ISO/IEC 20000
An Introduction

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ISO/IEC 20000

An Introduction

Van Haren
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Colophon

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, also take part in the work, in liaison with ISO and IEC. In the field of information technology, ISO and IEC have established a joint technical committee, ISO JTC 1.
International Standards are drafted in accordance with the rules given in the ISO Directives, Part 2.
The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

ISO/IEC 20000 is the official name of the standard. In the field, the standard is referred to as '**ISO 20000**'. For practical reasons, the shorter and more practical title for the standard has been used.

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Foreword

By John Stewart, Director of Procurement Policy and Standards in the UK Government's Office of Government Commerce, who was responsible, with the late Pete Skinner, for the ITIL concept. John led the early development of ITIL and once again has lead responsibility for it in OGC.

"The ethos behind the development of ITIL is the recognition that organizations are becoming increasingly dependent on IT in order to satisfy their corporate aims and meet their business needs. This growing dependency leads to a growing requirement for high-quality IT service. Quality means matched to business needs and user requirements as these evolve. This book is one of a series of codes of practice intended to facilitate the quality management of IT services". So ran an extract from the preface to the ITIL version 1 publications, the first of which the UK Government launched 19 years ago.

There are several stories in circulation and on the internet about how ITIL started and why – some of them decidedly weird, wonderful and fictitious. But the truth is that, as project developers, we proposed it because we were concerned that the UK government was becoming increasingly dependent on IT but the way it was managed was down to individual organizations, with no common approach and no real guidance on 'what good looks like'. When our Board agreed to fund initial development work, we looked around for sources of good practice and worked with stakeholders to pull together a coherent approach.

Because the UK government owned ITIL, it could be positioned 'above the market'. On that basis, ITIL had the potential for becoming a de facto standard for IT service management. By encouraging an open, competitive supply market of services and products supporting ITIL, we'd open the concept to organizations outside the UK public sector that would stand to benefit and, at the same time, ITIL itself would benefit from contributions and feedback from an extended base of key stakeholders.

ITIL provides a lingua franca driving a more uniform approach to IT service management. It helps its users to avoid reinventing an approach to IT service management by giving them one that is ready-made but tailorable. It is imbued with the concept of service quality management.

The extent to which quality management featured in our original thinking is demonstrated by two things: first that we published a Quality Management Library, shortly after the first ITIL volumes and secondly by our achievement – possibly the first in UK government – of ISO9001 for our work on ITIL and related developments.

Thanks to the efforts of many organizations and individuals ITIL has become an international success in its own right. I'd like to thank the many organizations which have based their businesses on servicing the ITIL market – and the many user organizations which have embraced ITIL as the basis for their IT service management. Without these organizations, ITIL would not be the success story that it has undoubtedly become. There is of course still a lot of scope for further take-up in many parts of the globe – and if you're one of them, please keep going!

We always thought that take-up of the ITIL concept worldwide would benefit from the existence of a complementary international standard. I commend the sponsors and developers of ISO 20000 for their foresight in conceiving the standard and for their drive in bringing it to fruition. I see ISO 20000 and ITIL moving forward on a shared endeavour to improve IT and the effectiveness of IT support to business and government wherever they are used.

May readers share in the endeavour and benefit from it.

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Acknowledgements

ISO/IEC 20000, the international standard for IT Service Management, attracts serious attention in the field. Many organizations and individuals are looking into the opportunities offered by the standard, and get together to discuss this. This book aims to offer an introductory guide to the standard, for all those involved in a certification project, or preparing for the various exams on ISO/IEC 20000 that have recently hit the market. These exams are expected to become key exams in the field of IT Service Management.

First, we wish to thank Selma Polter. As the intial editor, she designed this book's Table of Contents and spent a lot of energy developing graphical presentations of the requirements and recommendations in the standard, thereby adding great explanatory value to the book. She created the first draft of the manuscript, combining her knowledge of ISO 9000 with the requirements laid down in ISO/IEC 20000.

From the point where an initial draft was composed, Tieneke Verheijen was appointed managing editor, adding an introductory chapter plus additional best practice guidance on the various processes introduced in the standard.

Managing editor Jan van Bon was responsible for the over-all project, making sure this book would respond to the market's needs. He also participated in fine-tuning the book's final contents, especially its graphics.

We owe special thanks to Mr. Leo van Selm, who kindly offered to co-author and align this book's contents with ISO/IEC 20000 exam requirements. He also wrote the additional chapter on exam preparation and the sections on individual and organizational certification.

