. They are voluntarily adopted by an organization.

Compliance or conformance to standards give customers and potential customers confidence and trust in FM services. To achieve a balance, FM must develop standards judiciously (where it matters most) and treat them as living, breathing guidelines that can and must be constantly improved. When effectively managed, standards provide the kind of foundation for improvement demanded in today's facility management.

A standard may be a metric, specification, gauge, statement, quantity, behavior or physical sample against which levels of performance are compared and declared acceptable or unacceptable.



Standards may be internal or external:

- **Internal standards** are relevant organizational or FM standards and/or past related service standards.
- **External standards** describe conformance to regulatory requirements, international standards, health and safety laws and regulations, official industry standards, manufacturers' recommendations and so forth.

Types of standards

There are many standards applicable to quality in FM—standards that apply to accessibility, environment and efficiency, management, premises and property, security, technology, workplace health and safety and more. Standards may be country- or region-specific, or they may be international. Overlapping standards in a given area (for example, domestic and international quality management system standards) may not be that different.

It is not possible to mention all standards that pertain to quality in FM here. A small sample of FM quality-related standards (presented in alphabetical order) follows.

ANSI standards

ANSI (the American National Standards Institute) has coordinated the U.S. private-sector voluntary standardization system for more than 90 years. 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 (ANSs). ANSI accredits standards-developing organizations that operate in accordance with these consensus procedures and approves draft standards provided 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 have the opportunity to 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.



ANSI also 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.

ASHRAE standards

ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) provides standards for both its members and others professionally concerned with refrigeration processes and 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 cutting-edge 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 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 for 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. It continues to evolve. Its original intent was for planning, space management and 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 more 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.
- 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. Thousands of standards are published by ISO.

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).



Voluntary, market-driven, and consensus are important ISO standard concepts:

- **Voluntary.** ISO standards are voluntary. As a nongovernmental organization, ISO has no legal authority to enforce their implementation. However, some ISO standards have been adopted by countries as part of their regulatory framework. In some cases, although ISO standards are voluntary, they may become a market requirement.
- **Market-driven.** ISO develops standards for which there is a market requirement. An international cross-section of experts in the field (e.g., industrial, technical, and business sectors) who have asked for the standards and other parties with relevant knowledge (such as representatives of government agencies, consumer organizations, and academia) collaborate as technical committees to develop the standards.
- **Consensus.** The fact that ISO standards are developed in response to market demand and are based on consensus among the interested parties ensures widespread applicability. Standards are regularly reviewed to decide whether they should be maintained, updated or withdrawn. The review process ensures that the standards remain state-of-the-art.

Sustainability building rating systems

Building ratings systems provide an objective standard for certifying that a building is environmentally friendly or sustainable. In some countries, these are systems used to achieve a certification. Some of the major international sustainability building rating systems are shown (alphabetically) in Exhibit 5-8.

Exhibit 5-8: Sustainability Building Rating Systems

Building Rating System	Country of Origin	Availability
BEAM Plus	Hong Kong SAR	Hong Kong SAR
BREEAM	United Kingdom	15+ countries
Estidama and the Pearl Rating System	Abu Dhabi	Abu Dhabi
LEED	United States	41 countries
CASBEE	Japan	Japan
Green Globes®	Canada	North America
Green Star	Australia	Australia
Green Mark	Singapore	Singapore
Three Star System	China	China

(Note: The *Real Estate and Property Management* competency includes additional information about ASTM, IFMA/BOMA and OSCRE standards. The



Environmental Stewardship and Sustainability competency provides more detail about ISO and international sustainability building rating systems.

Standards ensure desirable characteristics of products and services such as quality, environmental friendliness, safety, reliability, efficiency and interchangeability. When products, systems, machinery, devices and services work well and safely, it is often because they meet standards.

Once a standard is identified for use, measurements demonstrate conformance or compliance. Common measurements in FM quality include accuracy (error-free), availability, capacity, completeness, consistency, costs, efficiency, reliability, responsiveness, satisfaction, speed and timeliness.

Distinctions between standards, codes, practices, best practices and protocols

What differentiates a standard from a code, a practice, a best practice or a protocol? There is often confusion about these terms, so we offer the following clarification points. Note that each term is discussed in other sections of content throughout the competency; we provide this discussion here for comparative purposes.

Standard

A standard is a formal expression of rules, guidelines or characteristics for activities or their results.

Example:

The Space Allocation Standard in the U.S. Army prescribes square footage of office space according to an individual's rank.

Standards may:

- Establish size or shape or capacity of a product, process or system.
- Specify performance of products or personnel.
- Define terms so that there is no misunderstanding among those using the standard.

Example:

Standard operational procedures (SOPs) help a new employee to learn and grasp necessary operational skills within a relatively short period (even without the help of a supervisor or an incumbent employee). SOPs ensure continuity of operations (even when there is a labor force change). SOPs also serve as a foundation for measurement, an audit purpose and more.

Effective standardization promotes forceful competition and has potential to enhance organizational profitability.



Standards allow an organization to:

- Attract and assure customers.
- Demonstrate market leadership.
- Create competitive advantage.
- Develop and maintain best practices.
- Comply with regulations and legislation.

Most standards are the result of a rigorous process of expert engagement, peer review, professional drafting and formal voting for acceptance. They are elaborated through empirical data, research and testing.

Some standards are mandatory. For example, a standard that is accepted by an industry is normally mandatory for those who work in that field. Other applications of standards are voluntary. However, laws and regulations may refer to standards and even make compliance with them compulsory.

A conformity assessment provides assurance and confidence when personnel, products, systems, processes or services are evaluated against the requirements of a voluntary standard. (A conformity assessment is any activity that helps to directly or indirectly establish that relevant requirements are fulfilled.)

Code

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

Example:

A building code is a set of rules that specify the minimum acceptable level of safety for constructed objects such as buildings. The International Building Code (IBC) is a model building code developed by the International Code Council (ICC). A model building code has no legal status until it is adopted or adapted by government regulation.

The IBC was developed to consolidate existing building codes into one uniform code that could be used nationally and internationally to construct buildings. It is used as a reference for architects and engineers when designing buildings or building systems. The purpose of the IBC is to protect public health, safety and general welfare as they relate to the construction of buildings.

Practice

A practice is a general term that refers to the customary, habitual or expected procedure or way of doing something. A practice has no force of law. A practice may be effective or not, good or bad; it merely describes performance.



Examples:

- An organization has a practice that prohibits socializing with potential vendors (e.g., having lunch or dinner and attending sporting or theatrical events outside of work) during the months preceding and during any type of selection process. Even though this is not written in the company policy handbook, it has become an organizational practice.
- It is a good practice to shut off the lights if you are the last person out of a conference room.

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 practice 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.

Examples:

- For large construction projects, an organization developed a general contractor (GC) bid review template that facilitated organizing everything into the 16 divisions of construction as defined by the Construction Specifications Institute (CSI) sections. This allowed the organization to consistently evaluate, and disqualify, GCs based on their understanding of the project scope.

For example, if two GCs had US\$250K for work in the “metals” section and a third had US\$125K, it potentially indicated that:

- The GCs might not understand or capture the full breadth of the scope involving the “metals” section of the project.
- The two GCs might be greedy.
- The third GC might have an innovative idea to reduce costs.

By asking probing questions about the “metals” section, the organization could easily ascertain who had a firm, clear grasp of the project. While time-consuming up front, this best practice resulted in fewer change orders and requests for clarifications (both cost drivers in a project budget) as the project proceeded.

- As explained in their book *Five-Phase Project Management: A Practical Planning and Implementation Guide*, Joseph Weiss and Robert Wysocki present a best practice for a project management process that has five main phases and 25 subphases.



Protocol

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

Examples:

- Conducting an audit for a facility assessment follows a specific protocol to ensure that all buildings on a campus are assessed utilizing the same process.
- In some military agencies, a facility manager does not report directly to the general in charge but reports through a line of command. Similarly, in some business structures, a facility manager is not a direct report to the chief operating officer (CEO).

There is a basic caveat in attempting to differentiate a standard from a code, a practice, a best practice and a protocol: The terms may have subtle nuances in different countries and be used differently in various jurisdictions.

Examples:

- In the U.K., there are “codes of practice” that are enforced by government regulation. In Europe, however, codes are not necessarily statutory.
- In the U.K., a protocol is also known as a “procedure.”

The online IFMA Resource Center provides links to additional examples of standards, codes, practices, best practices and protocols.

Since standards are the focus of the discussion here, we close with the following point: Standards give you the framework you need to monitor and improve performance in quality FM—whether that means increasing market share, driving down costs, managing risk more effectively or improving customer satisfaction.

Next we examine quality measurement tools.

✦ Topic 2: Quality Data and Facility Performance

Assessing the quality of facility management services necessitates that a facility manager be able to apply a variety of quality measurement tools. In this topic, we examine several types of tools you can use to collect quality data and assess facility performance:

- Benchmarking
- Gap analysis
- Seven basic quality control tools (Pareto chart, flowchart, check sheet, cause-and-effect diagram, scatter diagram, control chart, histogram)



- Quality improvement tools (root cause analysis, the Five Whys, PDCA cycle, six sigma DMAIC model)
- Statistical analysis (measures of central tendency, variation/statistical process control, association/correlation and regression analysis)
- Trend analysis

(Note: Surveys are another important quality tool. They are discussed in Chapter 3 of this competency.)

Data collected from these tools is yet another part of your quality tool kit. The value of data lies in being able to distill the numbers into information that can facilitate decision making and save operating costs.

Example:

Work management center calls are logged, and data compiled includes time, date, caller, issue, resolution, completion date and so forth. Such call report data is voluminous. Converting data to a Pareto chart shows the percentage of calls by topic; tracking and comparing the percentages from month to month shows trends that allow the facility manager to make decisions and take proactive steps to address the problems rather than merely reacting to them; converting the raw data to information improves FM operations.

Quality tools are a prerequisite for effective FM services as well as performance improvement. As you review the quality tools that follow, consider how the data can facilitate decision making and proactive steps that can improve FM quality performance of both in-house and outsourced services.

Benchmarking

Benchmarking describes a method of comparing performance of commodities or services against comparable practices across an organization or with other organizations or industries. It is a structured learning process. European Standard EN 15221, Part 7, “Facility Management—Guidelines for Performance Benchmarking,” formally defines benchmarking as:

A process of comparing strategies, processes, performances and/or other entities against practices of the same nature, under the same circumstances and with similar measures.

Benchmarking provides a rational method for setting performance goals (and takes the emotion out of any arguments).

In benchmarking, best practices are often the goals to be achieved. As noted in previous content, best practices are the techniques, approaches or methods 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. The quality task is to learn how to use the best practice information to improve FM performance levels.

Types and forms of benchmarking

Benchmarking may be internal or external. Data may be collected and analyzed from across the entire organization. Benchmarking may also be done with competitors, noncompetitive customers, suppliers and other organizations.

Exhibit 5-9 summarizes common types of benchmarking, including simple examples and basic advantages/disadvantages.

Exhibit 5-9: Types of Benchmarking

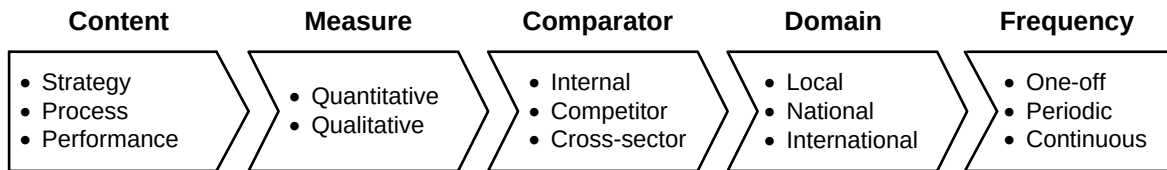
Type	Description and Example	Advantages/Disadvantages
Internal	Comparing practices to similar or peer operations across an organization. <i>Example:</i> Comparing the same or similar FM activities with those of other internal departments or FM operations across different campuses/country locations.	• <i>Advantage:</i> Easy to implement; can be done regularly and quickly. • <i>Disadvantage:</i> Limited focus may not provide best performance improvements.
Competitive	Measuring a specific product, service, process or activity against a best-in-class competitor. <i>Example:</i> Comparing employee amenities to those of a direct competitor.	• <i>Advantage:</i> Relevant information can lead to substantive performance improvements. • <i>Disadvantage:</i> Obtaining data can be difficult.
Functional	Comparing practices to similar functions within the same industry or industry leaders. <i>Example:</i> Comparing life and safety costs with those of an industry leader.	• <i>Advantage:</i> Industry issues are known and best practices are typically established. • <i>Disadvantage:</i> May encounter confidentiality or competitive issues.
Generic	Investigating work practices that are not commonly used in FM but could be adapted. <i>Example:</i> Examining how business processes are reengineered in manufacturing and assessing possibilities for FM process improvements.	• <i>Advantage:</i> Makes the broadest use of data collection; can yield productive and innovative results from thinking “outside-the-box.” • <i>Disadvantage:</i> Comparisons may not be particularly relevant.

It should be noted that while most benchmarking studies have an operational focus (which is the intent of this discussion), a benchmarking project may also have a strategic focus. Strategic benchmarking is described as applying process benchmarking to the level of business strategy by incorporating benchmarking results in the strategic planning process. Strategic benchmarking is not focused on the benchmarking partner; rather, it helps an organization develop an increased understanding and ability to address strategic business issues.



EN 15221-7 identifies benchmarking forms using slightly different conventions. It notes multiple aspects that affect the scope of a benchmarking exercise and the impact on the selection of data (content, measure, comparator, competency and frequency), as shown in Exhibit 5-10.

Exhibit 5-10: EN 15221-7 Forms of Benchmarking



Benchmarking applications and purposes

Through benchmarking, a facility manager looks for best practices the function can implement instead of waiting for some event or upper management decision that requires a change in FM departmental operations. The subjects that can be benchmarked include strategies, operations, processes, procedures, services and costs.

From this viewpoint, benchmarking can be conducted on all the areas shown in Exhibit 5-11. (Note that the list is not intended to be all-inclusive and terms are shown in alphabetical order.)

Exhibit 5-11: Common Areas for Facility Management Benchmarking

• Churn rate • Customer complaints (volume and frequency) • Direct and indirect labor costs • Emergency and disaster planning costs • Employee amenities • Environmental costs • Exterior building maintenance • FM cost of operations • FM information and technology costs • FM salaries and overhead administration costs • Janitorial/housekeeping practices and costs • Landscaping and grounds maintenance • Leasing costs • Life and safety costs • Mail services • Maintenance costs	• Management fees • Mean time to repair or fix • Mean time to respond • Moves and relocations • Occupancy costs: • Per meter/foot • Per person • Per workspace • Parking lot/parking garage service costs • Reception services • Repair costs • Security costs • Service provision (in-house staff/outourced) • Space planning costs • Square meters/feet per person • Sustainable maintenance practices and operations • Utility costs and consumption • Warrantys
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EN 15221-7 also highlights a variety of benchmarking purposes. Exhibit 5-12 lists those purposes.

Exhibit 5-12: EN 15221-7 Purposes for Benchmarking

• Identification of improvement options • Resource allocation decisions • Prioritization of problem areas • Verification 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
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Facility management operations are, of course, quite diverse in terms of size, number of facilities, building type, industry and so forth. To set the stage for a successful benchmarking initiative, you need to be sure that there are enough similarities between your organization and those you benchmark with. Often described with the metaphor “comparing apples to apples,” benchmarking comparisons need to be comparable and fair in order to be meaningful.

Benchmarking processes

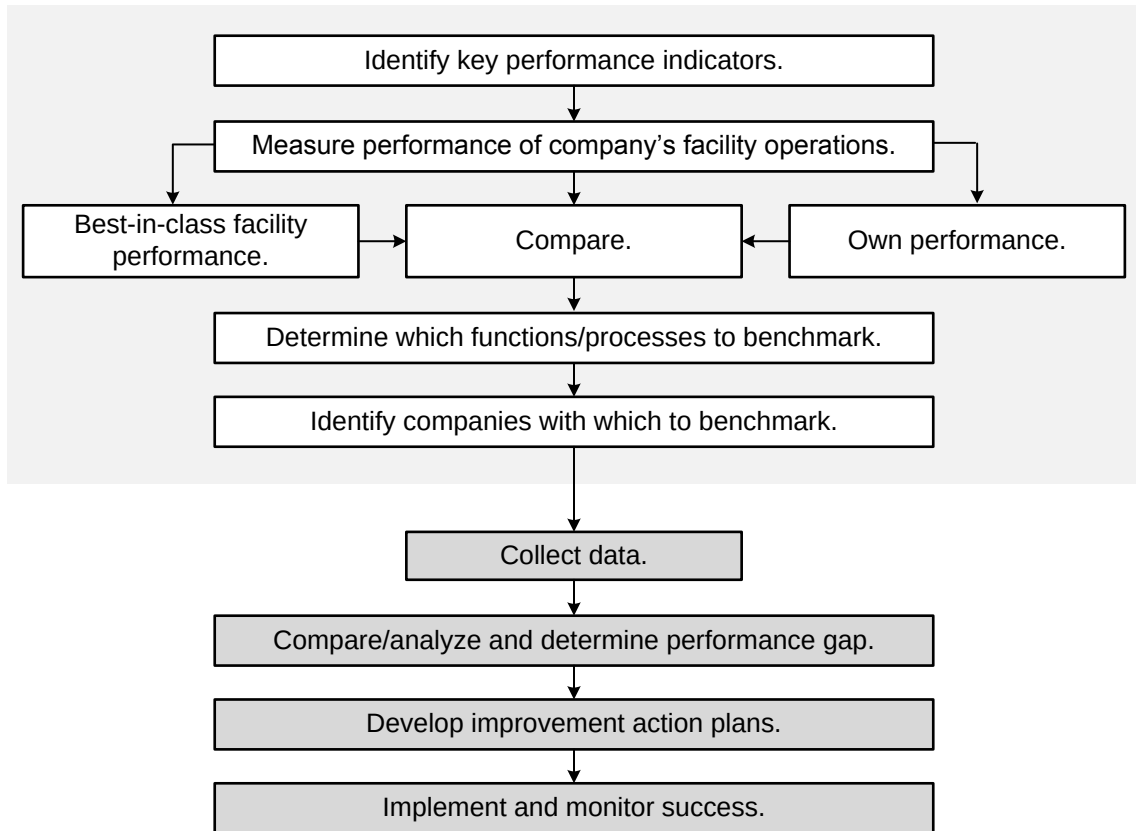
There are different ways to benchmark, and various benchmarking process models exist. However, they generally all involve some representation of:

- **Planning.** Identifying what to benchmark and whom to benchmark (who has the best-in-class performance); determining the data collection method and collecting the data.
- **Analysis.** Determining performance gaps and analyzing why best practices are superior; projecting future performance levels and how to achieve superior performance.
- **Integration.** Communicating benchmark findings and gaining organizational acceptance; establishing/revising performance goals; developing improvement action plans and an implementation schedule.
- **Implementation.** Converting benchmarks (best practices) into specific actions and monitoring progress and success; adjusting benchmarks and staying current with ongoing practices.

Various benchmarking methodologies order these elements into a series of activities or steps. In Exhibit 5-13, an approach IFMA has used to guide its benchmarking initiatives is shown.



Exhibit 5-13: Benchmarking Methodology Used by IFMA



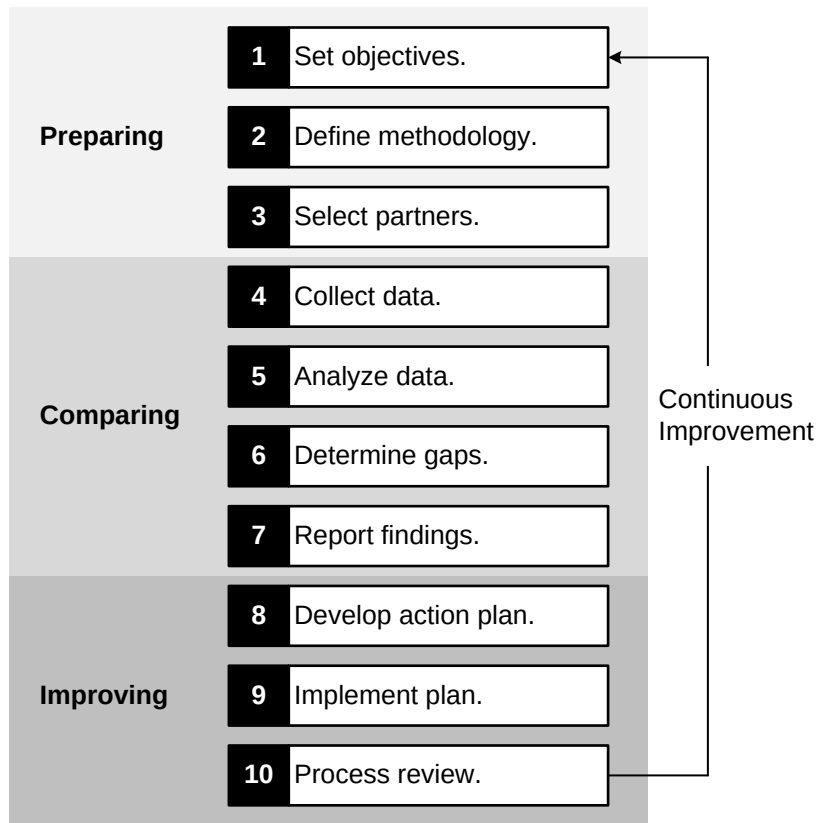
There is an iterative aspect in benchmarking that makes it truly a continuous improvement tool: A loop starts the process over again, examining new areas for improvement.

EN 15221-7 divides the benchmarking process into ten steps, split into three phases:

- **Preparing.** To set objectives, define a methodology and select partners.
- **Comparing.** To provide guidance in collecting and analyzing data as well as determining gaps and reporting findings.
- **Improving.** To develop and implement an action plan and review the benchmarking process.

The 10-step EN 15221-7 process is shown in Exhibit 5-14. A continuous improvement loop is included as part of the EN 15221-7 process.



Exhibit 5-14: EN 15221-7 Forms of Benchmarking

Benchmarking considerations

Benchmarking is not just about comparing numbers. To be successful with benchmarking, an organization should have a clear idea of its own key performance indicators (e.g., reduced response time or improved customer satisfaction) and knowledge of the related internal processes (current performance) before initiating the process. Only then can benchmarking effectively target a problem area, identify solutions and implement changes for improved results. (Key performance indicators are discussed in Topic 5 of this chapter.)

Some organizations realize striking financial returns from benchmarking; others report more significant nonfinancial results, such as improved customer satisfaction. The power of benchmarking is that it provides the opportunity to ask questions, seek reasons why current processes are in place and explore changes.

There are some basic tenets that can improve the potential for benchmarking success. Better benchmarking results are typically attained through the principles listed in Exhibit 5-15.



Exhibit 5-15: Principles to Support Facility Management Benchmarking

Principle		Implication
Secure commitment from top management.		Benchmarking requires time and money. Backing and support from top management is essential.
Embrace a willingness to change.		After best-in-class practices are identified, the organization must be ready to implement the practices.
Champion service delivery and customer satisfaction.		Benchmarking should not become fixated on the costs of providing a service and lose sight of the customer.
Know what you want to do with the results from the onset.		The current situation should be understood in detail. The purpose and goals for benchmarking should be clear.
Adopt a code of conduct when entering into benchmarking relationships.		To guide benchmarking encounters and enhance the professionalism and effectiveness of benchmarking, it's essential to prepare thoroughly, observe principles of legality and confidentiality, obtain any necessary permission, communicate fully with a benchmarking partner, follow through in a timely manner and complete benchmarking activities to the satisfaction and mutual agreement of all parties involved.
Adapt a best practice rather than copying it.		Because no two FM operations are exactly the same, copying a best practice and parachuting it into your organization rarely works well. The best approach is to understand the ideas behind the best practice and adapt them to fit your organization's culture and FM processes.

Open and honest information is critical in benchmarking. Obviously, organizations must protect confidential and sensitive information, but it is also important to be candid about your practices in order to learn from others. Involving a neutral third-party mediator, a consulting firm or a business school in situations where legality and confidentiality are concerns can help to ensure that no proprietary information is divulged.

Benchmarking resources

Benchmarking is a significant quality tool for performance improvement. There are many resources and publications you can use to learn more about it.

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. Certainly, Camp's landmark text remains 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.



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.

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

Gap analysis

A gap analysis is generally described as the difference between the current state and a desired state, or “the space between what is and what an organization hopes to be.” The current state is defined by current practices; the desired state is defined by best practices. Gap analysis is typically part of benchmarking (and that is our focus here). In some circumstances, however, a gap analysis may be conducted independently or be part of a needs assessment or other continuous improvement initiative.

A gap is the difference in the organization’s own benchmark data compared with a benchmark partner’s performance data. Gaps can be positive or negative. A gap tells you if you are ahead, behind or at parity with your benchmarking partner. In benchmarking, a performance gap refers to the difference between your performance and best-in-class performance. Gap analysis may uncover performance gaps in outputs (facility services) and results (customer satisfaction).

A performance gap may conceivably result from one of several reasons, such as (but not limited to):

- Market demand fluctuations.
- Customer demand fluctuations.
- Process differences.
- Differences in specifications.
- Human factors.

As the benchmarking processes shown in Exhibits 5-13 and 5-14 depict, performance gaps are not the final outputs of benchmarking. Additional analysis is required to assess how your organization’s given performance level measures up to the best practice and why the gap exists, and then logical next steps in transitioning to the desired performance level must be defined.



Typical performance analysis activities are:

- Defining the gap (through a comparison to internal operational data).
- Determining the reasons for the gap.
- Examining the factors that contribute to the existence of the best practice(s).
- Developing recommendations and an approach to implement the best practice(s).

Seven quality control tools

No discussion of FM quality measures would be complete without an overview of the seven quality control tools. The seven quality control tools (also referred to as the seven basic tools) include the Pareto chart, the flowchart, the check sheet, the cause-and-effect diagram, the scatter diagram, the control chart and the histogram.

Regardless of the current level of FM performance, there is always room for improvement. Analyzing FM performance in order to assess the current state and factors that need to be changed involves the use of data. Each of the quality control tools provides a means for organizing and analyzing data. For example, the tools may be used to:

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

Visual representation using quality control tools is one way of presenting the data in a way that allows ease of interpretation. The seven tools you will read about are widely used for this purpose.

The seven basic tools are often categorized as quantitative or qualitative, as shown in Exhibit 5-16.

Exhibit 5-16: Quantitative and Qualitative Tools

Quantitative Tools	Qualitative Tools
Used for organizing and communicating numerical data Include: • Pareto chart • Check sheet • Scatter diagram • Control chart • Histogram	Used to process information for decision making Include: • Flowchart • Cause-and-effect diagram



Simply put, the tools are a prerequisite for effective FM operations and performance improvements.

The subsequent discussion does not explain how to construct the tools; with the exception of check sheets, computer software and templates make it relatively easy to create the graphical representations. Instead, content provides an overview of what each tool is, what it does and how it is used.

A simple example of each tool is included.

Pareto chart

Definition/description

The Pareto chart is based on the Pareto principle, which suggests that most effects are the result of relatively few causes, that is, 80 percent of effects come from 20 percent of possible causes. Pareto charts are also called Pareto diagrams or Pareto analysis.

Did You Know?

The Pareto principle was first defined by quality expert Dr. Joseph Juran in 1950 and is named after 19th century Italian economist and sociologist Vilfredo Pareto. (As an aside, Pareto observed that 80 percent of the wealth in Italy resided with 20 percent of the population.)

The phrase “the vital few and the trivial many” is often associated with the Pareto principle. Juran originated the phrase. But Juran and other quality professionals later came to the conclusion that there are no trivial problems in quality; all problems deserve attention. Juran eventually renamed “the trivial many” as “the useful many,” but “the vital few and the trivial many” remains as common jargon.

A Pareto chart is used to graphically rank causes from most significant to least significant. It uses a vertical bar graph in which bar height represents the frequency or impact of causes.

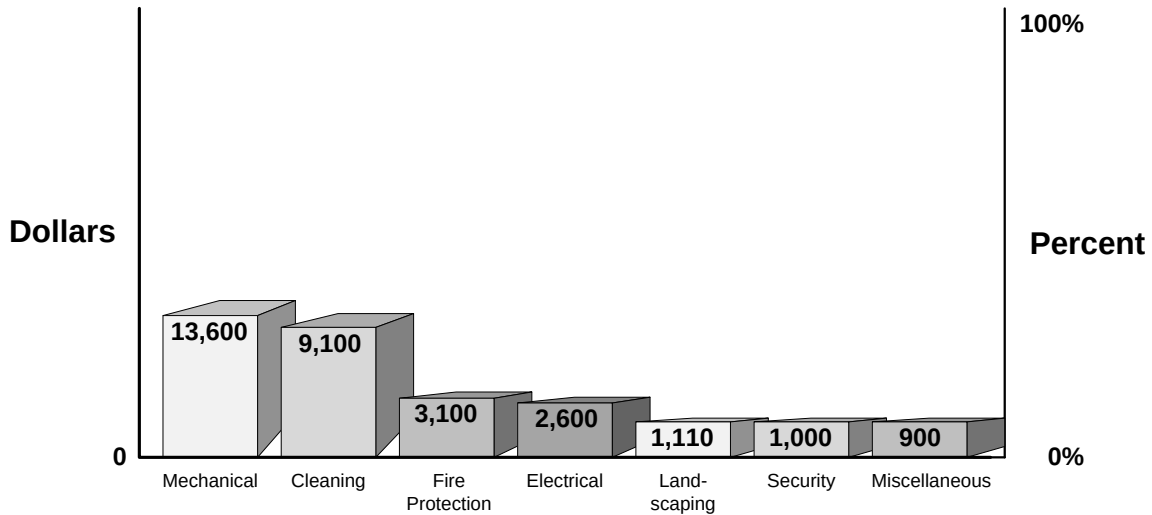
Bars in a Pareto chart are arranged in descending order of height, from left to right. Bars on the left have the highest significance or impact to an organization in terms of frequency, costs, time and so forth. This means that categories represented by the tall bars on the left are relatively more important 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.) A cumulative frequency line is sometimes added to a Pareto chart to indicate the cumulative contributions of items.

An example of a basic Pareto chart is shown in Exhibit 5-17.

Exhibit 5-17: Example of a Pareto Chart—Monthly Facility Expenses by Category



This Pareto chart shows that mechanical and cleaning comprise the largest monthly expenditures. Looking closer at costs and activities in both of those areas may have the most impact in any cost reduction and performance improvement efforts.

Use

A Pareto chart helps determine which problems are the most important using data, not perception. Using a Pareto chart, you can:

- Separate the few major (vital) problems from the many possible problems in order to focus improvement efforts.
- Arrange data according to priority or importance.
- Compare “before” and “after” data when evaluating improvement.
- Communicate with others about your data.

By focusing on the small number of problems that cause the majority of quality-related issues, you can help to ensure that continuous improvement efforts are targeted in areas where the results will be most beneficial.



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

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 130,000 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 end result would be significantly less cost savings.

Flowchart

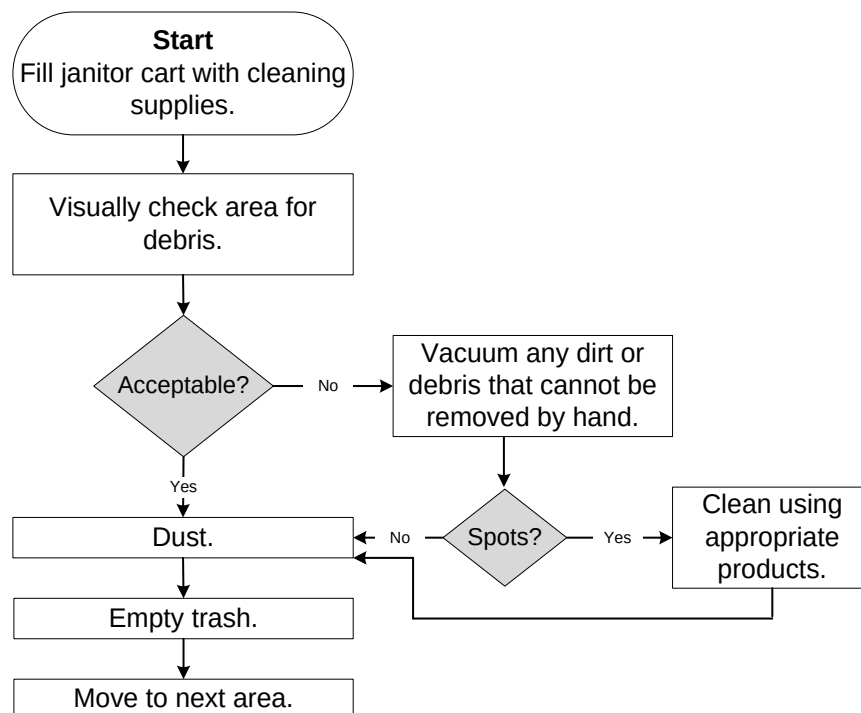
Definition/description

One of the best ways to understand a process is to draw a picture of it. A flowchart is a graphical representation of the flow of a process, mapping the sequence of steps and decision points.

Before a process can be improved, how it 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 beginning to end. Attempts to change or improve a process before it is fully understood are unwise, as more problems can be interjected inadvertently.

Exhibit 5-18 provides an example of a simple flowchart.

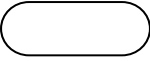
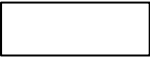
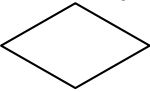
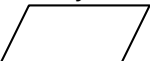
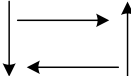
Exhibit 5-18: Example of a Flowchart—Daily Cleaning Processes



The flowchart in Exhibit 5-18 communicates the major steps in the cleaning process plus the key activities for each step.

There are many styles that can be used to draw a flowchart. Common flowchart symbols are the shapes shown in Exhibit 5-19. (Note that all of these symbols were not used in the previous cleaning procedures example.)

Exhibit 5-19: Common Flowchart Symbols

Name/Symbol	Description
Terminal symbol or beginning and ending steps 	Shows the first and last step of a process flowchart. The symbol may be labeled “start,” “begin,” “stop” or “end.”
Process symbol or activity symbol 	Shows a single step or activity in a process, including a brief description of the step or activity inside the rectangle.
Decision symbol or decision box 	Indicates a point where the outcome of a decision dictates the next step. Typically includes a question in the diamond; the path taken depends on the answer to the question. There can be multiple outcomes but often there are just two—“yes” or “no.”
Data symbol or input/output shape 	Indicates that information is coming into the process from outside or leaving the process (e.g., customer database records).
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 (e.g., a record or report).
Flow line 	Connects steps and activities and shows the direction of the process flow in sequence. The arrowhead of the flow line indicates the direction.
Connector symbol 	A small circle that indicates that the next (or previous) step is somewhere else on the drawing. This is particularly useful for large flowcharts; it is usually used to break a flow line that will be continued elsewhere. Reference page numbers may be included for easy location of connectors if the flowchart continues on multiple pages.

Although flowchart standards have been established (such as by ISO and ANSI), people often deviate from them to suit their own needs. For example,

individual organizations may adapt shapes and symbols for their internal use. Engineering symbols and pictures may be incorporated. If you choose to use a symbol in a nonstandard fashion, make sure you do it consistently so the reader of the chart knows your meaning for that symbol every time he or she sees it. Generally speaking (whether you use standard symbols, adaptations or other permutations), including a flowchart legend of style may be prudent. There is really no right or wrong way to create a flowchart as long as those who create and use it can understand it.

There are also several types of flowcharts. A few of the more common types are described in Exhibit 5-20.

Exhibit 5-20: Types of Flowcharts

Top-down flowcharts	Simple, easy-to-construct charts that emphasize the major steps of a process or project. This type of flowchart limits the amount of information that is included and is useful in highlighting essential process steps.
Detailed flowcharts	Include a lot of information about every stage in a process. The chart shows most steps in a process along with specific detail about what happens in each stage.
Deployment charts	Show the flow of a process along with the teams or employees who are responsible for the steps. They give “big-picture” overviews of processes and what people are supposed to do at each step. Deployment charts are also known as “swim lane” and “cross-functional process” charts. (Note: Chapter 4 shows an example in Topic 2, “Mapping Processes.”)
Workflow diagrams	Illustrate the movement of people, materials, documents or information in a process. The movement is sketched on a picture of the workspace. The picture allows organizations to identify any inefficiencies or problems in the way work flows.

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 to avoid unnecessary complexity. Remember that users must have a common understanding of the symbols.

Use

Custom flowcharts can provide useful information such as:

- A clear picture of how an FM process works by illustrating the relationship of 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 process or service.
- A starting point for process improvement activities.

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

Check sheet

Definition/description

A check sheet (sometimes called a tally sheet) is a simple form commonly used to collect improvement data during a data collection period. Check sheet data collected with minimal effort in an organized manner can be easily converted into meaningful information through further analysis.

Use

As the name implies, a visual element (such as check marks, Xs or tic marks) are recorded on a check sheet. Data categories on a check sheet should be defined so that they are clear, unique and unambiguous. The most desirable characteristic of check sheets is that they make it easy to record data such as the frequency or occurrence of particular events. The format visually displays data that reveals underlying patterns without requiring complex calculations.

Check sheets often have horizontal rows and vertical columns to collect data.

An example of a simple check sheet is shown in Exhibit 5-21.

Exhibit 5-21: Example of a Check Sheet—Work Management Center Call Classification

Priority Classification	Day					
	Mon	Tues	Wed	Thurs	Fri	Total
Emergency	xx	x	x	x	xx	7
Urgent	x	xxxx	xxx	xx	x	11
Routine	xxxxxx	xx	xxxxxx	xx	xxxxxxxx	24
Total	9	7	10	5	11	42

A check sheet could be coupled with a histogram to provide a direct visualization of the data. (Histograms are covered later in this section.)



Various innovations are possible. Some check sheets may also include illustrations. For example, to collect data on damage to concrete and asphalt in a facility parking lot, the check sheet might include a sketch or picture of the parking lot, allowing data collectors to place an **X** where they see damage. Clusters indicating the biggest problem areas would become apparent.

Cause-and-effect diagram

Definition/description

A cause-and-effect (C-E) diagram uses a visual method to show the many different causes that may contribute to a problem. It maps out a list of factors (the causes) that are thought to affect a problem (the effect).

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.

In a C-E diagram, the problem (the effect) is stated in a box at the right side of the chart and likely causes that can lead to the effect are listed around major categories. Relative to FM services, common causal factors for the major categories are generally related to influences from the following four Ps:

- People (human influences)
- Plant (space and equipment)
- Policies (rules for decisions)
- Procedures (steps in tasks)

Typically, the four Ps are the “main bones” on the C-E diagram. However, other categories are possible such as “environment” or “measurement.”

There is no formal rule about the name and number of categories.