The final manuscript was reviewed by 30 reviewers, who all pursued a review with great dedication and enthusiasm for the subject. We wish to thank Mrs. Renate Eberle in particular. As the chair of the EXIN/TÜV Committee that developed one of the first ISO/IEC 20000 exams in the market, she kindly supported the involvement of members of this Committee in the review:
• Michael Brenner - Leibniz Supercomputing Centre - Germany
• Marcus Giese - TÜV SÜD Management Service GmbH - Germany

Moreover, as a member of the EXIN development team, which made the actual design for the certification scheme, Mr. Leo van Selm put us in touch with his co-members, whom we also thank for their support and reviews:
• Michael Busch - it SolutionCrew GmbH - Germany
• David Clifford - PRO-ATTIVO - United Kingdom
• Bryan Shoe - Process Catalyst Solutions - USA

We also thank all other expert reviewers, who joined the team via various channels:
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- Paul Wigzel - Parity Training - United Kingdom
- Stuart Wright - PRO-ATTIVO - United Kingdom

Together, they produced circa 700 issues, which were all taken into account by the editors and co-author Leo van Selm, improving the manuscript to align with all the expert opinions on what this book should contain. All reviewers confirmed that the issues were processed to their satisfaction, with a final sign-off.

We hope this book will guide you through ISO/IEC 20000 in a clear and pleasant way, and that it will prepare you adequately for individual examination and organizational certification. Additional practical guidance on the certification can be found in this book's sister publication: "Implementing ISO/IEC 20000 Certification, A Roadmap". All possible opportunities for improvement will be welcomed by the editorial team and taken into account for next editions. Please send your comments to info@vanharen.net.

Jan van Bon
Managing Editor

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Chapter 1
Introduction

Quality in IT Service Management (ITSM) is one of the most important prerequisites for delivering services that are noticed and highly rated by the business. With the publication of the ISO 20000 standard for IT Service Management, the ISO quality management principles have been combined with the industry standard ITSM processes. This combination provides a very practical and usable international standard for quality IT Service Management, and one that is concerned with delivering managed IT services of an acceptable quality to the customers of an IT service provider.

Service quality management plays an increasingly major role in the worldwide domain of IT Service Management. Many standards have emerged over recent years. They require particular focus on quality and service provision, and are all driven by customer and business demands. The ISO 20000 standard specifies a series of minimum requirements that all service providers should meet. It provides an independent baseline from which further service improvements can be made.

With the introduction of ITIL® version 3, the standard becomes even more important. It provides a means by which to navigate the extensive best practice guidance, both in the new version of ITIL® and in other frameworks such as CObiT®.

ISO 20000 is independent of all frameworks; it is 'framework neutral'. No control is either defined or implied, between the standard and frameworks (such as MOF, ITIL® and the HP ITSM Reference Model) or to their supporting qualification schemes. However, there are many defined frameworks, both public and private (in-house best practices), which can help to ensure that capabilities are being recognized. Adoption of such frameworks may, indeed, result in ISO 20000 certification.

Internal and external service providers are being challenged to prove that their Service Management processes deliver the quality services that customers require. External service providers are already prompted to become certified to the standard as part of invitations to tender.

Although anyone can certify an organization against ISO 20000, the certification scheme managed by itSMF UK adds credibility to a certification. This scheme predicates the award of the ISO 20000 certificate upon audits conducted by Registered Certification Bodies (RCBs) against ISO 20000 Part 1 - 'The Specification'. This specification ensures that a service provider designs, implements and manages an IT Service Management system in line with the requirements of the standard.

Worldwide experience with ISO 20000 and its forerunners (BS 15000, AS 8018 and SANS 15000) shows that certification programmes for IT service providers also generate a demand for training and certification, as an example for auditors, process owners or managers, and consultants.

A more general interest in the subject is also created amongst professionals in IT Service Management, both on the customer's side and on that of the service provider. In the near future, it is likely that a knowledge and understanding (of at least the essentials of ISO 20000) will be a requirement for many IT Service Management positions.

1.1   How to use this study guide

This publication can be used as supporting literature for the ISO 20000 Foundation exams. It introduces the subjects of quality and the quality standard ISO 9000, and explains ISO 20000's position in IT Service Management. It also introduces the text from the standard, using graphics and best practice guidance.

This book may also be utilized when preparing for the ISO 20000 certification of a company. It explains the ISO 20000 requirements, and shows how best practices can be used to achieve these requirements.