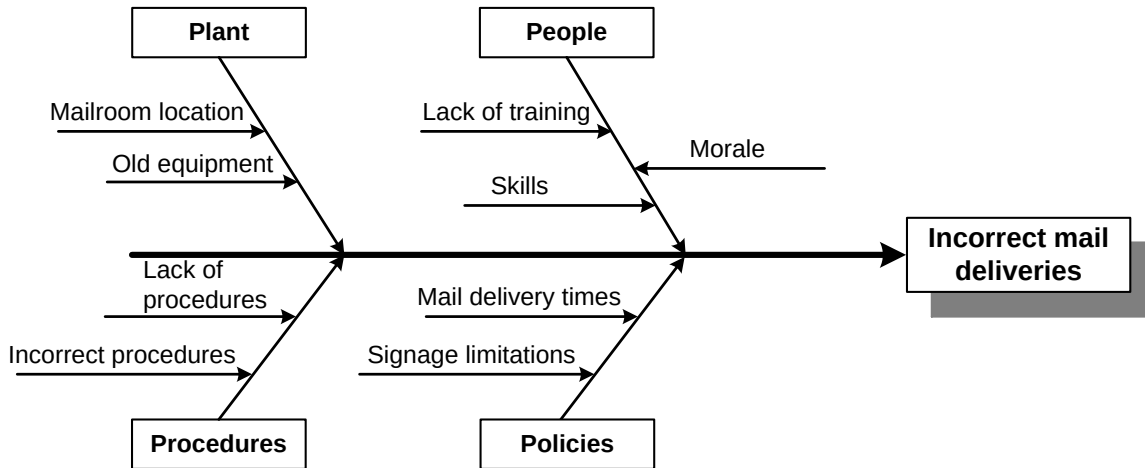
Ultimately, the categories should fit the problem being examined.

Exhibit 5-22 on the next page shows some of the reasons for incorrect mail deliveries in the C-E diagram example.

In this simple fishbone diagram, the “People,” “Plant,” “Policies” and “Procedures” headings are used to group ideas about the causes for incorrect mail deliveries. For example, under the “People” heading, lack of training, staff morale and staff skills are all possible causes that may contribute to incorrect mail deliveries.



Exhibit 5-22: Example of a Cause-and-Effect Diagram—Incorrect Mail Deliveries



Use

The C-E diagram provides a method for organizing what may be a long list of potential causes. It facilitates the quick sorting of ideas into useful categories. The potential causes may be created through a brainstorming session or by reviewing a process flowchart to explore what can go wrong at each step. The goal is to identify all possible causes and then select the most likely ones for further investigation.

A couple of additional points about C-E diagrams are worth mentioning here:

- The quality of the analysis of causes is only as good as the thinking of the individuals doing the analysis. It is important to involve all the individuals that can contribute to the identification of potential causes.
- In identifying causal factors, the aim is to cure the root cause of the problem, not the symptoms. However, a cause-and-effect diagram simply yields a theory or theories. It does not provide solutions to problems. Users must gather and analyze additional data to complete the rest of the problem-solving process. Other tools—such as Pareto charts, histograms, control charts and scatter diagrams—may be needed to analyze data. (Root cause analysis is explained in upcoming discussion of quality improvement tools.)

Scatter diagram

Definition/description

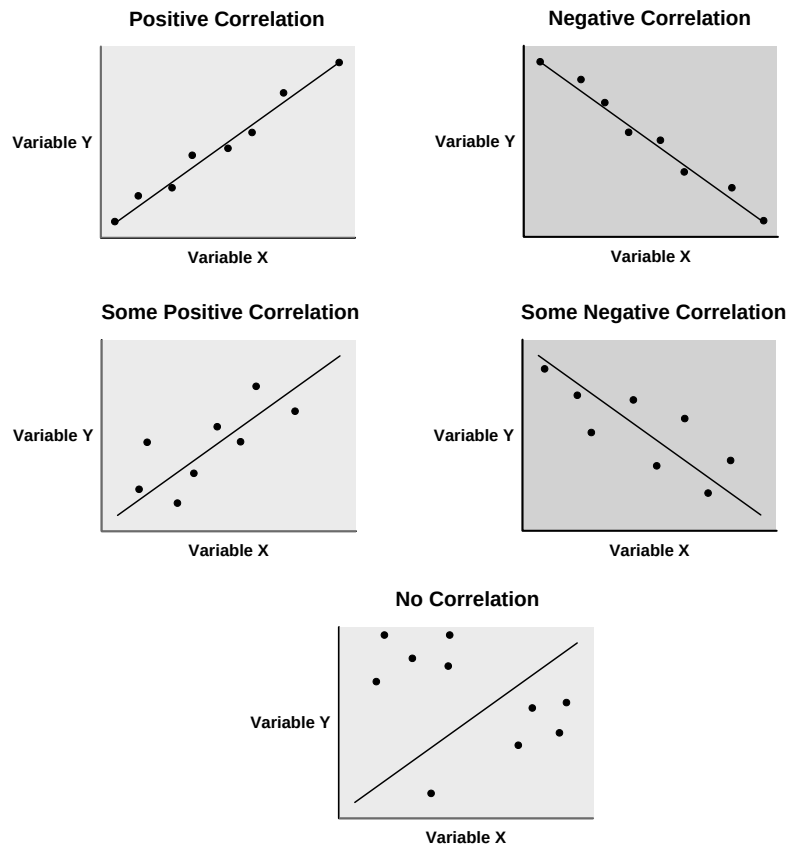
A scatter diagram is a chart that plots one variable against another to determine whether there is a correlation between the two variables. Many situations have paired data that may be related (for example, the number of FM staff trained in



new call management software and the number of complaints received from customers about follow-through). A scatter diagram visually depicts possible relationships between two variables.

In Exhibit 5-23 we see possible relationships between two variables in a series of scatter diagram examples. The two sets of data are plotted on a graph, with the y axis being used for the variable to be predicted and the x axis being used for the variable to make the prediction. For every change in X, a proportional change in Y exists. A diagonal line drawn through the plots shows how strong the relationship is.

Exhibit 5-23: Examples of Scatter Diagrams



As we see in Exhibit 5-23, the more the points cluster around the diagonal line, the more closely there is a one-to-one relationship.

Use

The utility of a scatter diagram is its ability to measure variables in a process and see whether any two or more variables are correlated or uncorrelated.

Finding correlations may infer causal relationships and ultimately lead to the root causes of problems.

A word of caution with scatter diagrams: Just because a graphical relationship exists, it does not mean that one variable causes the other to change. Variables can be selected and a strong positive correlation indicated when there is actually no meaningful relationship between the paired data. Both variables may be influenced by a third variable.

Control chart

Definition/description

A control chart is a statistically based line chart that indicates whether or not a process is stable, which means that it has predictable performance.

The fundamental statistical concepts underlying a control chart are:

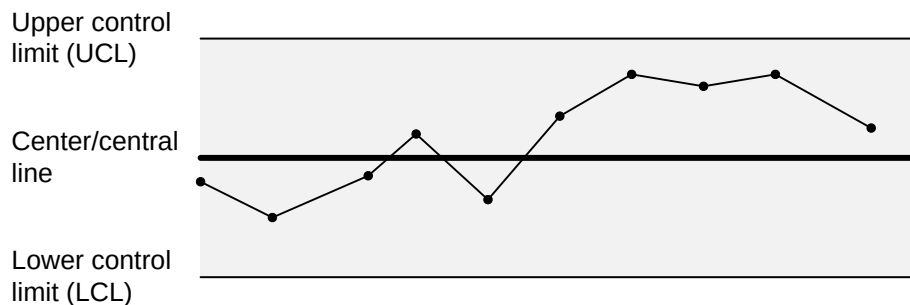
- All work occurs in a system of interconnected processes.
- Variation exists in all processes.
- The keys to success are understanding and reducing variation.

Control charts plot points on a line moving generally up or down through time. The center line represents the average value (mean) of the process characteristic. Two additional lines—the upper control limit (UCL) and the lower control unit (LCL)—are statistically (historically) determined and drawn on either side of the process average (the center line or central line). The UCL and LCL control limits are calculated from actual process measurements. They are not simply theories of what should be happening, nor are they indicators of what the user would like to happen. They show the expected variation, and they provide a basis for action when unusual patterns or amounts of variation appear.

Data shown in a control chart can be variables (measurement) or attributes (count).

Exhibit 5-24 shows a simple example of a control chart.

Exhibit 5-24: Example of a Control Chart



The control chart data shows how a process changes over time. One must assess if the variation shows that the process is stable and operating between expected boundaries or whether something has caused the process to go “out of control.”

When you look at a control chart, the process is stable if:

- Points are randomly distributed between the control limits.
- Most of the points are near the center line.
- Some points are more spread out and approach the limits.
- No points are beyond the control limits.

The process is out of control if:

- Nonrandom points (trend, clustering) occur within the control limits, with most points near the center line.
- Points occur outside the control limits or cluster toward the control limits.

Use

A control chart is used to monitor and analyze variation from a process to see whether it is in statistical control. The “picture” of data, plotted in time order, helps to distinguish between common and special causes of variation. An analysis of patterns might reveal wild fluctuations in values, sudden process jumps or shifts, a gradual trend or increased variation.

Note: Common cause and special cause variation are explained in Chapter 3.

A control chart is a sophisticated quality tool. There are several types of control charts. (A very basic one was shown in Exhibit 5-24; others are beyond the scope of this discussion.) While control charts can be extremely useful for both analysis of a process (for example, for improvement purposes) as well as to maintain control of a process, they can be difficult to understand and interpret. Suffice it to say that it is important to look for nonrandom patterns in control charts. A trend may be toward better or worse performance or results. Regardless, it is just as important to maintain or enhance good performance or results as it is to eliminate bad performance or results.

Histogram

Definition/description

A histogram is a graphic summary (bar chart) of variation in a set of data. The pictorial nature of a histogram illustrates patterns that may be difficult to see in a simple table of numbers.



The following points succinctly describe the value of histograms.

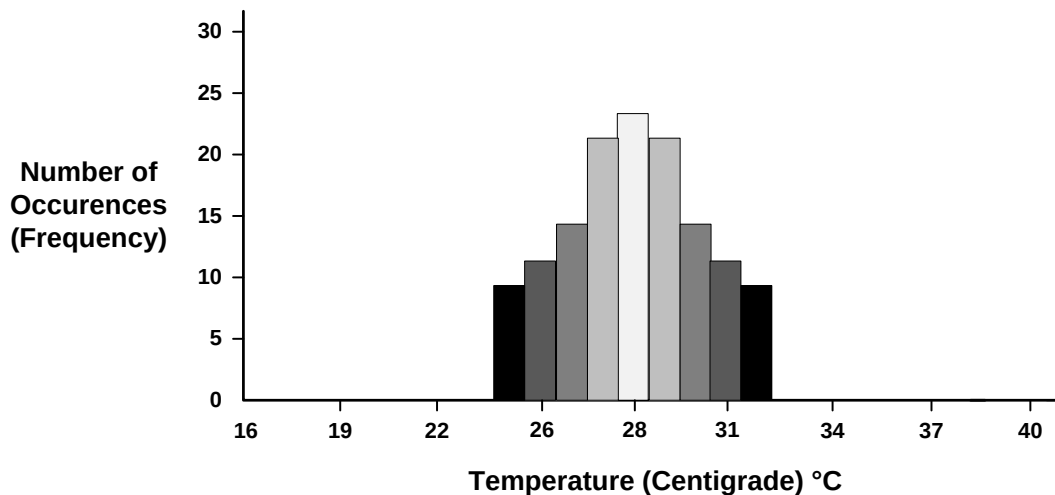
- **Values in a set of data almost always show variation.** Variation is an inevitable part of any process.
- **Variation displays a pattern.** Different phenomena will have different variation, but there is always some pattern to the variation. Patterns of variation in data are called distributions.
- **Patterns of variation are easier to see when the data is summarized pictorially in a histogram.** Because a histogram provides a “picture” of data, it enables us to easily see variation patterns.

While a control chart shows how a process performs over time, 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.

A “bell shape” represents the normal, natural 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 average as the other.

In Exhibit 5-25, we see a normal bell-shaped histogram distribution.

Exhibit 5-25: Example of a Histogram



The shape of the distribution in a histogram reveals the amount of variation within a process. Beyond the bell shape shown in Exhibit 5-25, 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.

Use

Important characteristics of histograms are:

- Centering (central tendency).
- Width (spread, variation, scatter, dispersion).
- Shape (pattern).

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.

Data used to construct a histogram should be based on a large sample. (A minimum of 50 observations is recommended.) A smaller sample may produce results that are not representative.

Another point to keep in mind about histograms is that definitive conclusions about small differences in variability of the locations of distribution peaks can be problematic; direct observation of the process in question and/or a certain amount of statistical expertise is often required.

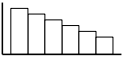
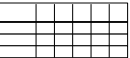
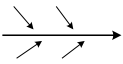
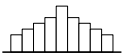
Summary of the seven quality control tools

The seven quality tools are fundamental instruments that can be used to improve the quality of FM services. They may be used to analyze the processes, identify the major problems, control fluctuations in quality, provide solutions to avoid future quality problems and more.

A brief recap of the seven tools is shown in Exhibit 5-26.



Exhibit 5-26: Summary of the Seven Quality Control Tools

Quality Control Tool	Used to ...
Pareto chart 	Rank causes from most significant to least significant using a vertical bar graph in which bar height represents the frequency or impact of causes.
Flowchart 	Represent the flow of a process, mapping the sequence of steps and decision points.
Check sheet 	Collect improvement data with a structured, prepared form and facilitate conversion of that data into meaningful information through further analysis.
Cause-and-effect diagram 	Identify many possible causes for an effect or problem and sort ideas into useful categories; also called Ishikawa or fishbone diagram.
Scatter diagram 	Plot pairs of numerical data (one variable against another on each axis) to determine whether there is a correlation between the two variables.
Control chart 	Show process data over time and indicate whether or not the process is stable (which means that it has predictable performance).
Histogram 	Show frequency distributions in data and illustrate patterns of variation that may be difficult to see in a simple table of numbers.

Quality improvement tools

Efforts to improve an FM process may use one or more of the quality control tools just discussed. Of course, there are many other quality tools and models that you can use to support those efforts. To ensure that quality FM improvement efforts are properly guided, you may need one or more of the following:

- Root cause analysis
- The Five Whys
- Plan, Do, Check, Act (PDCA) cycle
- Six sigma DMAIC (define, measure, analyze, improve, control) model

Root cause analysis

Definition/description

A root cause is the key reason a problem occurs. During problem analysis or any intended improvement effort, a root cause must be correctly identified. Failure to do so typically results in the problem reoccurring. Only when the root cause is eliminated will the problem be eliminated. Root cause analysis is



a problem-solving process that methodically distinguishes the decisive or original cause of a problem or condition.

Use

Root cause analysis helps to identify underlying problems at a fundamental level. It mitigates dealing with problem symptoms and instead uses a disciplined investigation to examine potential problem sources.

There are no definitive steps in root cause analysis. A systematic problem-solving process is used and generally accounts for the activities shown in Exhibit 5-27.

Exhibit 5-27: Root Cause Analysis

- **Identify the problem.** Recreate the problem. Confirm the specific nature of the problem. For example, use a flowchart to understand where the problem occurs.
- **Expand thinking about potential causes of the problem.** For example, use a cause-and-effect diagram to identify all possible causes. If multifaceted, group causes and problems into smaller issues that can be examined one at a time. Use the Five Whys (discussed next).
- **Analyze the problem.** Prioritize all possible causes. Collect data and facts about the problem. For example, use a Pareto chart to determine the frequency, examine trends and so forth.
- **Focus on true causes.** As appropriate, use additional tools such as check sheets, control charts, scatter diagrams and histograms to confirm root causes and how to correct them.

Depending on the specific nature of the problem (how significant, the frequency and so forth), these activities may be condensed or expanded to ensure that the root cause is correctly identified. Since multiple issues often share a common cause, root cause analysis may solve related problems at one time.

The Five Whys

Definition/description

Root cause analysis attempts to understand why a problem occurs. The Five Whys is a technique used in discovering the root cause (or causes) of a problem by repeatedly asking the question “why?” The technique also shows how different causes might be related.

Use

Once a problem is identified and described in specific terms, the Five Whys technique asks why it happens. The questioning continues until the root cause



is identified. The number five is actually arbitrary, as you never know how many times you may have to ask “why” to identify the root cause. Basically, the questioning continues until the answer to asking “why” again does not provide useful information. Consider the simple example below.

Example:

Problem—While leasing swing space, several office employees are experiencing carpal tunnel syndrome symptoms.

Why—The chairs and computer accessories are not adjustable.

Why—The office furnishing and accessories are outdated.

Why—The building owner did not fully understand ergonomic requirements.

Why—The lessee’s technical specifications lacked sufficient detail.

Why—Insufficient time and effort was spent in preparing the specifications.

In this example, poor requirements planning appears to be the root cause of the problem. Additional time and due diligence for requirements analysis should be allowed when planning future swing space.

An important point when using the Five Whys is to keep the focus on the process aspects of a problem rather than the people involved. In other words, separate the problem from the people. In some situations, the Five Whys may uncover insufficient training or performance issues, but the investigation should not be intended to find a scapegoat for the process problem.

Here we focused on the basic Five Whys technique. There are permutations of the technique, such as “5W2H,” which expands the five Ws to *who*, *what*, *when*, *where* and *why* in conjunction with two Hs, *how* and *how much* (or *how many*).

**Plan, Do, Check,
Act (PDCA) cycle**

Definition/description

The Plan, Do, Check, Act (PDCA) cycle is an iterative model used in quality (and other applications) that has four phases: Plan, Do, Check and Act. The output of each phase serves as the input to the next phase, and the cycle can be repeated numerous times to capture the results of changes and progressive elaboration.

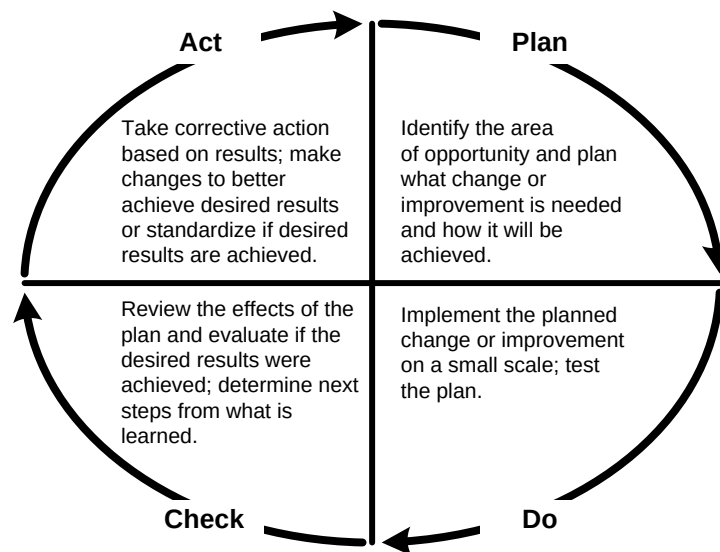
In landmark events in the total quality management movement, Plan, Do, Check, Act was discussed by Dr. Walter Shewhart, so it is sometimes called the Shewhart cycle. Dr. W. Edwards Deming introduced the cycle in Japan for



use in quality management, so the cycle is also referred to as the Deming cycle. In some renditions, the cycle is called PDSA (for Plan, Do, Study, Act or Plan, Do, Select, Act).

In Exhibit 5-28, we see the basic rendition of the PDCA cycle.

Exhibit 5-28: Plan, Do, Check, Act (PDCA)



Use

The PDCA cycle captures the core philosophies of continuous improvement and innovation. It provides a repeatable sequence of activities and facilitates efficient and effective problem solving at all levels of processes.

PDCA is also used by ISO to develop performance standards. (Consult the ISO 14000 family of standards.)

(Note: The *Project Management* competency discusses the application of the PDCA cycle to entire projects or project phases.)

Six sigma DMAIC model

Understanding the six sigma DMAIC model first requires a primer on the six sigma methodology.

What six sigma means

Six sigma is a process improvement approach encompassing a variety of techniques and tools all focused on improving the capabilities of business processes. Key features are the use of data and statistical analysis and highly trained project leaders (known as Black Belt, Master Black Belt, Green Belt and



Champion). Project selection is based on bottom-line results and has dramatic goals to reduce errors. The resulting decrease in process variation leads to reduced defects and improvements in profits, employee morale and quality.

“Six sigma quality” is a term generally used to indicate that a process is well controlled. The term and process originated with Motorola, which named one of its key operational initiatives “Six Sigma Quality.”

Sigma (σ), a letter in the Greek alphabet, is used in statistics as a measure of process variability. The name “six sigma” is derived from process control limits that are six standard deviations (± 6 sigma) from the center line on a control chart. For example, in manufacturing, a process that is six-sigma-capable will produce virtually defect-free work. A process operating at six sigma will produce a defect rate of only 3.4 defects per million units, for a yield of 99.9997 percent.

As is apparent from this overview, six sigma was designed for high-tech/high-volume manufacturing. In facility management, the concept of 3.4 defects per million units is not relevant because FM does not have that type of volume in operations. However, the DMAIC model embodies disciplined quality management principles that do apply.

DMAIC definition/description

DMAIC (define, measure, analyze, improve, control) is a problem-solving and improvement process prescribed by six sigma.

An overview of the DMAIC steps is shown in Exhibit 5-29.

Exhibit 5-29: Six Sigma DMAIC Model

Step	Description
Define	The problem is identified and improvement goals and objectives are defined, derived from the customer's perspective (the customer's requirements).
Measure	The current process is measured; data gathered is used to set a baseline for process improvement. Metrics are established to monitor progress.
Analyze	The current process is analyzed to understand problems and their causes. Potential root causes and the problems to be addressed are identified.
Improve	The process is improved by implementing pilot solutions for the root causes.
Control	The improved process is evaluated and controlled through monitoring and standardization.



Use

Beyond the mathematical origins of six sigma, the DMAIC model has wide application to FM service. Where process improvement projects for six sigma DMAIC in manufacturing are usually selected based on criticality or importance in terms of financial savings (cost avoidance), customer satisfaction and product quality, the steps are appropriate for a vast array of FM customer satisfaction and service quality improvements.

In *Managing Facilities and Real Estate*, Michel Theriault provides the following example of a DMAIC application for FM moves/adds/changes (MACs).

Exhibit 5-30: DMAIC Example for Moves/Adds/Changes

DMAIC Step	MAC Application
Define	 Moves are important to customers because they impact their efficiency and downtime. Depending on the number of positions involved and the degree of physical construction or changes required, service may be defined in terms of: • Scope of FM involvement (as compared to the occupant's involvement). • Minimum lead time. • Maximum time to complete.
Measure	 With the scope, lead time and time to complete defined, it is possible to measure these for each MAC completed. • Scope can be measured with a checklist or survey to ensure that FM has done what it promised. • Measurements can determine if minimum lead time is met and whether the MAC met customer requirements. • After defining what constitutes "complete," the maximum time to complete (which could be overnight or over a weekend) can be measured.
Analyze	 Performance results for scope, lead time and time to complete should be analyzed. Negative survey responses can be analyzed to pinpoint issues; an occupant coordinator might be interviewed. If required lead times are not met, analysis can investigate why it takes too long to initiate moves and what can be done to correct the situation. If certain things are not completed by the next morning or the next Monday, analysis should identify what those are and the reasons why they were not completed when required.
Improve	 Based on analysis, things that prevent meeting objectives are clear. Solutions to correct the problems identified can be developed. Solutions may involve having more resources on site, adding longer lead time, adding furniture components to inventory, better documenting the processes and responsibilities and so forth. These have to be implemented as part of a revised process so that improvements actually happen.
Control	 With changes made, it is still necessary to measure and analyze. Improvements should be assessed to ensure that the results desired are being attained and that there are not any other factors (not revealed in the first analysis) thwarting results. Controls should be implemented to ensure that the improvements (and the entire process) are being followed. This may involve using new checklists or implementing spot audits, for instance.

Source: Adapted from *Managing Facilities and Real Estate* by Michel Theriault, Toronto: Woodstone Press, 2010. Used with permission.



The DMAIC methodology helps to minimize special cause variation and reduce common cause variation. Customarily, the seven basic quality tools (discussed earlier in this topic) are used. Depending on the nature of the process improvement undertaken, other improvement methodologies and tools are often used within six sigma DMAIC, including statistical process control (discussed next), voice of the customer (discussed in Chapter 3), benchmarking, ISO 9000 (discussed previously) and more.

Given the nature of your organization, the extent of its involvement with six sigma and the application you have for six sigma DMAIC, you may choose to complete six sigma training. Regardless, as demonstrated in the Exhibit 5-30 MAC example, DMAIC principles can be quite helpful in improving FM services.

Statistical analysis

Content thus far has demonstrated the value of various control and improvement tools and how they can facilitate quality FM services. To varying degrees, the tools mentioned involve analysis and interpretation. Next we discuss statistical analysis. Volumes have been written on statistics. Our intent here is not to delve into great detail but rather to provide an overview of basic descriptive statistics.

Descriptive statistics are used to condense and summarize large quantities of data. They are helpful in reducing the amount of data you have to interpret and can point out specific issues that may be more important than others. We will consider:

- Measures of central tendency.
- Measures of variation/statistical process control (SPC).
- Measures of association/correlation and regression.

Measures of central tendency

Measures of central tendency try to describe groups of things or events by how much of a certain characteristic they have in common. In other words, measures of central tendency identify typical characteristics of a data group.

There are three measures of central tendency:

- The mean is the mathematical average score or value in a set of data.
- The mode is the value that occurs most frequently in a set of data.
- The median is the middle point above and below which 50 percent of the scores lie in a set of data. (Note: When an odd number of measurements is arranged in order of size, the median is the middle measurement of the data set; with an even number of measures, the median is the average of the two middle measures.)



Example:

Consider the following set of data.

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

Mean (average) = 10.33

Median (point above and below 50 percent of the scores lie) = 12

Mode (most frequently occurring score) = 12

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 difference 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.

What would happen, however, if we had a large number of data points and there were some extreme scores? In our FM service example, let's 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. In this case, the median might be most useful. The median is the score that lies directly in the middle of the values. To find the median, the data is arrayed in an order like the ascending order shown in the example. The total number of data points are counted (50) and then divided by two. The median will lie between data values 25 and 26 and will probably be close to 7.

**Measure of variation/
statistical process control (SPC)**

Measures of variation provide an indicator of variation around central tendency values. As we have read, it is important to measure variability. In the FM service example just discussed, a large variation in evaluations by occupants might indicate a variety of problems. Statistical process control (SPC) is the application of statistical techniques to measure and analyze the variation in processes.

An overarching goal in facility management is to provide reliable services to customers—services that consistently result in meeting or exceeding customer expectations. If we think of a service in the process context, a reliable service produces the desired output each time with little variation. When a service (or process) is reliable and stable, the next goal is continuous improvement so that the output even better meets customer requirements.



SPC monitors services and processes in order to control the quality. It is done in real time rather than after delivery (or inspections). In monitoring ongoing delivery, SPC helps control problems as they occur. It also helps predict future instability and identify whether efforts should focus on problem prevention or improvement.

There are several SPC measures of variation. Two basic ones are range and standard deviation.

Range

Range is a measure of dispersion in a data set (the distance between the highest and lowest values). Numerically, the range equals the highest value minus the lowest value.

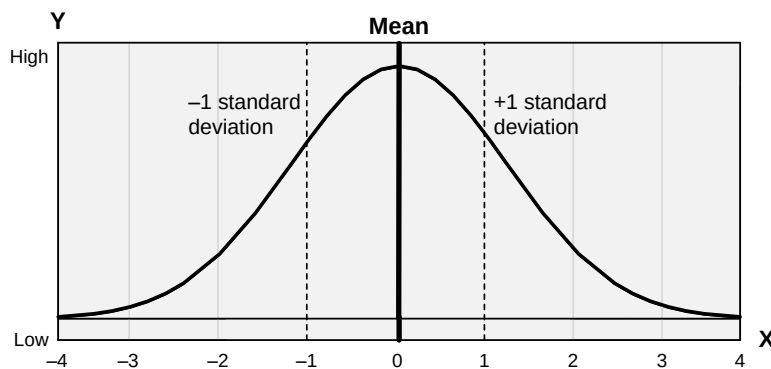
Example:

The data 10, 11, 12, 68, 69, and 70 yields a range of 60 ($70 - 10$).

Standard deviation

Standard deviation shows how much data is spread out around the mean or average. A normal distribution of data means that most of the examples are close to the average and relatively few tend to one extreme or the other. Normally distributed data will have graphs that look like the bell curve in Exhibit 5-31. A large standard deviation tells you that the data is fairly diverse, while a small standard deviation tells you that the data is tightly bunched together.

Exhibit 5-31: Normal Distribution



Standard deviation is used to find the mean of data when it is in groups. It is useful to note that for data that can be represented by a normal distribution, we can say:

- 68 percent of the data lies between one standard deviation either side of the mean.
- 95 percent of the data lies between two standard deviations either side of the mean.



Standard deviation is a computed measure of variability. Computer software programs are available to calculate the standard deviation in a set of data.

SPC involves gathering data, graphically charting the information on various types of charts and examining the data to detect unwanted variation. Many services and processes lend themselves to SPC.

Measures of association/ correlation and regression analysis

Measures of association show the extent (magnitude) to which two or more factors (variables) are related and the nature (direction) of the relationship. These measures are meant to indicate the dependence between two variables—for example, proper ergonomics and incidence of repetitive stress injuries or raised floors and construction remodel costs. Two common measures of association are correlation and regression.

Correlation

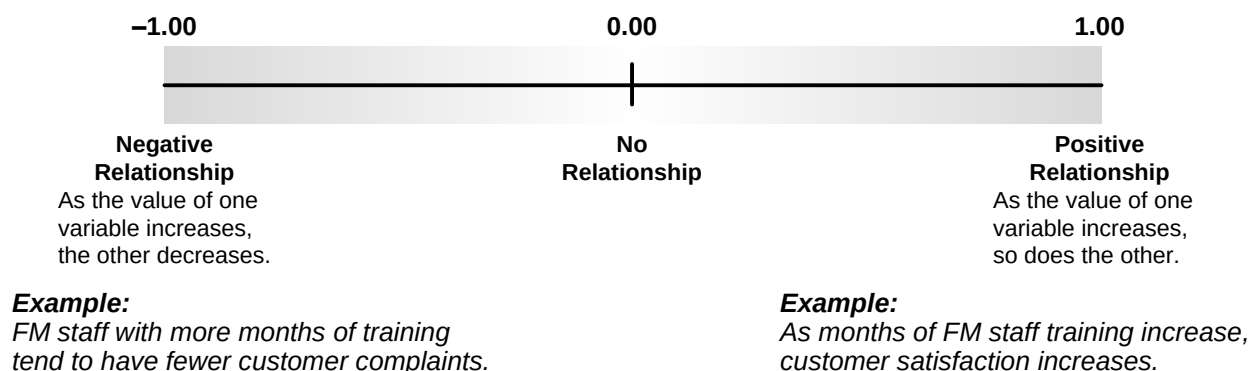
Correlation is a statistical measure of the relationship between two variables. The correlation coefficient is measured on a scale that varies from +1 through 0 to -1. Complete correlation between two variables is expressed by either +1 or -1. When one variable increases as the other increases, the correlation 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). Complete absence of correlation is represented by 0.

Did You Know?

In negative correlation, there is still a correlation; it is an “inverse” correlation. The word “negative” is a label that shows the direction of the correlation. Correlations, whether positive or negative, range in their strength from weak to strong.

Exhibit 5-32 shows a graphic representation of correlation.

Exhibit 5-32: Correlation Coefficient



Regression analysis

Regression analysis refers to a statistical method used to predict a variable from one or more predictor variables. Its purpose is to determine whether a relationship exists between variables and the strength of the relationship.

A causal relationship exists when one can infer that two variables are related in some way. Three conditions have to be met before a causal relationship can be inferred:

- There has to be evidence of association.
- The dependent variable has to change in a consistent way after the independent variable has changed.
- All other possible causes have to be eliminated.

Regression analysis allows you to test multiple variables at one time and to statistically determine which variables have a meaningful impact and which do not.

Trend analysis

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

Examples:

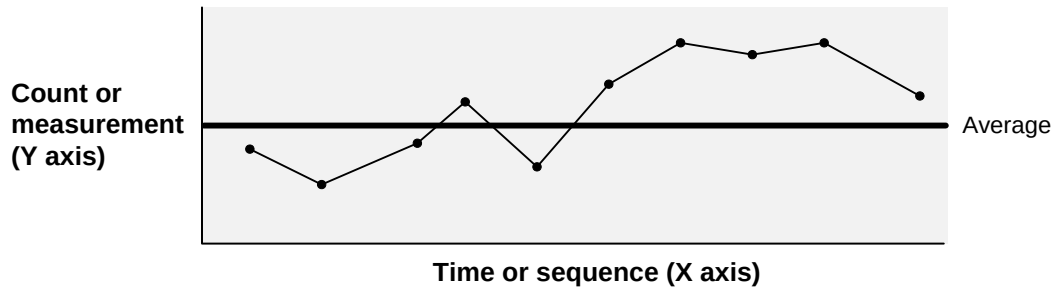
- A continuous upward trend in customer satisfaction ratings
- A continuous downward trend in FM administrative costs
- A sustained level of performance in compliance with industry standards

Measurement data alone does not lead to continuous improvement. The quality tools you have read about throughout this topic are vital in organizing the data in a manner to support analysis and decision making. Useful tools for trend analysis include Pareto charts, check sheets, control charts and histograms (all discussed previously). Run charts are another useful quality tool.

A run chart 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.

As we see in Exhibit 5-33, a run chart is the beginning of a control chart; all that needs to be added are the upper and lower process control limits.



Exhibit 5-33: Example of a Run Chart

The reference line drawn across the middle showing the average is calculated from the data:

$$\text{Average} = \frac{\text{Sum of the values}}{\text{Number of values}}$$

A run chart shows data points plotted in the order in which they occur. The simple picture portrayed over time:

- Reveals trends and shifts in data.
- Shows variation.
- Identifies decline or improvement.

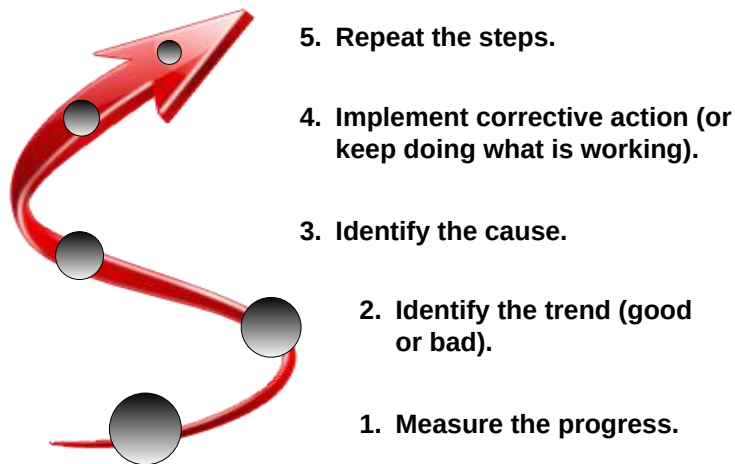
Trend analysis helps to identify patterns in FM performance, whether favorable or unfavorable, as compared to identified indicators such as goals, standards or past performance. In addition, trend analysis helps to assess the effects of corrective and preventive action and ensure that improvement gains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

It is fitting that this topic devoted to quality measurement tools ends with trend analysis. 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. Conceptually, trend analysis and quality FM improvements are no more complex than the simple visual shown in Exhibit 5-34.



Exhibit 5-34: Five Steps for Trend Analysis and Quality FM Improvements



Lagging and leading 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 depicts actual trends against performance levels. In other words, a lagging indicator reflects history and final outcomes of certain actions and processes. Many lagging indicators are associated with regulatory compliance issues and warranties.

Although useful in many ways, lagging indicators often do not provide enough information to guide future actions and ensure overall FM quality. A bit facetiously, they have been 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 sufficient 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 problematic to know exactly how to further improve performance. Or lagging indicators may fail to reveal embryonic problems that can result in severe performance issues.

- **The data begets reactive actions.** Lagging indicators may provide a basis for corrective action if the results they report deviate from the outcomes that are expected. However, this manifests itself as a reactive approach; corrective action commences after the “bad” results have occurred.

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 take action 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.

Examples:

Assuming real-time reading of power consumption, a spike in energy usage (as shown on a run chart) is a leading indicator that would most likely trigger additional investigation by FM. Root cause analysis could be used to examine potential problem sources.

A work management center ticket is broken down into multiple activities and followed step-by-step through a tracking system. When one of the activities is late or off schedule according to predetermined parameters, the tracking system alerts a customer service representative and/or operator who in turn advises the facility manager and/or technician that incurred delays could affect the on-time closeout of the overall ticket. Remedial action can be taken.



The intent here is not to give lagging indicators a bad name. Both types of 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.

✦ Topic 3: Service Specifications

Service specification defined

Recall the definition of a service specification provided in Chapter 1:

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

True to their name, service specifications describe the FM services you provide to customers—whether those services are provided by internal staff or external suppliers. A service specification is essential as a prelude to a service level agreement (discussed in Topic 4) and to the formation of key performance indicators (discussed in Topic 5).

At a minimum, service specifications cover:

- Internal standards—relevant organizational or FM standards and/or standards that may have been part of previous service provider contracts.
- External standards—conformance to regulatory requirements, international standards, health and safety laws and regulations, industry standards and manufacturers' recommendations.
- Procedures—specifications about what the service provider or FM staff must do to fulfill any required technical standards.

To better understand service specifications, let's visit with a facility manager preparing a procurement request for parking lot snowplowing. While drafting specifications to include in the bidding process and annex to contract terms and conditions, one of the service specifications states:

Will plow when 5.08 centimeters/2 inches of snow have accumulated.

Would this suffice? Not likely, for any or all of the following reasons:

- Who measures this? (Is it measured by FM or the contractor?)
- How is it measured?
- What about drifts?
- What are the service times?



- What happens if the snowplow fills in aprons (loading areas)?
- What about deicing?

Given this definition, a better draft of the snowplow service specification would be:

Will plow when 5.08 centimeters/2 inches of snow have accumulated. This is measured by the contractor at the pavement, not to include drifts. Depending on the time of the snowfall, service will be completed by 6:00 a.m. or 5:00 p.m. Aprons with excess snow after snowplowing will be cleared.

Deicing materials of the contractor's choice will be applied to lot entrance/exit, parking lot, walkways, stairways and handicapped access ramp areas at the discretion of the contractor. The decision as to when and how much material is to be applied is based on many factors including but not limited to current ground temperature, current weather forecasts from the National Weather Service and future weather prediction. Customer is aware that weather conditions in the area may change rapidly and without notice.

Of course, there should be additional snowplow specifications developed, such as the distance for plowing or sand/salt in relation to any parked vehicles, equipment or other obstructions in the parking lot, provisions for turf repair and property damage, snow removal and more.

Types of service specifications

The level of detail in a service specification naturally varies, depending upon the complexity and importance of the service or asset item. For example, cleaning service specifications would generally be less rigorous and a bit more subjective than technical specifications required for a work management center. Regardless of the specific nature of the service and whether the specification is for in-house FM staff, a subcontractor or an outsourced service provider, the intent is the same: Communicate expectations about the level of service. Well-crafted service specifications can provide clarity and contribute to effective and quality FM services.

A primary consideration when developing a service specification is the type. The choices include:

- Prescriptive.
- Performance-based.
- Output-based.

Exhibit 5-35 summarizes basic characteristics of the three types. Using outsourced pest control service as an example, each type of specification is described.