Readers who are not directly involved in a certification may also use this publication as guidance to improve the quality of the services they deliver.

Chapter 2 introduces the principles of service quality management, discussing Total Quality Management and the concepts of quality, services and IT Service Management, processes and continual improvement.

Chapter 3 positions the ISO 20000 standard within the field of IT Service Management. This chapter also explains the concept of certification practices.

Subsequently, all parts of the ISO 20000 standard are introduced, with both requirements, as well as best practices. Where possible, graphical representations aim to clarify which parts are required by the specification of the standards ('shalls'), and which parts are best practice guidance from the code of practice ('shoulds').

Chapter 5 focuses on the ISO 20000 Foundations exam, its requirements and how to prepare for it. Currently, itSMF UK, ISEB and EXIN/TÜV SÜD are developing exams to enable individuals to become proficient in the practices of ISO 20000, including consulting and auditing around

the standard. At the time of writing, information was only available on the EXIN/TÜV SÜD certification scheme. Therefore, most information in this book has been based on their material, including the set of sample questions that are provided. However, this publication covers all of the information that any new ISO 20000 student should know, and therefore it can be used as preparation for any ISO 20000 exam at foundation level.

Chapter 2
The principles of service quality management

Business increasingly depends on technology-enabled services. Business success, as well as IT success, depends more than ever on how well it can deliver against the mounting expectations of an increasingly demanding client base. Well-publicized corporate governance scandals and new regulatory pressures, such as the US Sarbanes-Oxley Act, have led businesses to insist that the IT sector adopts a customer-focused, quality-oriented and consistent approach towards the delivery of IT services. To manage quality, we should first agree on a definition of the subject. This is what the following section is about.

2.1 Understanding quality

There are many personal definitions of 'quality' but ISO 9000 (on which ISO 20000 has been based) states:

> We can speak of **quality** when all those features of a product (or service) which are required by the customer are being delivered to the customer.

> **Quality management** then means what the organization does to ensure that its products or services satisfy the customer's quality requirements and comply with any regulations applicable to those products or services.

For the IT service department, quality management entails understanding the business' perspective on quality and value, and ensuring that the service is designed and managed to meet these specifications.

2.1.1 Total Quality Management (TQM)

> **Total Quality Management** (TQM) continually encourages everyone in the organization to fulfill the demands of the internal and external customer, in order to reach a competitive advantage. It is a generic term used to describe a vast collection of philosophies, concepts, methods and tools.

There are several methods for managing IT service quality. All of them have their roots in the first decades of the twentieth century. Since then, with the technological revolution as their main driver, companies have been trying to control the quality of the products they were producing. In the 1980s this became known as Total Quality Management (TQM).

The Plan-Do-Check-Act cycle
William Edwards Deming introduced—to an existing simple diagram of a cycle for quality improvement—the Plan-Do-Check-Act cycle (in short, the PDCA cycle, see Figure 2.1)[1]:
• **Plan** - What should be done, when should it be done, who should be doing it, how should it be done, and by using what?
• **Do** - The planned activities are being implemented.
• **Check** - Determine if the activities provided the expected result.
• **Act** - Adjust the plans to fix any non conformance derived from Check phase.
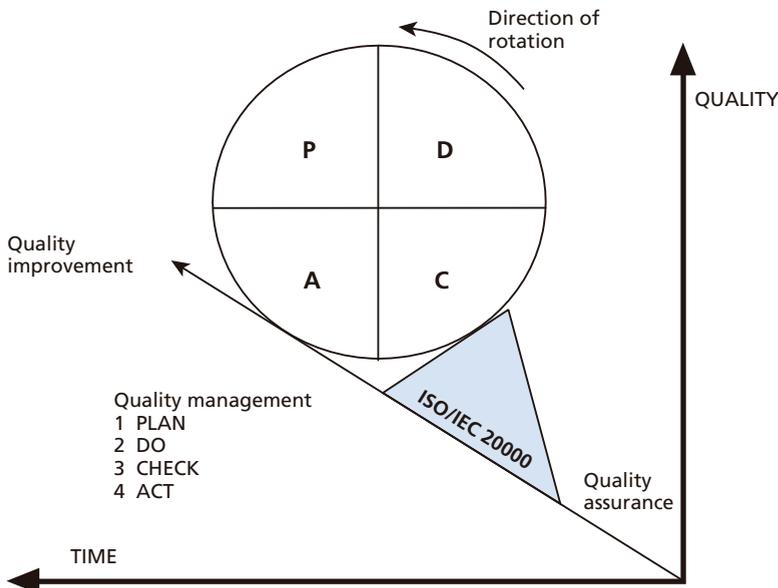
Figure 2.1   The PDCA cycle. Rolling up-hill, the phases P, D, C, A are followed subsequently

Both ISO 9000 and ISO 20000 include this circle in their continual improvement approach. It was Joseph Juran who introduced this 'continual improvement concept'. This important 'founding father' of TQM established customer-focus as another fundamental concept of Total Quality Management. To ensure that both the customer and the supplier know what is expected of the service, a continual dialogue with the customer is essential.