Exhibit 5-35: Types of Service Specifications

Type	Characteristics
Prescriptive	- Dictate exactly what will be done, how the tasks will be performed and the frequency. - Specify inputs. - Restrictive. - For subcontracted or outsourced services, usually cannot be modified once the contract is running.
Example: 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 by no fewer than two technicians at weekly intervals and findings reported on every visit.	
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).
Example: 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	- Note what service is required, not how it should be provided. - Focus on what the deliverables are in business terms rather than how they 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.
Example: The service provider will sustain a pest-free environment, avoid problems such as contamination of product and damage to property, and comply with legislation.	

As we see through the examples, the progression from prescriptive to performance- and output-based allows the outsourced service provider greater latitude to develop and apply the best service solution. Allowing the service provider to perform its obligations with the minimum of constraints creates the freedom for the provider to leverage existing practices and adapt to new technologies, products or materials.

Returning to the earlier snowplow example, the service specification is largely performance-based. While it opens with specific parameters (the depth of snowfall and time constraints), most subsequent elements describe targets but allow the contractor some flexibility (for example, the contractor's choice of deicing materials, the application of those materials at the contractor's discretion and customer acknowledgement of mitigating weather conditions).



Both the snowplow and pest control examples are examples of services delivered by external suppliers. Service specifications are critical for contracting for supply of goods or services in such scenarios. Where service specifications are used for contracting, they should be an annex to the contract and *not* part of the contract terms. Specifications often change over time as organizational needs change. There should be contract verbiage that implies the vendor will comply with the specification as provided and as amended by agreement from time to time.

For internal situations, service specifications should allow FM staff to use their experience and resources to meet performance requirements. Service levels still have a very important role to play in supporting the performance- and output-based service descriptions in that they drive the quality of delivery. But rather than imposing resource requirements or methodology as prescriptive specifications do, performance- and output-based specifications identify more the “what” and then set a performance target for its delivery. FM staff or a service provider is then responsible for designing “how” this target can be met.

The end result of a service specification should be cost and efficiency benefits to the service provider and enhanced services for the FM client—a proverbial win-win scenario for both parties allowing each organization to focus on what they do best.

Performance- and output-based specifications do not aim to remove all detailed specifications, but they do look to remove unnecessary constraints and position the service provider as the expert and allow them to decide the best way to do things.

How do you know which type of specification is most appropriate? The choice of which type is selected will depend on a range of factors, including:

- **The impact of service failure on the business.** The higher the risk, the more prescriptive the specification.
- **The value of the service.** The lower the value, the less detailed the specification.
- **The managerial ability of the potential supply chain.** If, for example, you are buying expertise in cleaning as well as the service itself, it should be unnecessary to specify cleaning materials and methodologies.



- **Relevant regulations and statutes.** Reference to relevant regulations and statutes suffices. There is no sense in repeating a series of statutory requirements in a specification.
- **The supply chain's maturity.** The ability of a supply chain to understand and deliver against performance- or output-based specifications may vary. For example, supply chain maturity is often much lower in emerging economies than in well-developed, established nations and regions.
- **The technical nature of the assets and the service.** Catering is notoriously difficult to specify, for example. A catering contract is more than a discussion of food, beverages and decor on paper. Catering service specifications must accommodate numerous expectations of food service, procedures, fees, liability concerns, dates of delivery and more.
- **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 measures more qualitative and subjective?

FM role in service specifications

The *Finance and Business* competency tells us that it is a best practice in procurement to focus on describing required outputs rather than inputs. Prescriptive specifications should be used only when there is a clear risk-related reason to do so; they should be avoided except where not prescribing will significantly impact risk for the core business of the buyer. Even with in-house FM staff, the majority of service specifications should be performance- or output-based.

Fundamental to the performance and output-based approach is FM's ability to balance less-prescriptive and directive verbiage with sufficient detail to have a workable agreement with a service provider and clear expectations for FM staff.

When working with service providers, the responsibilities fall upon both parties.

- **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. However, this should not mean that FM is deprived of subsequent key performance information or progress updates.



- **Service provider responsibilities.** Service providers need to ensure that they are clear about client requirements and secure client input at every point it is needed to frame the appropriate solution to be delivered.

Drafting service specifications

We began this discussion with a not-so-fictional example of a facility manager drafting a service specification. Writing service specifications is an important task and job in itself. Fortunately, there are a variety of resources available to help. Many associations, for example, provide guidance to members and offer model forms of specification and templates.

As we will see in the next two topics, service specifications in conjunction with service level agreements and key performance indicators support improved service delivery quality and consistency.

(Note: The *Finance and Business* competency includes additional content about service specifications in the context of procurement.)

*** Topic 4: Service Level Agreements**

Service level agreement defined

The list of terms in Chapter 1 defines a service level agreement (SLA) as:

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.

FM role in 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, an SLA is drafted. The SLA translates customer expectations into formal requirements and targets and creates a mutual understanding about the service to be provided.

The specific details of an SLA will vary, of course, depending on the nature of the service to be provided, whether the SLA is for in-house or outsourced service and how formal or informal the relationship is between the service provider and FM. There are, however, core elements generally found in most SLAs, and these are listed in Exhibit 5-36 along with simple examples.



Exhibit 5-36: Service Level Agreement Elements *

SLA Element	Content Examples
Scope of work/service specifications	• Standard services • Nonstandard services • Terms of the services to 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 • Service review meetings

* 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.

In practice, any agreement between a customer and a supplier can have an SLA. An SLA should:

- 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.

A good example of an SLA is one developed for an internal move project. Planning and design are provided by the internal FM team (and thus typically free of charge). The labor, packaging and vehicles needed for the move are from a contractor (and thus chargeable).

Describing a service level agreement from a quality perspective, an SLA should also:

- Include quality measures.
- Incorporate customer feedback as a way to assess performance.
- Track leading indicators.
- Include mutually derived performance metrics and standards.
- Articulate a commitment to continuous improvement.
- Integrate best practices relevant to the service in question.



✦ Topic 5: Key Performance Indicators

Key performance indicators defined

Service specifications often describe performance requirements in terms of factors that are critical to the successful provision of the service. These critical success factors (CSFs) are those attributes of a service that determine whether or not its objectives and priorities have been met. Within each CSF will be one or more key performance indicators.

As noted in the Chapter 1 list of common quality terms, key performance indicators (KPIs) are:

The most relevant metrics in determining whether the outcomes of an activity contribute to the goals of the entire organization and the aims of the activity.

KPIs must be aligned with organizational goals and objectives so as to focus the effort of supporting services on the goals of the entire organization.

In FM services, KPIs are related to the criticality and importance of the service (not the level of the service).

Example:

Relative to vacancy and space utilization in a facility:

- The KPI is the vacancy rate.
- The percent is the level (for example, keeping the vacancy rate at five percent).

True to their name, these FM metrics should be *key*. Many things can be measured, but not all measures are equal. Monitoring and measuring performance data for a large number of low-value activities is not only time-consuming but it can become counterproductive. At the risk of drowning in data, KPIs should be those performance measures that support the core business and, as the definition notes, “contribute to the goals of the entire organization and the aims of the activity.”

Developing key performance indicators

A precursor to developing key performance indicators for FM is to determine what types of KPIs exist for the entire organization. Individual organizations will have different KPIs based on the nature of their business. Many report on areas such as (but not limited to):

- Profitability.
- Operating expenditures.
- Customer satisfaction.
- Customer retention.
- Sustainability performance.



- Employee recruitment effectiveness.
- Employee absenteeism.
- Turnover.
- Workplace productivity.

Understanding organizational KPIs is critical to getting the best fit between the facilities and the entire organization and selecting the appropriate FM KPIs. Facility management needs to identify business KPIs that it can directly impact. As the FM KPI definition points out, KPIs are the most relevant metrics. Metrics chosen should be within the sphere of FM influence and be aligned to the entire organization's business strategy and 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.

Exhibit 5-37 shows examples of plausible FM KPIs.

Exhibit 5-37: Sample FM Key Performance Indicators

Performance Focus	Key Performance Indicator
Main target KPI	Overall cost of service monitored in line with predetermined benchmark analysis
Financial reporting	Detailed financial records, including measurement against budget and planned spend profile
Performance monitoring	All subcontractors in line with the detailed service specifications
Contract management	Monthly reports supplied to client; meetings with client to take place monthly for first three months and quarterly thereafter
Monthly client reports	Report delivered to client within agreed-upon time frame
Staff-level input	Contracted staff levels measured over three months
Customer service	Constant aim to reduce FM-related complaints
Emergency procedures and actions	Site staff trained in, conversant with and certified on the emergency procedures at the locations
Completion of all regular tasks in accordance with contract	Tasks completed weekly
Compliance with government legislation and directives	Certificates held where relevant and relevant staff given ownership for this responsibility
Compliance with contracted outputs (customer satisfaction)	80 percent satisfied or very satisfied response from a minimum of 50 percent return—standards rising annually

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 framework that accounts for the following activities:

- Establish and quantify FM objectives that support the success of the entire organization.
- Identify appropriate metrics that reflect what you need to know.
- Identify key deliverables that impact the FM organization's success (such as quality, timeliness and so forth).
- Establish the mechanism to measure and report the performance results.

How many KPIs are appropriate? Some schools of thought recommend three to five KPIs for each success factor; other recommendations say one to five or five to seven. There is no definitive number. One may be too simplistic, while a wide range may lead to confusion and invariably make it difficult to prioritize what is important. Perhaps Theriault describes it best in saying that KPIs are “relatively few in number.” The number depends upon the service and FM and customer requirements. The guiding tenets are that the KPIs should be outcome- or result-based measures that are linked to FM needs and that support the entire organization's success.

How the KPIs are stated is a subject for debate. Some advocate the language of accounting and finance. However, as you well know, there are many important performance metrics in FM quality and service delivery that are not measured in monetary value. Bottom line, FM KPIs should:

- Be understandable.
- Provide clear direction and guidance about what is important.
- Encourage the right behavior.
- Lead to fast action if trend lines change.

Should FM KPIs be restricted to contract compliance? While they are rolled up to service specifications, to limit them to SLA and contract enforcement can lead to a narrow view of FM and reinforce the traditional perceptions of FM as “problem fixers” rather than “value adders.” Ideally, all KPIs across an organization are aligned.

Well-conceived FM KPIs clearly communicate priorities, targets and results required to FM staff and external service providers. They enable a facility manager to continually learn and improve FM services.

Technology and information systems greatly facilitate reporting on KPIs. Digital dashboards help to turn the data into relevant and timely information. Chapter 3 provides more information on performance monitoring.



Progress Check Questions

Directions: Read each question and respond in the space provided. Answers and page references follow the questions.

1. A Web-based training session with tips and techniques to improve customer satisfaction is offered for FM employees and service providers. Roll call is used to establish attendance and measure training success. What is the problem with this measurement approach?

2. True or false? Any measurement that helps a facility manager understand service operations might be a metric.

() a. True

() b. False

3. Which of the following statements **best** describes ISO standards?

() a. Product-specific

() b. Market-specific

() c. Consensus

() d. Conformance

Match each quality tool with its application.

- | | |
|-----------------------------------|---|
| 4. _____ Benchmarking | a. Determines which improvement project would have the most impact based on frequency of service problems |
| 5. _____ Gap analysis | b. Portrays how a maintenance process is done |
| 6. _____ Pareto chart | c. Correlates FM staff training on new software and the number of calls to the computer help line |
| 7. _____ Flowchart | d. Results in a public-sector organization borrowing the best practices of the private sector |
| 8. _____ Check sheet | e. Establishes that security costs are at parity with best-in-class |
| 9. _____ Cause-and-effect diagram | f. Tracks the frequency of unscheduled chiller maintenance |
| 10. _____ Scatter diagram | g. Monitors incoming electrical power to a facility to determine the number of interruptions |
| 11. _____ Control chart | h. Diagrams collective knowledge about a maintenance problem, focusing on the problem |
| 12. _____ Histogram | i. Collects data on which days of the week the fitness center receives the most users |



13. Which of the following is a technique **best** suited for determining the root cause of a problem?
- ☐ a. The Five Whys
 - ☐ b. PDCA cycle
 - ☐ c. Six sigma DMAIC
 - ☐ d. Trend analysis
14. If the PDCA cycle is used in conjunction with a benchmarking initiative, top management commitment would be secured during which phase?
- ☐ a. Plan
 - ☐ b. Do
 - ☐ c. Check
 - ☐ d. Act
15. Which of the following statements **best** describes statistical process control?
- ☐ a. Calculates mean, mode and median measures of central tendency
 - ☐ b. Determines whether a relationship exists between variables and the strength of the relationship
 - ☐ c. Identifies specific areas for improvement and measures variations in outputs
 - ☐ d. Describes a variable's tendency to increase, decrease or remain unchanged over time
16. A run chart is a line graph in which the vertical axis represents the _____ and the horizontal axis represents the _____.
- ☐ a. time scale, measurement
 - ☐ b. cause, effect
 - ☐ c. frequency, measurement
 - ☐ d. measurement, time scale
17. True or false? Leading indicators are predictive and lagging indicators are about results.
- ☐ a. True
 - ☐ b. False
18. In an output-based service specification, a facility manager should
- ☐ a. specify the precise service level required.
 - ☐ b. remove as many constraints as possible.
 - ☐ c. build in extra quality assurances.
 - ☐ d. set clear goals and manage toward the execution of them.
19. A facility manager wants to determine if customer relationships are in good or bad shape. Would customer complaints suffice as a singular KPI? Briefly explain why or why not.



Progress check answers

1. Specific answers will vary. The basic problem is gathering easily quantified data for its own sake. Attendance roll call reveals nothing about the main objective of the training—knowledge and skills gained to improve customer satisfaction. (p. 5-19)
2. a (p. 5-20)
3. c (p. 5-26)
4. d (p. 5-32)
5. e (p. 5-39)
6. a (p. 5-40)
7. b (p. 5-42)
8. i (p. 5-45)
9. h (p. 5-46)
10. c (p. 5-47)
11. g (p. 5-49)
12. f (p. 5-51)
13. a (p. 5-54)
14. a (p. 5-56)
15. c (p. 5-60)
16. d (p. 5-63)
17. a (p. 5-66)
18. b (p. 5-69)
19. Specific answers will vary. The individual KPI is important but would probably not provide enough information. Many unhappy customers do not complain. This singular KPI would give the facility manager some indication but would not tell the full story. (p. 5-76)



Chapter 3: Quality Assessment of Facility Management Services

After completing this chapter, students will be able to:

- Monitor customer satisfaction and provide customers with feedback.
 - Develop and manage continuous improvement initiatives.
 - Recognize and act on areas that necessitate process improvement due to variation.
 - Assess the performance of service providers and plan appropriate performance improvements.
-

References to customer satisfaction have been sprinkled throughout this competency. It comes to the forefront in this chapter. As defined in Chapter 1, customer satisfaction is:

The end result of delivering a product or service that meets customer requirements, needs and expectations.

Given our definition of customer satisfaction, the challenge for a facility manager becomes getting close to customers and fostering a relationship with them in order to fully understand their needs and expectations. This understanding must then cascade throughout the entire FM organization because every service provider impacts customer satisfaction.

Customer satisfaction measurement is an integral part of getting close to customers and quality facility management. Such measures help FM to:

- Understand customer needs, priorities and expectations.
- Capture and integrate the voice of customers.
- Identify and drive improvement initiatives.
- Identify the need for corrective action.
- Build customer relationships and manage customers' expectations.
- Establish benchmarks for future measurement efforts.

The challenge a facility manager faces is how to do all of this and do it well—how to quantify, measure and track customer satisfaction and turn the results into action. That is what you will read about in this chapter.



✦ Topic 1: Measuring Customer Satisfaction

There are several ways to collect and analyze customer data. While it is beyond the scope of this discussion to cover all possible customer satisfaction measurement techniques, content examines ones commonly used in FM:

- Complaint management
- Interviews
- Focus groups
- Surveys
- Service response cards
- Walk-throughs and observations

However, before we delve into techniques, it is important to understand the need for comprehensive feedback and consistent measurement. Selecting techniques that offer a balance of qualitative and quantitative data greatly enhances your ability to gain important customer insights and make informed decisions. Understanding the concepts of reliability and validity helps to ensure that you have accurate data to work with.

Qualitative and quantitative measures

Qualitative data

Simultaneous use of qualitative and quantitative data is what provides a facility manager with a full, well-rounded assessment of customer satisfaction. When both types of data are used, a facility manager gains comprehensive feedback.

Qualitative data is based on research that supplies non-numeric data, for example, through the use of interviews, focus groups, open-ended survey questions, observations or other methods that gather expression of attitudes, opinions and feelings. Because these measures focus on discovering underlying perceptions and motivations instead of more concrete, objective (quantitative) criteria, they are sometimes referred to as “soft” measures. It is often necessary to use qualitative measures because objective criteria are not always applicable when assessing FM quality and customer satisfaction.

While it is more difficult to quantify subjective soft measures than objective (“hard”) measures, the benefit of using qualitative data is that customers have the opportunity to provide feedback using their own words. Thus, qualitative measures help FM identify:

- What is really important to customers.
- Unmet or latent customer needs.
- Preferred features of services.



One challenge in qualitative feedback can be the amount and/or spread of customer comments to analyze. Grouping comments into a small number of subject-matter categories (such as important service features or complaints) simplifies the task. These clusters can, in turn, be distilled into quantitative data. For example, one category can represent 52 percent of comments received, another 12 percent of comments received and so on. A Pareto chart may be used to prioritize comments.

Quantitative data

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 and regression analysis (all discussed in Chapter 2).

When measuring customer satisfaction, you can also use indirect indicators such as staff retention, turnover rates, and feedback from appraisals. (Note: The *Human Factors* competency contains additional information about all of these measures.) Productivity (if it is measureable) is another indicator of customer satisfaction.

Reliability and validity

Whether using qualitative or quantitative measurement tools, the challenge is to obtain reliable and valid information that can be used to make objective conclusions about customer feedback.

(Note: While reliability has specific meanings and applications in operations and maintenance, the focus here is the context of customer satisfaction measurement.)

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.

Validity answers two questions:

- What does the instrument measure?
- How well does the instrument measure it?



A reliable or consistent instrument or method is not necessarily valid. However, a valid instrument is always reliable.

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.

Next we look at the specific customer measurement techniques. As you will see, each technique has specific applications and distinct benefits and cautions.

Complaint management

The adage "Bad news spreads fast" aptly applies to complaint handling. Unhappy customers generally share their misfortune and bad experiences with others. They are vocal about poor service, rude employees and whatever else displeases them. In fact, landmark customer service research conducted by the U.S. Office of Consumer Affairs/Technical Assistance Research Programs (TARP) shows that people who have a service problem are likely to tell eight to ten people about it.

However, research also estimates that fewer than one in 20 people who have a complaint will formally complain. That means you cannot assume that the majority of your customers are satisfied. It also reinforces the notion that you need to listen to the voice of the customer and stimulate complaints as opposed to operating on intuition and instinct related to customer requirements. To ignore the silent majority can put the reputation of the FM function at risk.

Best-in-class organizations welcome complaints because complaints are customer feedback that can be used to improve service performance. There is also the potential to reduce costs and improve the bottom line. Best-in-class organizations make it easy for customers to complain; they even encourage complaints and then they bend over backward to set things right and make changes so that future customers do not experience similar problems.

One of the most valuable ways to collect good qualitative and quantitative data in a customer-focused organization is through a complaint management system. Complaints provide a wealth of information. And, by making it easy for customers to complain, more customers will come to you with their problems, giving you greater opportunity to correct and/or improve FM services.



Characteristics of an effective complaint management system

An effective complaint-handling system proactively encourages customers to complain and facilitates prompt and courteous complaint resolution. Features that generally characterize effective complaint management systems are shown in Exhibit 5-38.