The third concept that Juran introduced was the value of every associate. Employees influence change and can become the greatest asset towards improving quality. Each employee should be

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1 Deming has been inspired by Walter Shewhart, one of his teachers already advocating a 'learning and improvement cycle'.

given a clear and consistent policy on how and to what extent their tasks contribute to realizing the organization's objectives. Then, they can be empowered and accountable for carrying out the tasks assigned to them. This will improve employee satisfaction, as well as productivity and innovation. ISO 20000 education and examination can clarify the employees' roles within an organization.

2.1.2 The growing role of quality in IT Service Management

The fast growing importance of information technology in many industries in the 1980s, resulted in a need for software and IT-dedicated models, methods and tools. For an increasing number of products, the product development lead-time was determined by the lead-time of the software development (such as products in the consumer electronics industry or in the telecommunications industry). For this reason, the efficiency and effectiveness of the software development processes particularly needed to be improved.

At the same time, attention for IT Service Management was growing, and resulted in the IT Infrastructure Library (ITIL®). The quality of IT services thus became an issue.

IT service quality management should ensure that information is reliable and safe. Improving processes in an organization is impossible if there is a lack of complete and accurate information on which to base decisions. The first element of which quality should be ensured is the management information, as it serves and informs all of the other products and processes.

As TQM is an amalgam of various quality management systems, there is no such thing as 'official TQM certification'. Besides quality awards, such as the Malcolm Baldrige National Quality Award and the European Foundation for Quality Management awards, ISO 9001:2000 certification indicates that an organization is working according to TQM principles. Companies certified in ISO 20000 can be expected to have been audited against international best practices in ITSM.

2.1.3 Quality management principles (components)

To lead and operate an organization successfully, it is necessary to direct and control it in a systematic and transparent manner. Success can be achieved by a management system that continually improves performance and addresses the needs of all interested parties. Managing an organization encompasses quality management amongst the other management disciplines.

The ISO 20000 IT Service Management standard bears the features of ISO 9000, the international standard for quality management. It includes all of the eight quality management principles of ISO 9000 (see Figure 2.2):
• customer focus
• leadership
• involvement of people
• process approach
• continual improvement
• factual approach to decision-making
• mutually beneficial supplier relationships
• system approach to management
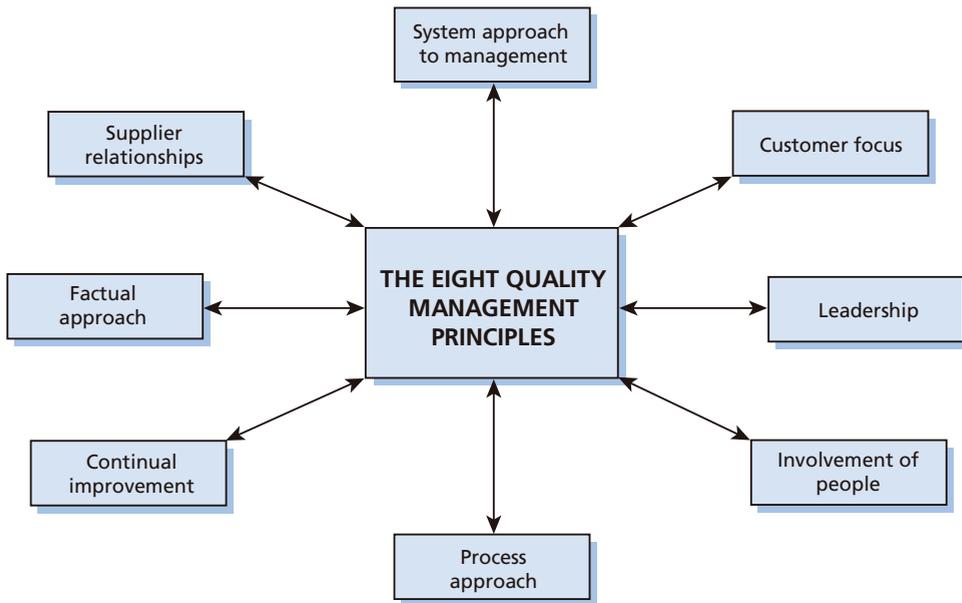
Figure 2.2   The eight quality management principles of ISO 9000

These principles can be regarded as the components of quality. They can be used by top management in order to lead their organization towards improved performance. The following sections discuss each component in more detail.

Customer focus

Organizations depend on their customers. Therefore, they should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations.

Key benefits of customer focus are:
- increased revenue and market share, obtained through flexible and fast responses to market opportunities
- increased effectiveness in the use of the organization's resources, to enhance customer satisfaction
- repeat business, originating from improved customer loyalty

Applying the principle of customer focus typically leads to:
- being able to develop corporate strategy based on identifying customer's future needs
- researching and understanding customer needs and expectations
- linking the objectives of the organization to customer needs and expectations
- communicating customer needs and expectations throughout the organization
- measuring customer satisfaction and acting on the results
- systematically managing customer relationships
- ensuring a balanced approach between satisfying customers and other interested parties (such as owners, employees, suppliers, financiers, local communities and society as a whole)

There may be a difference between the customer and the user of a service. The person paying for it is always the customer; this is not always the person using the service, who is defined the user. In the end, the customer's requirements are paramount. However, the customer is likely to take the user's experiences into account when assessing the services that are being delivered.

Leadership

Leaders establish unity of purpose and direction of the organization. They should create and maintain an internal environment in which people can become fully involved in achieving the organization's objectives.

Key benefits of leadership are:
- people will understand and be motivated towards the organization's goals and objectives
- activities are evaluated, aligned and implemented in a unified way
- miscommunication between levels of an organization will be minimized

Applying the principle of leadership typically leads to:
- considering the needs of all interested parties, including customers, owners, employees, suppliers, financiers, local communities and society as a whole
- establishing a clear vision of the organization's future
- setting challenging goals and targets
- creating and sustaining shared values, fairness and ethical role models, at all levels of the organization
- establishing trust and eliminating fear
- providing people with the required resources, training and freedom, to act with responsibility and accountability
- inspiring, encouraging and recognizing people's contributions

Involvement of people

People at all levels are the essence of an organization. Their full involvement enables their abilities to be used for the organization's benefit.

Key benefits of involvement of people are:
- motivated, committed and involved people within the organization
- innovation and creativity in furthering the organization's objectives
- people being accountable for their own performance
- people being eager to participate in and contribute to continual improvement

Applying the principle of involvement of people typically leads to:
- people understanding the importance of their contribution and role in the organization
- people identifying constraints to their performance
- people accepting ownership of problems and their responsibility for solving them
- people evaluating their performance against their personal goals and objectives
- people actively seeking opportunities to enhance their competence, knowledge and experience
- people freely sharing knowledge and experience
- people openly discussing problems and issues

- reduction of conflicts within the company
- improved customer perception of the organization

Process approach

When activities and related resources are being managed as a process, a desired result can be achieved more efficiently. Also refer to Section 2.4.

A process is a structured set of activities designed to accomplish a defined objective (see Section 2.4 for details). A process has inputs and outputs. Organizations that wish to function effectively have to identify and manage numerous interrelated and interacting processes. Often, the output from one process will directly form the input into the next process. The systematic identification and management of the processes employed within an organization, and particularly the interactions between such processes, is referred to as the 'process approach'.