Exhibit 5-38: Characteristics of an Effective Complaint Management System

- **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 customer 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 regular review of the complaint management system.
- **Customer and service provider input.** Developing an effective complaint process solicits input from both customers and service providers (both FM staff and external providers). For example, a face-to-face follow-up process with a customer to ensure satisfaction and/or understanding of the actions taken can reduce or eliminate recurring problems.
- **Ease of access.** Customers 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 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 customers and employees and reevaluation based on satisfaction measurement ensure continuous improvement.
- **Customer satisfaction.** Quality and customer satisfaction are 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 manner in which 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.



Technology and complaint handling

Technology utilization in complaint handling is a big plus. As with many areas of FM, technology greatly streamlines and facilitates the process. 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 (discussed in Topic 3).

Benefits and cautions for complaint handling

Exhibit 5-39 lists benefits and cautions in complaint handling.

Exhibit 5-39: Benefits and Cautions of Complaint Handling

Benefits	Cautions
• Establish a proactive business attitude for the FM group. • Provide a way to measure improvement of the FM department in relation to customer service. • Offer FM an opportunity to make amends with dissatisfied customers and restore goodwill. • Curb “word-of-mouth” negative publicity that can affect other customers. • Resolve recurring problems to reduce similar complaints in the future. • Identify areas for service improvement.	• Require top management commitment. • Complaint system should be quantitative and endorsed by all. • Complaints should be monitored (tracked and regularly analyzed). • Service providers should be trained and empowered. • Those individuals receiving/processing complaints should be well-trained in customer service techniques. • 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 than window dressing.

Complaints are really opportunities for service improvements and better quality. Careful and effective complaint management pays quality dividends.

Interviews

Would you say you understand what your customers want? If yes, what do you base your opinion on? Many organizations think that they intuitively know what a customer wants. Unfortunately, such an introspective look can often yield an internal bias of what customers should want but not necessarily an accurate profile of true customer needs and expectations. Interviews are an important technique that FM can use to eliminate internal bias and identify reasonably objective service attributes important to customers.



An interview involves asking a carefully planned, structured series of questions. Interviews may be done in a face-to-face setting, virtually or over the telephone. An interview provides qualitative information and may yield additional insights through probing questions.

The purpose of an interview is to solicit an unbiased view from a customer and to ensure that the organization has not omitted any major issues. The qualitative information collected can be explored further through a focus group or quantified by a survey.

Characteristics of effective interviews

Whoever asks the questions (e.g., a facility manager, FM staff or a third party) must conduct the interview without preconceptions about the outcome. Verbal and nonverbal clues from the interviewee must be read if there are questions customers have difficulty in understanding or are uncomfortable in answering.

No one interview approach will be likely to fit all customers. The interviewer may need to adapt his or her personal style to fit a customer’s preferences. At the start of the interview, an interviewer needs to be able to quickly establish rapport. To help facilitate a substantive discussion, the interviewer should probe for additional information as necessary and summarize throughout.

Interviewees should not be selected solely for their friendliness or willingness to participate. Customers should be selected so that an array of demographics is obtained. This can help FM to determine if specific customers have any unique service requirements.

Benefits and cautions for interviews

In Exhibit 5-40, benefits of interviews and cautions regarding the use of interviews are shown.

Exhibit 5-40: Benefits and Cautions of Interviews

Benefits	Cautions
• Demonstrate a serious commitment to improvement. • Are flexible. • Yield insightful information (e.g., opinions and reactions). • Allow for probing to collect more in-depth information. • Can yield quantitative data.	• Time-intensive to get adequate sample size and analyze data. • Method of selecting willing participants is difficult to manage objectively to get well-rounded feedback. • Interviewer’s nonverbals can influence responses. • Interviewers should be careful not to ask leading questions. • Interviewees may answer with what they think is “right.” • Interviewees may use time as an opportunity to vent.



Properly designed and executed, interviews can yield valuable customer perceptions about service attributes.

(Note: Information on verbal and nonverbal communication is found in the *Communication* competency.)

Focus groups

A focus group is a structured but informal technique to assess customer needs and feelings. A small group of customers (normally six to 12) is invited to participate in a discussion led by a facilitator. A focus group usually lasts two to three hours.

The group dynamics and discussion during a focus group can provide a great deal of information about customer needs, attitudes and opinions in a relatively short time frame. Focus group data provides a good foundation for and supplement to quantitative surveys.

Characteristics of effective focus groups

Effective planning is key to the success of a focus group. Objectives must be clearly defined regarding the type of information to be gathered (such as to develop a list of customer attribute data, to pre-test elements for a survey or to discuss service issues).

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 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.

A good facilitator practices active listening and is adept at conflict resolution (if differences in opinions arise). Being knowledgeable about the topics is also important. Having a reasonable measure of enthusiasm for the session is helpful; it can be contagious in a group setting.

(Note: The *Communication* competency explains active listening. Both the *Communication* and *Leadership and Strategy* competencies discuss conflict resolution.)

When selecting 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.



Comparing the results obtained from different groups can be quite insightful.

Benefits and cautions for focus groups

Exhibit 5-41 lists focus group benefits and cautions.

Exhibit 5-41: Benefits and Cautions of Focus Groups

Benefits	Cautions
• Provide a relatively comfortable forum for obtaining feedback. • Are completed relatively quickly. • Identify emerging trends in customer expectations (e.g., early warning signs of shifting customer preferences). • Allow for group discussion and prioritization. • Allow for “champions” to be identified (as a future reference).	• Requires competent facilitation. • 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. • Participants can be influenced by what others say and gravitate to “groupthink” (conformity). • Participants need to be representative of the customer base or results may be skewed.

Well-run focus groups provide an excellent forum to capture the voice of the customer. They can generate a valuable list of service attributes important to customers.

Surveys

Surveys (questionnaires) involve asking a series of prepared questions to collect data about opinions, behavior or knowledge. They are commonly used with customers to discover needs and assess satisfaction. There are different ways to do a survey (e.g., face-to-face, over the telephone, mail or electronically). In facility management, surveys are predominantly done online.

Online e-surveys are Internet-based. Numerous software applications are available and offer a variety of template design options. Interactive features such as graphics or programming that triggers alternate questions based on previous responses are possible. Respondents are typically sent an e-mail notification with a hyperlink to the Web site hosting the survey. An organization may choose to host a survey on its own Web site. Users should be given a reasonable time frame in which to respond (for example, by a specific date that allows several days to respond).

Compared with the other survey formats, e-surveys can be administered more quickly and cost less. They also provide almost instant analysis. Because of the convenience for users to respond, they often get a higher response rate than telephone or mail surveys.



Assessing customer satisfaction with a survey is a valuable FM management tool. 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.

Sampling

Sampling is the process of selecting a number of customers 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 customer base in order to understand and generalize about the entire customer population. Sampling is often used when surveying the entire population is too unwieldy or costly.

Example of a population:

All employees in a building

Example of a sample:

20 of 100 employees in the building

Sample and population are classified as inferential statistics. Inferential statistics allow for forming a conclusion about a characteristic of a population by studying a sample taken from that population.

Recall from the Chapter 2 discussion of statistical analysis that there are descriptive statistics used to condense and summarize large quantities of data. As you will see in the upcoming (Topic 2) discussion of data analysis, inferential and descriptive statistics are used together in quantitative analysis of customer data.

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.

There are many scientific sampling methods to choose from, and there are various research tools that can help you draw a valid and representative survey sample. The point here is not to make you a statistician. We simply want to reinforce the importance of sampling and provide an overview of four basic methods.

- **Census.** In a census sample, you select all customers. It is representative of the entire population because it is the population. Census sampling is used when feedback from all customers is important.



- **Judgment.** In judgment sampling, you select a subset based on your knowledge and discretion. While easy to do, the degree to which results can be generalized is questionable.
- **Target.** 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), you sample with a purpose in mind and have one or more specific predefined groups you want to gather input from.
- **Statistical.** Statistical sampling selects a subset of customers based on chance. There are different statistical sampling techniques (simple random sampling, stratified random sampling, and cluster sampling). A major advantage of statistical sampling is the ability to generalize your results to the larger group from which they are selected.

The major difference between the sampling methods shown here is the absence or presence of random selection. Does that mean that nonrandom judgmental or target samples are not representative of the population? Not necessarily. But it does mean that your samples cannot depend upon theory and rationale that statistically support that you have represented the population well. With judgmental or target samples, it may be hard to know how well you have represented the larger group. Of course, a statistician or researcher prefers random sampling methods. However, in facility management (and many other areas) it may not be feasible, practical or theoretically sensible to do random sampling.

The take-away about sampling is to do it so that you can have confidence in your survey results. You want to assess the true level of satisfaction of the customers you survey and be able to generalize the results.

Survey design

How you design your survey questions and rating scales determines the data you get back. It also greatly influences your analysis and conclusions. The type of information you collect, question format and word choice are all important considerations.

Type of information

The initial step in developing a survey is to identify what type of information you want from customers. Exhibit 5-42 describes the four basic types of information collected in surveys: attitudes, beliefs, behaviors and attributes.



Exhibit 5-42: Types of Information Collected in Surveys

Type	Description
Attitudes	Require people to indicate how they feel about something (e.g., whether they have positive or negative feelings about something)
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?	

Question format

Once you determine what kind of information you want from survey respondents, the next decision is what kind of question format to use:

- Open-ended or close-ended questions
- Rating scales

Open-ended or close-ended questions. Open-ended questions are questions that have no answer categories. The respondent is asked to state his/her own opinion. Close-ended questions present discrete choices to the respondent to elicit a simple response. Examples of both types are provided in Exhibit 5-43.

Exhibit 5-43: Examples of Open- and Close-Ended Questions

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? ☐ Vending areas ☐ Cafeteria ☐ Fitness center ☐ ATM

Open-ended questions can result in a richer understanding of customer attitudes and thought processes, but they should be used judiciously. Time constraints often lead respondents to provide short, terse comments. In some cases, a person may not respond at all. When developing open-ended questions, try to make the request clear and reduce the difficulty of answering the question.



Example:

Rather than asking “What do you think about the food service operations?” ask questions such as:

- Please list the three things we need to improve the most.
- What was your most positive experience?
- What was your most negative experience?

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 yes/no response is a variation of a close-ended question. Using this format, the customer simply responds with a yes or no answer. In addition to the close-ended question format shown in Exhibit 5-43, an example of a yes/no variation is “Have you used the fitness center within the last month?”

Rating scales. The response format for close-ended survey questions (how the customer can respond to each item on the survey) determines how the survey data can be used. Three popular scales are used: the Likert scale, rank ordering, and forced allocation.

The five-point **Likert scale** (named after R. A. Likert, who developed it) represents a bipolar continuum and 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. Exhibit 5-44 shows fundamental Likert scale response formats.

Exhibit 5-44: Likert-Type Response Scale Examples

Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Very Dissatisfied	Dissatisfied	Neither Satisfied or Dissatisfied	Satisfied	Very Satisfied



There are variations on the five-point response scales (for example, 1 to 7, 1 to 9, 0 to 4). As we see in Exhibit 5-44, odd-numbered scales often have a “neutral” or “undecided” middle value. It is also possible to use a response scale with an even number of responses and no middle neutral or undecided choice. In this situation, the respondent is forced to decide whether they lean more toward the agree or disagree end of the scale for each item. As warranted, “not applicable” or “don’t know” may be included as part of the scale.

Words or numbers may be used to label the responses. For example, a rating of service expectations might include the responses, “Greatly exceeds,” “Exceeds,” “Meets,” “Almost meets” and “Fails to meet” or a scale with 5 equated to the “Greatly exceeds” value and 1 as “Fails to meet.” Many possibilities exist.

Examples of survey items using the Likert rating format appear in Exhibit 5-45.

Exhibit 5-45: Question Items Using Likert Scales

In general, the temperature in my work area:	Strongly Disagree	Neutral	Strongly Agree	Don't 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 during hot weather.	(1) (2) (3) (4) (5)			☐
4. Lets me wear the clothing I prefer.	(1) (2) (3) (4) (5)			☐
5. Can be changed enough by me.	(1) (2) (3) (4) (5)			☐

In general, maintenance people in my work area:	Strongly Disagree	Neutral	Strongly Agree	Don't Know
1. Prevent the need for emergency repairs.	(1) (2) (3) (4) (5)			☐
2. Come fast enough when I request them.	(1) (2) (3) (4) (5)			☐
3. Are considerate of my work time.	(1) (2) (3) (4) (5)			☐

You can show people objective temperature readings, but you have to ask them whether those temperatures create comfort. In similar fashion, you can show people response times, but you have to ask them whether the response times are satisfactory.

Of all survey rating scales, the Likert response format is the most frequently used.



Rank ordering occurs when respondents are asked to rank a series of service attributes according to their perceived importance. 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 becomes more difficult for most respondents.)

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 quite small or quite 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 allocation to help determine which outdoor recreation features are most important to customers is presented in Exhibit 5-46.

Exhibit 5-46: Forced Allocation Scale Example

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

In addition to open- and close-ended questions and scales, other question formats exist such as 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.

Word choice

We all realize that there are many ways to say the same thing. This simple axiom applies to question writing. You need to ask questions that customers can answer. Questions must be concise and unambiguous and must contain only one thought. There should be no room for misunderstanding.



Notice that the questions in Exhibit 5-45 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 question such as “Maintenance service is performed according to prescribed standards.” To ask that question assumes people know the prescribed standards. Depending on the audience, that assumption is highly problematic and potentially erroneous.

Survey response rate

Response rate, as the name implies, is the percentage of people who respond to a survey. The general rule regarding response rates is to have the largest number of people possible respond.

A good survey response rate is important to help:

- Ensure that survey results are representative of the target population.
- Produce accurate, useful survey results.

At a base level, survey response rate is a simple calculation:

$$\text{Response rate} = \frac{\text{Number of completed surveys}}{\text{Number of people contacted}}$$

Example: If you asked 210 employees to complete a survey and 75 responded, the response rate is 210/75 or 28 percent.

Although this basic definition of response rate compares the number of people contacted with the number of surveys returned, there is more than one way to measure it. For example, does the number of completed surveys include surveys with some answers left blank or only those where every question was answered? Some criterion may be set to further qualify what constitutes a completed survey (e.g., 80 percent of questions answered). Of course, that can result in significant discussion about which questions were (or were not) answered.

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.
- **Statistical analysis.** If sophisticated statistical analysis is planned, a minimum sample size is required and associated requirements for response rate are important to provide meaningful results.



- **Survey administration.** How a survey is administered influences acceptable response rates. Is the survey Web-based and administered online? By e-mail, phone, face-to-face and so on?
- **Familiarity with respondents.** Are respondents familiar with you? Most researchers think that the better your respondents know you, the better your response rate. For example, respondents who you know by name or who have regular contact with you may be more likely to respond to your survey than respondents you do not know.
- **Anonymity.** Making a survey anonymous may boost response rates. You can still establish appropriate demographics (e.g., functional area or position level) that will help during analysis, but people may be more inclined to respond (and be more candid) if they know they will not be given direct attribution.

The most common questions about response rate tend to be: What is an acceptable response rate before you can put faith in the results? Or how many is enough? There is no simple answer. For example, when several experts were posed the question as to what is considered good or adequate as a mail survey response rate, the numerical range was from 25 to 75 percent. But the point of contention remains: There are informal expectations about what constitutes an acceptable response rate, what is high and what an unacceptable level is.

One Web-based survey software vendor offers the following points and numerical guidelines regarding e-survey response rates:

- Internal surveys (employee surveys) generally have a much higher response rate than external surveys (customer satisfaction surveys).
- Internal surveys will generally receive a 30 to 40 percent response rate or more on average, compared to an average 10 to 15 percent response rate for external surveys.
- Response rates can soar past 85 percent when the respondent population is motivated (either because the respondents have an interest in the topics being surveyed or incentives are being offered to complete the survey) and the survey is well-executed.
- Response rates can fall below two percent when the respondent population is less targeted, when contact information is unreliable or where there is less incentive or little motivation to respond.

Simply put: Acceptable survey response rates are not cast in bronze. There are several mitigating variables that can inflate or deflate a response rate.



Did You Know?

In public opinion surveys, the general objectives are to give an accurate picture of how people feel about a topic and predict what they would do (e.g., buy, vote and so forth). Surveyors typically want to get an answer that is within a few percentage points of “truth.” A statistic called the standard error of the mean measures this wiggle room. It is inversely related to the number of respondents. From that perspective, the answer to “How many is enough” depends on how far off the surveyor is willing to be.

In an issue of *The Gallup Europe Journal Newsletter*, a point was made that the level at which nonresponse begins to affect data quality cannot be established for all surveys but needs to be assessed for each survey separately. The main advantage of a high rate of response is in reducing the possibility of a nonrepresentative sample. However, response rate may not always be the best way to judge the accuracy of survey results. Rather, the representativeness of respondents is.

Response rates with surveys are always a challenge. As noted previously, incentives to complete the survey can help. Common incentives are to offer free or discounted registration for a paid event or a chance to win a mobile device or something else. It is also a good idea to send follow-up reminders as the survey deadline approaches.

An important participation incentive to survey respondents is that their opinions will be heard and that action will be taken based on their feedback. If respondents believe that participating in a survey will result in real improvements, response rates may increase, as will the quality of the feedback.

Characteristics of effective surveys

All surveys will generate data. As we just read, proper sampling is important. So too is the quality of questions and item construction. Collectively, several factors make the difference in the level of customer response and the usefulness of the data collected.

All surveys should be reliable and valid. To better ensure that the questions are understood, consider field-testing or validating the survey instrument with a small group of preselected customers.

Keep measurements consistent. Measures across successive surveys (for example, an annual customer satisfaction survey) should be consistent. If different measures are used, you will be unable to benchmark performance.



Benefits and cautions for surveys

Exhibit 5-47 shows benefits of surveys and cautions regarding their use. These items specifically pertain to e-surveys.

Exhibit 5-47: Benefits and Cautions of e-Surveys

Benefits	Cautions
• Relatively inexpensive. • Offer a variety of design options. • Standard data collection. • Convenient for respondents. • Can provide anonymity. • Expedient way to have customers quantify their reactions.	• Less flexible than focus groups or interviews. • 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.

Surveys can efficiently measure customer satisfaction and dissatisfaction with FM services. You can segment questions according to types of services, service providers, general facility condition and so forth. Survey data can help you track trends and identify major improvement efforts. Make sure you do not ask too many questions at one time or overuse them, and surveys will be a valuable quality measurement technique.

Service response cards

A service response card is an abbreviated form of a survey. For that reason, they are sometimes called transaction surveys; they are also known as comment cards or suggestion cards.

Service response cards are short and concise, and they take little time and effort to complete. They are, however, mighty in their potential 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).

Characteristics of effective service response cards

Good service response cards should serve the purpose for which they are intended. They allow customers who receive astonishing service the chance to tell a facility manager about their wonderful experience. They also give



dissatisfied customers an opportunity to vent and the FM organization a chance to make amends.

Some service response cards are anonymous; others solicit contact information for follow-up. Whether you include open- and closed-ended questions, rating scales or a mix depends on your purpose and the audience. However they are designed, effective service response cards foster communication with customers and let them know their opinions are valued.

Benefits and cautions for service response cards

Traditionally, service response cards were paper-based. However, 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.

Exhibit 5-48 shows benefits of service response cards and cautions regarding their use.

Exhibit 5-48: Benefits and Cautions of Service Response Cards

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.

Short. Simple. To the point. Service response cards let customers communicate with FM on a regular basis.

Walk-throughs and observations

It is easy to become complacent and develop tunnel vision about facility conditions and service in the absence of one-on-one customer contact. Walk-throughs and observations are a relatively easy way to better understand a customer's viewpoint. 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 customer's perspective.

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.

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).
- Visiting the facility and accompanying the VIP.
- Recording observations.
- Planning action and implementing improvements.