Key benefits of the process approach are:
- lower costs and shorter cycle times, through effective use of resources
- improved, consistent and predictable results
- focused and prioritized improvement opportunities
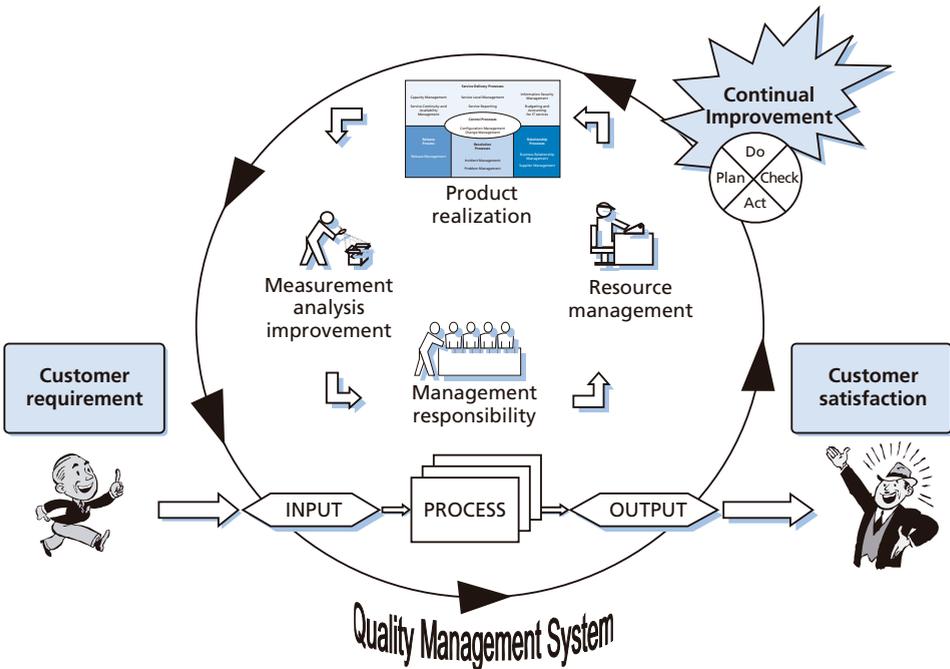

Figure 2.3   Model of a process-based quality management system (Tricker, 2006).

Figure 2.3 illustrates the process-based quality management system that ISO 9000 describes. Though it does not show processes at a detailed level, it does show that interested parties play a significant role in providing inputs to the organization. In order to monitor the satisfaction of

interested parties, information is needed on their perception, as well as on the extent to which their needs and expectations have been met.

Applying a process approach typically leads to:
- focusing on expected results from the integrated activities of the process
- systematically defining the activities necessary to obtain a desired result
- establishing clear responsibility and accountability for managing key activities
- analyzing and measuring of the capability of key activities
- identifying the interfaces of key activities within and between the functions of the organization
- focusing on factors such as resources, methods and materials, that will improve key activities of the organization
- evaluating risks, consequences and impacts of activities, on customers, suppliers and other interested parties

Continual improvement

Continually improving a quality management system is necessary in order to increase the organization's performance and the customer's satisfaction. This should be a permanent objective of the organization.

Key benefits of continual improvement are:
- improved performance through improved organizational capabilities
- improved quality of the service provided
- alignment of improvement activities at all levels, to an organization's strategic intent
- flexibility to act quickly on opportunities

Applying the principle of continual improvement typically leads to:
- employing a consistent organization-wide approach to continual improvement of the organization's performance
- providing people with training in the methods and tools of continual improvement
- making continual improvement of products, processes and systems an objective for every individual in the organization
- analyzing and evaluating the existing situation, to identify areas for improvement
- establishing the objectives for improvement
- searching for possible solutions to achieve the objectives
- evaluating these solutions and making a selection
- implementing the selected solution
- establishing measures to track continual improvement
- measuring, verifying, analyzing and evaluating results of the implementation, to determine that the objectives have been met
- formalizing changes
- recognizing and acknowledging improvements
- reducing conflicts with customers, and generating more business in the mid term by proactively improving the relationship and the products provided

Results are reviewed, as necessary, to determine further opportunities for improvement. In this way, improvement is a continual activity. Feedback from customers and other interested parties, audits and review of the quality management system can also be used to identify opportunities for improvement.

Factual approach to decision-making

Effective decisions are based on the analysis of data and information.

Key benefits:
- decisions based upon accurate and complete information
- an increased ability to demonstrate the effectiveness of past decisions through reference to factual records
- increased ability to review, challenge and change opinions and decisions

Applying the principle of factual approach to decision requires:
- ensuring that data and information are sufficiently accurate and reliable
- making data accessible to those who need it
- analyzing data and information using valid methods

This approach typically leads to decisions and actions based on factual analysis, balanced with experience and wisdom.

Mutually beneficial supplier relationships

An organization and its suppliers are interdependent, and a mutually beneficial relationship enhances the ability of both to create value.

Key benefits:
- increased ability to create value for both parties
- flexibility and speed of joint responses to changing market or customer needs and expectations
- optimization of costs and resources

Applying the principles of mutually beneficial supplier relationships typically leads to:
- relationships that balance short-term gains with long-term considerations
- pooling of expertise and resources with partners
- identifying and selecting key suppliers
- clear and open communication
- sharing information and future plans
- joint development and improvement activities
- inspiring, encouraging and recognizing improvements and achievements by suppliers

System approach to management

The system approach aims to identify, understand and manage the relationships between processes, and to manage them as a system. This increases the organization's effectiveness and efficiency in achieving its objectives.