Theriault describes the VIP as one of your “most scrupulous customers, occupants or decision makers” and notes that the individual should not be part of the FM team or directly related to the building. You want to see what the VIP sees when he or she walks through the building. The VIP can be asked to provide general or specific observations and to rate and prioritize items about facility services and conditions.

Characteristics of effective walk-throughs and observations

Whether you do the walk-through and make observations on your own or you select a customer, the goal is to catch things that may not have surfaced as problems but are still relatively visible.

Talking with customers helps you assess facility services and conditions from their perspective. Some type of checklist is useful to record information. Rating scales can establish priorities.

Information collected should be categorized in some manner. (Theriault sorts the items along a spectrum from “immediate quick fixes” to “do-able in time” depending on cost and “divine intervention” for items to be included in future budgets and done at earliest convenience.)

As with any quality initiative, improvements should be made. The things that can be fixed with relative ease at minimal or no cost should be done. Other items should be budgeted.

Benefits and cautions for walk-throughs and observations

Benefits and cautions of walk-throughs and observations are listed in Exhibit 5-49.



Exhibit 5-49: Benefits and Cautions of Walk-Throughs and Observations

Benefits	Cautions
• Collect direct observations from customers. • Provide a fresh view. • Identify items missed by FM on a daily basis. • Create goodwill.	• Require an open mind. • Necessitate some knowledge of the facility in case of questions. • Can be seen as “airing your dirty laundry.” • Can be time-consuming. • Necessitate action and follow-up to be meaningful.

Walk-throughs and observations allow you to stay in touch with your customers—customers for whom services are intended and service providers who actually perform the work.

Visit the IFMA Facility Management Learning System online Resource Center for samples of some of the quality tools.

✦ Topic 2: Analyzing Customer Feedback and Communicating Results

Customer feedback is the foundation for improving FM performance. The customer satisfaction measures described in Topic 1 allow you to collect customer feedback regarding the efficiency and effectiveness of FM facilities and services. A logical progression after measuring customer satisfaction is to analyze the feedback, communicate the results to customers and then plan appropriate actions. These steps are a mix of art and science.

Analyzing the customer feedback is largely the science part. The good news is that by the time you get to data analysis, most of the really difficult work has been done. If you have planned and implemented measurements well, data analysis is usually a fairly 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 the 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.



Here is a closer look at the art and science of analyzing customer feedback and communicating the results.

Analyzing customer feedback

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 subsequent data analysis content (unless otherwise noted) pertains to survey results. Using this information as your baseline, you should be able to extrapolate how to best analyze customer satisfaction data collected with other measurement techniques.

Survey data analysis involves the three major areas shown in Exhibit 5-50, done roughly in the order presented.

Exhibit 5-50: Data Analysis Steps

Areas	Description
Data preparation	Cleaning and organizing the data for analysis <i>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.</i>
Descriptive statistics	Simple summaries describing the data—what it is and what the data shows <i>Example: Using measures of central tendency, measures of variation/statistical process control (SPC), and measures of association/correlation and regression 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.</i>
Inferential statistics	Making inferences from the data to more general conditions <i>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.</i>

The descriptive statistics you analyze can be voluminous. Following a logical sequence can help you avoid the common pitfall of paralysis from analysis. Consider the following guidelines.

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).
- Segregate data based on demographic differences in population.

Comparing data to other information

- Compare findings to previous benchmarks to assess if expected or desired changes are present or if there are trends.
- Compare findings with other internal and external data to assess if they agree or if there are abnormalities that should be investigated further.

Reviewing open-ended comments

- Identify areas where FM is doing well.
- Identify early warning signs and areas of dissatisfaction for actionable suggestions for how to improve.

For surveys, one specific decision you need to make is how to handle missing items (those questions where the respondent did not know how to answer, omitted answering for some reason or indicated that the items were not applicable). A reasonable way to handle such items is to provide a special code or category indicating why the data is missing.

The feedback collected from customers can help to improve operations. However, before the potential of the feedback can be realized and translated into informed business decisions, the data must be examined. As just noted in the general guidelines, data analysis should examine individual survey items (individual variables) as well as the relationship between variables.

E-survey software vendors typically offer tools to help analyze data and create custom reports. Easy-to-use analysis tools (e.g., spreadsheets and charting tools) can help to create simple graphic tables and diagrams as well as interactive dashboards. Such tools greatly streamline survey analysis and reporting for both individual items and the relationship of survey responses to one another.

Based on a specific survey's purpose and the data analysis and reporting requirements, customer feedback may be shown as:

- **Frequency and percentage tables**, for example, tables showing item values and categories, the number and percentage of respondents indicating each value or category and the adjustment percentages for any missing values.
- **Graphic data**, for example, graphic displays of information from both frequency tables and percentage tables to help convey item outcomes at a glance.



- **Percentage distribution tables**, for example, displays of how items move together (indicating a significant relationship between them) or how item answers move independently of each other (showing no relationship).
- **Scatter diagrams**, for example, scatter plots indicating the degree of significance of the relationship between two variables.

Methods for analyzing survey data range from simple (such as tables and graphs) to complex (such as correlation and regression analysis). There are even more sophisticated statistical analyses that are beyond the scope of this content. For surveys requiring you to examine multiple factors and criteria, you should enlist research assistance in both survey design and analysis.

During survey data analysis, you also need to consider validity (e.g., did the survey measure what it was supposed to measure) and reliability (e.g., is the survey capable of producing the same results over repeated administration).

Whether you are analyzing survey data or results collected from one of the other customer measurement techniques, you should also assess the ease of administration and the associated costs.

Considerations include:

- Was the measurement instrument easy to administer?
- Were questions clear and easy for customers to respond to?
- What were the time and costs associated with the measurement instrument and did they fit within the budget?
- What do you perceive as the strength and weakness of the instrument?

Communicating results

Once customer satisfaction data is compiled and analyzed, the results should be communicated with actionable recommendations for resolving the identified weaknesses. Communicating results demonstrates that you are listening to your customers and tells them what changes and improvements you intend to make.

Keeping your audience in mind, you need to carefully select and organize the data. If you present too much detail when you share the information with customers, 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.

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.

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 or not 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.

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.

As a courtesy, a summary of survey results and what you plan to do should be made available to everyone who received the survey. Summary results may be transmitted electronically, included in an organizational newsletter or shared through some other communication medium. Not only does this demonstrate professionalism and a commitment to quality, but it can improve the response rate the next time you conduct a survey.

Keep the big picture in mind when you communicate customer 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.

Appropriate organization style standards must be followed, but communicating customer satisfaction results does not have to be dull in order to be taken seriously. You have a story to tell. Seize the opportunity to make it engaging and interesting.



(Note: The *Communication* competency discusses good business writing essentials as well as elements of effective reports.)

✦ Topic 3: Acting on Customer Feedback

Collecting customer satisfaction data is useful only if there is a process in place to implement action plans. Stated another way, the data may be extremely insightful and well worth the time, effort and cost to collect, but it must be acted upon.

By analyzing the distribution of survey items and their relationships to one another, a facility manager can identify any gaps between what customers expect of FM and what is actually 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 be used 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.

To effectively use customer feedback, a facility manager must translate data into opportunities for 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. Chances are, you will not be able to address every performance issue right away. Furthermore, not all issues are equal in magnitude and importance. Some may necessitate future budgeting. A focused action plan with specific targets helps to ensure that your efforts are devoted to areas that warrant priority. Once priorities are determined, they should be implemented in the same manner as other organizational projects, ensuring that they fit the strategy for the entire organization and can be supported by the available resources.

Different organizations use different improvement tools and models to implement FM action plans. Chapter 2 discussed some of the basic ones:

- Root cause analysis
- The Five Whys



- Plan, Do, Check, Act (PDCA) cycle
- Six sigma DMAIC model

In this topic we examine the concept of continuous improvement and add a general process improvement methodology to your FM quality tool kit. Because understanding variation is an integral part of process improvement, content also looks at types and causes of variation.

Continuous improvement

Back in Chapter 1, continuous improvement (CI) was defined as

The collective actions an organization takes to increase the effectiveness and efficiency of activities and processes in order to enhance its ability to meet requirements and provide added benefits to customers and the entire organization. A strategy for achieving total quality management, CI is directed at improving quality and customer satisfaction.

A continuous improvement process is a disciplined methodology. CI analyzes capabilities and processes and improves them repeatedly to achieve the objective of customer satisfaction.

A generic model for continuous improvement is helpful. An example is described in Exhibit 5-51. As you review this example, keep in mind the steps listed are general. The model is not intended as a prescriptive step-by-step approach but rather considerations to think about in continuous improvement processes.

Exhibit 5-51: Example of a Continuous Improvement Process Model (continued on next page)

Step		Typical Activities Involved
Select the process to improve.		• Analyze feedback from customers. • Identify those processes critical to improvement. • Establish a well-defined improvement objective.
Define the current process.		Flowchart the current process, mapping activities, actions and decisions that occur between starting and ending points of the process.
Review 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.



Exhibit 5-51: Example of a Continuous Improvement Process Model (concluded)

Step		Typical Activities Involved
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. - Revise the original process flowchart.
Test the changed process.		- Pilot the process change on a small scale. - Collect data.
Evaluate progress.		- Assess whether the change improved the process. - Evaluate whether the desired impact was achieved.
Maintain/standardize the process.		- Determine whether additional improvements are feasible or monitoring will suffice until further improvement becomes necessary. - Institutionalize the process improvement so everyone is using the new standard process correctly.
Reflect on the process.		- Document lessons learned. - Recognize accomplishments.

Following the steps 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.
- Customer focus (consideration of customer feedback, needs and potential impact).
- Sufficient resources (the right team, time, money and materials).
- Extent to which the process is data-driven.

The end result should be a process that meets or exceeds requirements. Actions taken should prevent process problems from occurring or reoccurring.

(Note: The *Leadership and Strategy* and *Project Management* competencies both provide related information on several of these factors that support CI initiatives.)

Steps in the generic CI model:

- Help you ask questions, gather information and take actions effectively and efficiently.
- Provide a framework that guides you from the initial improvement challenge to continuous improvement success.
- Prevent you from skipping important steps along the way.



Examples:

At the onset, in the “Select the process to improve” step, customer feedback is taken into account. 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.

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.

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 Exhibit 5-51. 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.

Kaizen

Kaizen was first incorporated into business process improvements as part of W. Edwards Deming’s teachings. It was embraced in Japanese manufacturing during the 1950s. Certainly there are other notable quality control and continuous improvement management concepts. But no discussion of continuous improvement would be complete without a mention of kaizen; the word *kaizen* is generally synonymous with continuous improvement.

Kaizen describes continuous improvement at all levels in an organization. The premise is that as every process (beginning with the most important) is examined, worked on and improved, the entire organization improves. Kaizen is often described as a “staircase of improvement.” Moving from step to step, an organization uses a continuous process of following an improvement, maintaining an improvement, following an improvement, maintaining an improvement, and so on. While the steps may be small, they move the entire organization upward toward sustained improvements (and, potentially, “radical breakthroughs”).

Kaizen reaches beyond facility management. Suggestions are not limited to specific functional areas, and the process involves every employee—from



senior management to the housekeeping and food service staff. Everyone is encouraged to come up with small improvement suggestions on a regular basis. In most cases these are not ideas for major changes. Kaizen is based on making little changes on a regular basis.

Kaizen involves setting standards and then continually improving those standards. To support the higher standards, Kaizen may necessitate training, materials and supervision to help employees achieve the higher standards and maintain their ability to meet those standards on an ongoing basis.

While kaizen was once a Japanese manufacturing tradition, it is now widely used internationally, modified by each culture and organization to best suit their own business environments. A “kaizen blitz” is a popular permutation. The term describes a concentrated team-based improvement initiative designed to improve discrete process issues within a few days. Conventional process improvement projects can stretch out over many weeks or months. In a kaizen blitz event, teams use structured but creative problem solving to identify and implement quick-fix performance improvements.

Every FM process or service has undiscovered opportunities for improvement waiting to be discovered. Consistently meeting or exceeding customer expectations can be supported by kaizen.

Controlling variation

A goal in quality FM is to have reliable processes—ones that produce the desired output each time with very little variation. Important points to remember about variation are:

- Common cause variations in service processes usually require management action to change some inherent feature in the process.
- Special cause variations in service processes can usually be detected and removed by a service employee.
- Because approximately 85 percent of observed variation in a process is attributed to common cause and 15 percent to special cause, management is responsible for providing the necessary inputs to correct the majority of variation problems.

Without an understanding of variation, difficulties can (and often do) arise that can include:

- Rigid service specifications and standards.
- Unrealistic performance standards.
- A work environment that forces service providers to sacrifice quality.
- Erroneous decisions because of incorrect data interpretation.



Conversely, if service processes are reliable and stable, the climate is set for continuous improvement. Further variations in service processes can be reduced so that outputs are even better able to meet customer requirements.

In the Chapter 2 discussion of control charts (one of the seven basic quality control tools), a point was made that some variation is found in all processes. A key to controlling processes is to control variation as much as possible. To do that, it is important to distinguish between common cause and special cause variation.

Common cause variation

Common cause variation is a type of variation inherent within every process and repeated randomly within predictable limits. Sources of common cause variation in a process include chance causes, random causes, system causes and inherent causes.

Common cause variation (sometimes called systematic variation) results from how a process is designed; it is a natural part of the process. A process that has only common causes of variation is said to be stable or predictable. Even though common cause variation cannot be predicted, the process is still within statistical control.

The way to correct common cause variation is to change some fundamental aspect of the process. This requires management intervention, because workers in the process cannot fundamentally alter the process of their own accord.

Example:

FM maintenance staff at a hotel is responsible for touchup painting in rooms where minor damage occurs. Paint jobs must be continually re-accomplished. Upon investigation, the chief engineer learns that the crew has not been properly trained to perform the task and ensures that the training is provided.

Making only minor adjustments to a stable process is generally not advisable. Such changes are called “tampering.” Tampering with a stable process can lead to further variation because of unnecessary changes.

Special cause variation

Special cause variation results from special circumstances; it is not an inherent part of a process. Special causes of variation are factors that disrupt the usual flow of work and, therefore, must be identified, investigated and brought under control.

A process with special causes of variation is unstable and unpredictable. It is because of this unpredictability and lack of stability that the process is not in statistical control. Special cause variation requires tracking down and eliminating the special cause to bring the process into statistical control.



Special causes typically have a much bigger impact than any single common cause variation. Special causes are usually easy to detect and correct. Because the source of variation can be investigated and assigned to a particular source, special causes are sometimes called assignable causes. Typically no major modifications to the process are required, and correcting special cause variation can be accomplished without management intervention.

Consider the following example of special cause variation that continues the previous scenario of FM hotel maintenance staff.

Example:

After a period of good performance, the paint job quality of the same maintenance crew begins to deteriorate. Investigation determines that the paint mixing machine is not operating properly; poorly mixed paint is the cause of the bad paint job quality. The chief engineer has the machine repaired.

✦ Topic 4: 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 having an understanding of customers, 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 a facility manager can ascertain customer needs, determine at what levels those needs should be met and deliver FM services. We are now at the juncture of how to measure the performance of the facility organization and service providers to make continuous improvements.

Striving for quality FM service

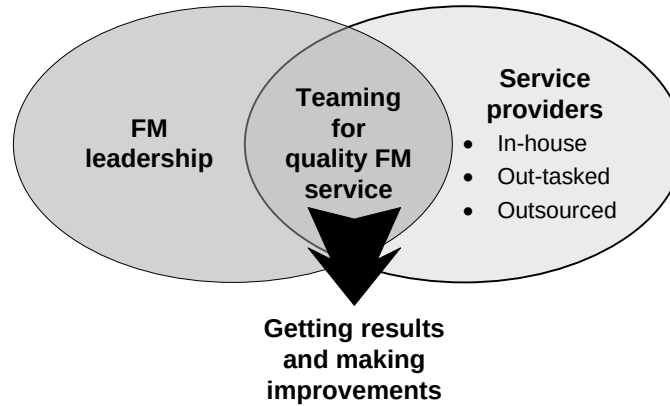
A significant amount of research has been conducted on service management. Books, articles and training on effective practices abound. Timeworn core principles about assessing and managing service performance that are applicable in facility management include:

- 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 customer.
- Measure performance.
- Recognize and reward accomplishments.



Most FM organizations are some mix of in-house, out-tasked and outsourced service providers. From concept to action, achieving quality FM is akin to a teaming process between facility leadership and service providers. This process is visualized in Exhibit 5-52.

Exhibit 5-52: The Teaming Process for FM Quality Service



The teaming process is about putting your best assets—internal and external—to work to meet or exceed customer expectations.

- FM leadership—sets clear expectations about requirements and measures.
- Service providers—apply the right quality tools to design and deliver the requested goods and services.

Getting results and making improvements requires performance monitoring and measuring.

Performance monitoring and measuring

In *Total Facilities Management*, Brian Atkin and Adrian Brooks 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, noting how this can become counterproductive. Atkin and Brooks recommend focusing on KPIs instead. If you reflect back to the measurement guidelines in Chapter 2 (Exhibit 5-6), a point was made that you need to ensure that measurements 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. General guidelines and principles follow.

Atkin and Brooks describe an assessment process that involves monitoring adherence to standards and targets according to:

- Conformance to regulations.
- Service delivery quality and performance targets.
- Costs.
- Time.
- Interaction with customers.

In *Managing Facilities and Real Estate*, Michel Theriault offers a performance management approach where performance measures cascade from FM processes to performance indicators, trends and KPIs.

The *Finance and Business* competency discusses performance management in the context of service provider contract monitoring.

There are, however, several principles we can generalize here that apply to both internal and external service providers. They are listed in Exhibit 5-53 on the next page.

Done properly, performance monitoring:

- Supports quality and CI.
- Facilitates early resolution of any performance issues.
- Identifies opportunities for process improvement.
- Provides valuable lessons for use when designing SLAs in the future.
- Gives service providers relevant feedback to improve their performance.
- Provides a framework for FM employee development and training.
- Builds alliances with external service providers.

Performance monitoring also holds service providers accountable. While contracts with external providers often include penalties and performance appraisals of FM staff identify areas of weakness, objective quality measures included in SLAs used in conjunction with good communication and other proactive and constructive measures are better avenues to continuous improvement. Most service providers will accept that they should be held accountable for their performance if they see the assessment process as rational, fair, consistent and transparent.



Exhibit 5-53: Performance Monitoring Principles

To Assess Performance Provisions	To Collect Performance Information
• Actual progress against work schedules • Fulfillment of time frames and adherence to milestones • Fulfillment of quality and quantity objectives • Conformance to specifications • Conformance to baseline operational performance metrics • Conformance to service/quality levels • Conformance to standards	• Inspections • Observations • Solicited customer feedback (e.g., customer satisfaction surveys and service response cards) • Unsolicited feedback (e.g., complaints or suggestions) • Work management center call reports (if services provided have call center support) • Service provider reports • Structured data monitoring from suppliers • Tests • Audits • Regularly scheduled meetings
To Record Performance Information	To Document Performance
• Project software • Spreadsheets • Custom applications • Work management center information systems • Computer-aided facility management (CAFM)	• FM reports • Performance score sheets • Scorecards

(Note: The *Human Factors* competency discusses performance management and performance appraisal for FM staff. Additional related information is found in the *Leadership and Strategy* competency.)



Progress Check Questions

Directions: Read each question and respond in the space provided. Answers and page references follow the questions.