Key benefits of the system approach are:
- integration and alignment of the processes that will best achieve the desired results
- ability to focus effort on the key processes
- providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization

Applying the system approach to management typically leads to:
- structuring a system to achieve the organization's objectives in the most effective and efficient way
- understanding the interdependencies between the processes of the system
- structured approaches that harmonize and integrate processes
- providing a better understanding of the roles and responsibilities necessary for achieving common objectives, and thereby reducing cross-functional barriers
- understanding organizational capabilities and establishing resource constraints prior to action
- targeting and defining how specific activities within a system should operate
- continually improving the system through measurement and evaluation

Please refer to Section 2.1.4 for further information.

2.1.4   Quality management systems

A quality management system is the way in which an organization works, the way in which an organization manages its business. It defines the way an organization manages the quality of its products or services. ISO 9000:2005 describes fundamentals of quality management systems and defines related terms.

As previously stated, meeting customer requirements should be the ultimate goal of every organization dedicated to quality. The quality management system approach encourages organizations to analyze customer requirements, to define the processes that contribute to the achievement of a product which is acceptable to the customer, and to keep these processes under control. It provides the framework for continual improvement, to increase customer satisfaction and the satisfaction of other interested parties. This provides confidence to both the organization and its customers that the products provided consistently fulfill the requirements.

An approach to developing and implementing a quality management system consists of several steps:
- Determine the needs and expectations of customers and other interested parties.
- Establish the quality policy and quality objectives of the organization.
- Determine the processes and responsibilities necessary to attain the quality objectives.
- Determine and provide the resources necessary to attain the quality objectives.
- Establish methods to measure the effectiveness and efficiency of each process.
- Measure the effectiveness and efficiency of each process.
- Determine means of preventing nonconformities and eliminate their causes.
- Establish and apply a process for continual improvement of the quality management system.

Such an approach is also applicable to maintaining and improving an existing quality management system.

Quality *policy* and quality *objectives* provide a directional focus for the organization. Both determine the desired results and assist the organization in applying its resources to achieve these results. The quality policy provides a framework for establishing and reviewing quality objectives. The quality objectives need to be consistent with the quality policy and the commitment to continual improvement, and their achievement needs to be measurable. The achievement of quality objectives can have a positive impact on product quality, operational effectiveness and financial performance, and thus on the satisfaction and confidence of interested parties.

2.2   Understanding service

2.2.1   What is an IT service?

Traditionally, IT was seen to deliver products: hardware, systems, software, PCs, etc. However, the dependency of business upon IT has made it clear that this no longer is the case. Although IT uses products in the delivery of IT services, it is now considered to be a typical services domain. So what is the difference between a product and a service? This can be expressed in terms of the following characteristics:

- **Services are highly intangible** - A *service* is not physical, it cannot be touched or weighed. It consists of tangible components such as the hardware that is used to deliver the service, the network and the disk that carries the software. But services are much more than just the combination of tangible *products*.
- **Services are produced and consumed at the same time** - The *service* is consumed at the very moment it is produced. And services cannot be stored. This is why, in Service Management, proactive quality assurance is much more important than any check on delivered quality afterwards.
- **Services are very variable** - *Services* are delivered by machines, but also by people. And people are not machines: they show variability. For example, a helpdesk employee who has had a bad night may be quite unfriendly in the first hour of his shift, but, after a cup of coffee, his mood may be much improved - as will the service. *Products* tend to be more machine-related and their variation can be handled more easily.
- **The user takes part in the production of the service** - Often, a *service* cannot be consumed without some specific actions by the user. This way, the user (and thus the customer) has an influence on the quality of the service. A *product* is normally produced in a one-sided action by an external provider.
- **Satisfaction is subjective** - *Services* consumption is influenced by the consumer, in this case, by the IT user. And services can only be measured after they have been delivered, not before. *Products* can be assessed, tested and evaluated before buying them; services can only be judged after delivery.