1. Qualitative data tends to be _____, while quantitative data is more _____.
☐ a. factual, statistical
☐ b. objective, subjective
☐ c. statistical, factual
☐ d. subjective, objective
2. A reliable instrument is characterized by
☐ a. confidentiality.
☐ b. objective feedback.
☐ c. consistency.
☐ d. open-ended responses.
3. True or false? A lesson learned through best practice complaint handling is that when you make it easy for your customers to complain, your customers will make it easy for you to improve FM operations.
☐ a. True
☐ b. False
4. Which of the following statements **best** describes the purpose of an interview?
☐ a. To generate a list of service attributes important to customers
☐ b. To test information for inclusion for a focus group
☐ c. To solicit data from key stakeholders who are unlikely to complete a survey
☐ d. To collect unbiased information about customer needs and expectations
5. When focus group participants are stratified by personnel levels, the likelihood participants will be more candid
☐ a. increases.
☐ b. decreases.
☐ c. remains the same.
☐ d. cannot be predicted.
6. A customer satisfaction survey is sent to 50 of 100 facility occupants. This is known as a
☐ a. population.
☐ b. sample.
☐ c. normal distribution.
☐ d. standard deviation.



7. Which type of question format allows you to **best** determine the percentage of positive and negative satisfaction responses for a given service attribute?

- ☐ a. Yes/no response
- ☐ b. Forced choice
- ☐ c. Likert rating
- ☐ d. Open-ended

8. An effective service response card

- ☐ a. protects anonymity.
- ☐ b. invites communication.
- ☐ c. tests benchmark data.
- ☐ d. facilitates statistical analysis.

9. True or false? Walk-throughs and observations help to plan improvements for weaknesses identified through focus groups and interviews.

- ☐ a. True
- ☐ b. False

10. Name at least four principles you should practice when reporting survey results.

11. Which of the following service criteria would be considered an intangible factor?

- ☐ a. Communication with the customer during a service call
- ☐ b. Response time
- ☐ c. Delivery expenditure
- ☐ d. Work carried out according to health and safety regulations



Progress check answers

1. d (p. 5-81)
2. c (p. 5-82)
3. a (p. 5-83)
4. d (p. 5-86)
5. a (p. 5-87)
6. b (p. 5-89)
7. c (p. 5-92)
8. b (p. 5-98)
9. b (p. 5-99)
10. Specific answers will vary. Plausible responses include:
 - Keep your audience in mind.
 - Carefully select and organize the data.
 - Use summary tables and graphs to show the most relevant or important information.
 - Ensure that communication is open and honest.
 - Write concise reports; reserve raw data and open-ended responses for appendices.
 - Protect anonymity.
 - Make a summary available to everyone who received the survey.
 - Follow organizational style standards. (p. 5-104)
11. a (p. 5-113)



Chapter 4: Improvement of Facility Management Work Processes

After completing this chapter, students will be able to:

- Assess ways to improve facility management workplace productivity.
 - Construct process maps of facility management processes.
-

✦ Topic 1: Assessing Workplace Productivity

A facility manager has many metrics to use in assessing facility performance. From a customer's perspective, however, opinions of FM performance are typically not based on those same metrics. Instead, customers often base their opinions of the facility management function on their perceptions of the productivity of staff, service providers and contractors.

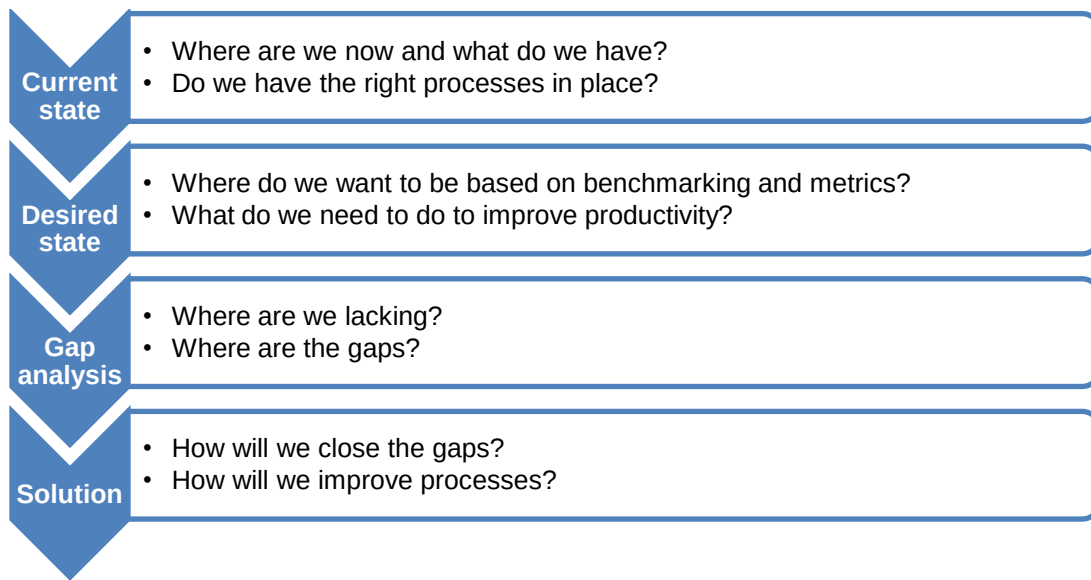
The *Human Factors* competency examines how facilities contribute to the performance of FM employees from the perspective of quality of work life. Here we consider how the quality of FM work processes influences the performance of FM employees.

A work environment can impact productivity generally in one of two ways: by enabling it or by thwarting it. Many studies have been done on factors that negatively impact productivity in a workplace. There are lists of environmental factors and workplace design elements, for example. There is much evidence about what not to do. Factors that positively impact a work environment are not as easy to discern. There are many interacting variables. What applies in one workplace may not be appropriate in another.

So how can a facility manager make changes aligned with organizational goals that positively impact the FM work environment and result in improvement from the viewpoint of the customer? A practical and pragmatic approach starts with a productivity assessment. While it is not feasible to show an assessment process that will work for every FM organization, the four basic elements that characterize most assessments are shown on Exhibit 5-54.



Exhibit 5-54: Workplace Productivity Assessment



The approach visualized in the exhibit and other similar renditions used across organizations allows FM to answer the following core questions:

- Where are we?
- Where do we need to be or want to go?
- What do we have to do to get there?
- How do we do those things?

Such assessments make use of current productivity metrics and consider:

- Design of the job or task in question in terms of the task time and cycle time, number of steps, percentage of time spent in approvals, retrieving information (tools, equipment, resources), non-valued-added activities and so forth.
- The adequacy of information available in terms of completeness, accuracy, timeliness, accessibility and so forth.
- The adequacy and cost of the resources used in the execution of the task.
- The adequacy of the direction given.
- The cost of resources.

Assessment findings and conclusions may be used to target process improvements that reduce resource consumption, use less costly resources, improve the information and direction, improve processes to reduce cycle time and improve productivity.



FM processes are, of course, unique to each organization's needs. Process mapping is an integral part of process improvement. Without process maps, workplace productivity cannot be measurably improved.

✦ Topic 2: Mapping Processes

There are several ways to analyze a process. The most common one is a flowchart (discussed in Chapter 2 in the content on the seven basic quality tools). Process mapping is another.

The basic characteristics of a process map are similar to those of a flowchart. Process maps:

- Provide a graphic representation of a process.
- Show the sequence of inputs, tasks and activities in a process.

Where process maps differ from flowcharts is in the level of detail. They are much more comprehensive.

What is process mapping?

Process mapping is the flowcharting of a work process in detail, including key measurements. Using modified flowcharting symbols, process maps show major and minor activities, decisions, delays, targets, the location where steps occur and any other details necessary to show exactly how a process is done. Complex interactions can be represented in a logical, highly visible and objective way.

Types of process maps

There are several different types of process maps. Each serves a specific purpose. In Exhibit 5-55, some of the more common types are described.

Exhibit 5-55: Types of Process Maps (continued on next page)

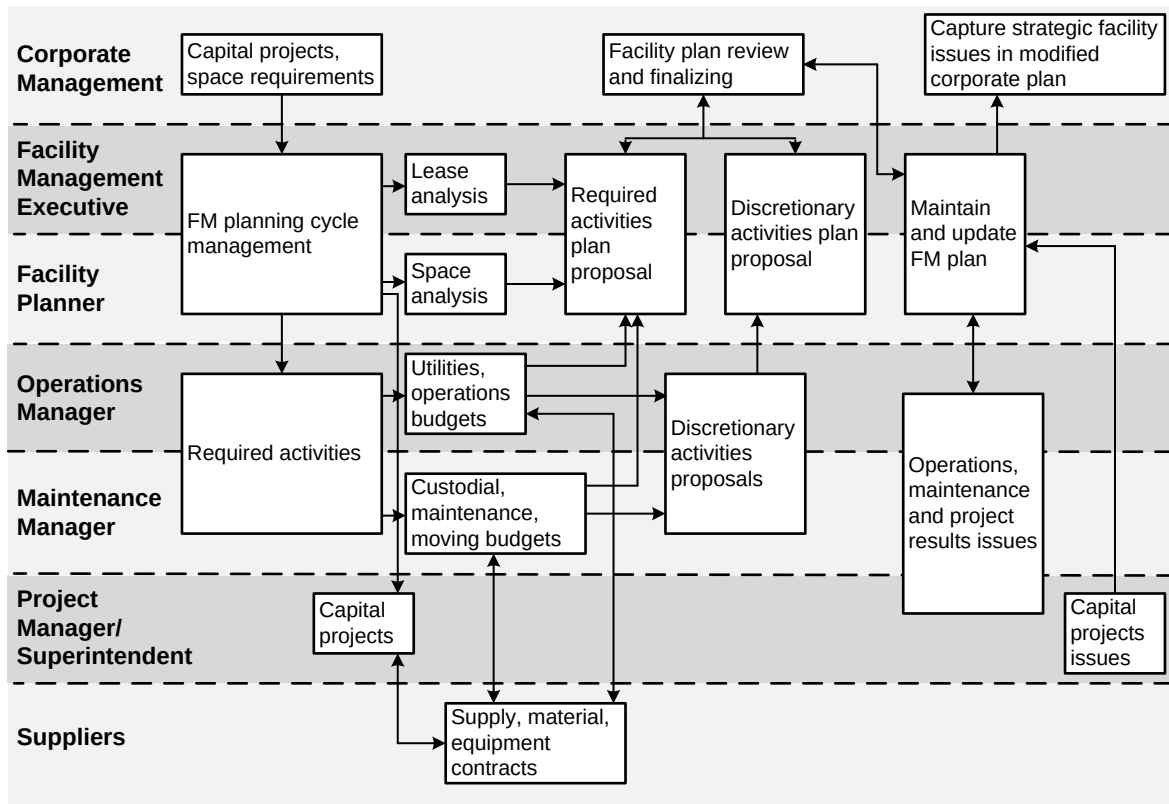
Type	Description	Use
As-is process map (present state)	Representation of how the current process works, including delays, excessive handoffs and any other non-value steps	• Gives everyone a good understanding of the process they are targeting • Helps to flush out issues in a process
Should-be or to-be process map (future state)	Representation of how the process will work when non-value steps are eliminated, flow is streamlined and all other improvements are made	• Visualizes how the process will look after improvement • Helps to ensure that events flow in sequence



Exhibit 5-55: Types of Process Maps (concluded)

Type	Description	Use
Ideal process map (ideal state)	Representation of how the process will work in an ideal situation without the constraints of time, cost and technology	- Challenges the current paradigm - Helps to look at creative ways to change the process
Cross-functional process map (also cross-functional process chart, swim lane chart or deployment chart)	Representation of a process that involves a number of different people or functional units; functional lanes (also called swim lanes) represent the different people or functional units involved	- Tracks who is responsible for each step - Makes it easier to track the number of handoffs (when control of the process is passed to another person), which are usually sources of errors and waste

Exhibit 5-56 shows an example of a cross-functional process map.

Exhibit 5-56: Example of a Cross-Functional Process Map for Planning of Facility Services

Input from the corporate plan provides the foundation for the entire facility plan.

Construction of process maps

Process mapping is most productive when conducted by a team of people in, or closely associated with, the process being analyzed. It provides the perfect opportunity to partner with service providers. Even when different individuals have all worked in the same process, they soon realize they often have unique perspectives of how the process works. Information sharing and clarifying differences opens the participants' minds to new ideas.

There are no standardized rules for drawing a process map. The important thing is that participants ultimately agree on the process paths, frequency of tasks, decision points and so forth.

The basic steps in process mapping are:

- Define the process.
- Map the process.
- Analyze the process.
- Map alternatives.
- Map intersection points.
- Evaluate and improve the process.

Did You Know?

Much of the work in “business process reengineering” is rooted in the straightforward craft of documenting how work flows through a process and drawing process maps.

Benefits of process maps

Beyond providing clear and common vision, process maps have several other benefits:

- They can be used to assess cycle time duration and variation as well as value-added versus non-value-added events or steps in a process.
- When annotated with service flow rates, they can be used to analyze bottlenecks, locate sources of delay and identify waste.
- In cross-functional process maps, handoffs are clear and allow you to evaluate how they could be re-ordered or modified to minimize the total number that are part of a process.

Have you ever wondered how service process productivity differs if a substitute or new employee is on the job? Do some people do things differently



than others? How do services vary after hours or on holidays? Or what happens if a customer does something unexpected during a service call?

Process mapping helps to answer all of these questions and more.

Process mapping defines current practices being used and allows you to look for better alternatives. Great potential exists to make process improvements that will lead to better customer satisfaction, improved service delivery and cost savings.

By implementing quality FM process improvements, you have great potential to develop and/or improve the internal quality culture of facility management and the entire organization, changing quality assumptions from:

- Reactive to proactive.
- Inspection to prevention.
- Trial and error to do it right the first time.
- Firefighting to root cause addressing.
- Meeting specifications to continuous improvement.
- Product-oriented to customer-oriented.
- Supply-side economy to demand-side economy.
- Blame placing to problem solving.
- Quality vs. operations to quality and operations.
- Cost or quality to cost and quality.
- Operations only to marketing, engineering and operations.
- Low in the organizational hierarchy to high in the organizational hierarchy.
- Quality costs more to quality costs less.
- Quality is technical to quality is managerial.
- Schedule first to quality first.



Progress Check Questions

Directions: Read each question and respond in the space provided. Answers and page references follow the questions.

Match each type of process map with its characteristic.

- | | |
|--------------------------------|--|
| 1. _____ As-is process map | a. Eliminates non-value-added steps |
| 2. _____ Should-be process map | b. Shows current process, including excessive handoffs |
| 3. _____ Ideal process map | c. Facilitates out-of-the-box thinking |
4. True or false? A cross-functional process map that minimizes the number of handoffs in a process reduces the potential for an error, an oversight or something being left out.
- () a. True
- () b. False



Progress check answers

1. b (p. 5-121)
2. a (p. 5-121)
3. c (p. 5-122)
4. a (p. 5-123)



Chapter 5: Compliance with Codes, Regulations, Policies and Standards

After completing this chapter, students will be able to:

- Recognize how internal audits and inspections provide assurance that facilities are in compliance with codes, regulations, policies and standards.
 - Develop and implement processes to monitor compliance and corrective action.
-

✦ Topic 1: Internal Audits and Inspections

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 in compliance with 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.

Characteristics of FM audits and inspections

The act of auditing is generally described as methodical examination and review. There are many types of audits in facility management.

Examples:

A facilities audit examines the existing physical condition and functional performance of buildings and infrastructure, including maintenance 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 emergency evacuation audit rigorously examines policies and procedures for evacuating facilities promptly and safely against codes.

A service delivery audit looks at the relationship between FM and customers.

An energy audit examines a single building or campus and identifies how and where that building or campus is consuming energy and what options exist to reduce energy consumption and save energy costs.



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.

Inspection means checking the characteristics of a product or service. The outcome of an inspection is to accept or reject something on the basis of its conformity to standards and specifications.

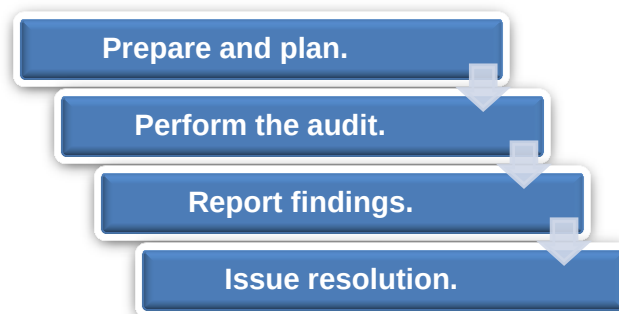
Audits never replace inspections. While it is possible to have a stand-alone audit or a discrete inspection, most FM audits incorporate inspection techniques.

FM audit process and practices

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.

The basic steps in an FM self-audit are shown in Exhibit 5-57. An overview of each step follows the exhibit.

Exhibit 5-57: Fundamental Steps in the Audit Process



Within each of the four steps there are specific activities and tasks.

Step 1: Prepare and plan.

- Define the audit purpose and scope, including goals and objectives and schedule.
- Notify the location and affected stakeholders; brief any concerned persons (customers and others).
- Identify the specific items or documents that are to be audited.



- Identify the specific processes to be audited.
- Identify the measures against which the items/documents/processes are to be assessed and how the measures will be applied.
- Develop inspection forms.
- Assemble the audit team.
- Develop an audit plan, including the planning of inspections.

Step 2: Perform the audit.

- Conduct inspections.
- Record information.

Step 3: Report findings.

- Evaluate inspection results.
- Document findings.
- Prepare a report.
- Brief responsible and concerned parties.
- Submit the report to involved parties.

Step 4: Issue resolution.

- Document and communicate deficiencies and areas of noncompliance.
- Evaluate actions to correct deficiencies in a timely manner.
- Take action and verify corrective action.
- Follow up with employees and customers.
- Close out the audit process.

Did You Know?

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 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 an FM audit

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's and board of directors' business requirements are satisfied.

Cautions in an FM audit

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.

- **An audit should not be conducted for the sole purpose of finding irregularities and faults.** Fear and resentment can surface if employees perceive the audit process as a means for FM management to monitor what is going on. During an audit, evidence may uncover deficiencies and the need for improvement, but the audit should establish whether processes are effective.
- **An audit should not be used as an inspection.** As noted previously, an audit should not replace inspection and be used to accept or reject a product.
- **An auditor needs to practice effective communication.** Even though the audit process is about gathering facts, there is a significant communication component. An auditor needs to establish rapport with people he or she comes in contact with and practice active listening during the audit process. Data alone often cannot tell the entire story.
- **The purpose and scope of an audit must be clearly defined.** If purpose and scope are inadequately defined, the audit results may be worthless.

It has been said that an audit compares reality with requirements. As a result of an audit, a facility manager learns whether facilities are in compliance with codes, regulations, policies and standards. The audit process can be an arduous one for facility management, but with proper planning, implementation and follow-through, the benefits can go a long way.



Progress Check Questions

Directions: Read each question and respond in the space provided. Answers and page references follow the questions.

1. Name two factors that differentiate audits from inspections.

2. During which step of an audit would a representative sample of records be checked for accuracy, completeness and timeliness?

- () a. Prepare and plan.
() b. Perform the audit.
() c. Report findings.
() d. Issue resolution.

3. True or false? Using audit results in employee performance appraisals is likely to create resentment.

- () a. True
() b. False



Progress check answers

1. Specific answers will vary. Plausible responses include:
 - An audit is about finding facts and establishing objective evidence.
 - Audits may be performed on a product, service, process or system.
 - Audits never replace inspections.
 - Inspection means checking the characteristics of a product or service.
 - Most FM audits incorporate inspection techniques. (p. 5-127)
2. b (p. 5-128)
3. a (p. 5-130)

Next Steps

You have completed this competency of the IFMA Facility Management Learning System. Next, check your understanding by completing the online competency-specific chapter quizzes and case study to help you identify any concepts that need additional study. Check your understanding another way by selecting the competency-specific eFlashcards, or visit the Resource Center to download printable flashcards.

Once you have completed the chapter quizzes, reviewed the eFlashcards, completed the case study and feel confident that you have mastered the information, you can advance to the next competency.