Many of the differences between services and products are determined by the percentage of tangible goods in the service (Figure 2.4). Intangible characteristics tend to be more difficult to measure than tangible goods, due to subjectivity. The less number of goods that a service contains, the harder it will be to measure it in an objective way.
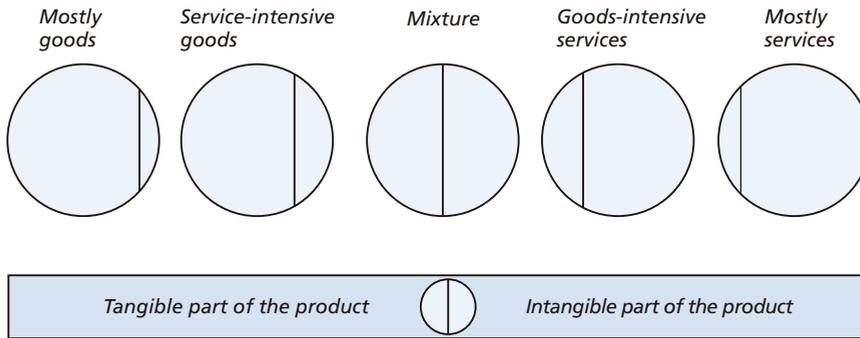
Figure 2.4   Services and products

2.2.2   Components of an IT service

The entity 'service' is a core entity in IT Service Management. According to ITIL® V3:

> A **service** is a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks.

But what is an IT service if you break it down in detail? The IT service is an output of the IT organization (be it internal or external), and not an outcome in the business, where the real value has to be created with the service. In terms of this output of the internal or external IT organization, an IT service can be described as a collection of related elements that together compose the service and provide potential value to customers.

In terms of technical composition, an IT service is a supported information system that is delivered to a customer against agreed quality. This composition mentions three elements:
• information system
• support
• quality specifications

The following paragraphs explain each of these elements.

Information system (IS)
The information system (IS) is a coherent data processing system for the control or support of information for one or more business processes. It breaks down into People, Processes and Technology, and it can be used - with Partners - to manage the final focus area: Information (Figure 2.5).

The people that are part of the IT service are the staff that should be in place to make sure that the IS works according to requirements. They perform all activities across the service lifecycle aimed at providing and maintaining the service to meet the required specifications. Without people, an IS would not last for very long.

The processes are documented in process descriptions. These documents also contain the required procedures, work instructions and manuals. Without well-documented instructions an

organization would soon be left with just the knowledge that is stored in the heads of people, and people tend to move to other jobs or forget about things - and what if they do not agree on a specific issue? Standardization would be a hard quest if we were unable to rely on agreed and well-documented instructions.
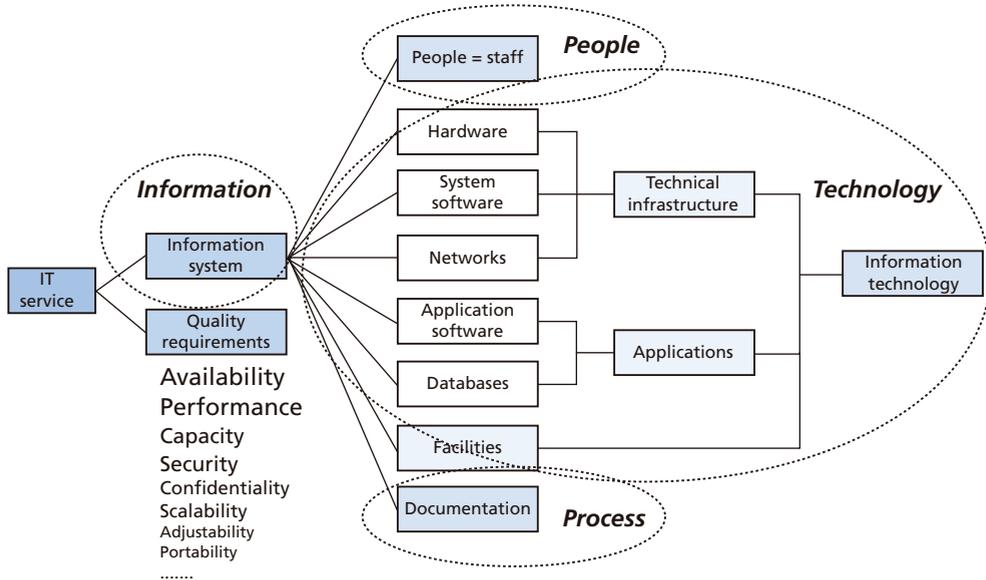
Figure 2.5   Terminology tree illustrating the breakdown and the levels of aggregation of components of an IT service (Source: Compendium ITSM)

The technology domain is most familiar to IT experts. The information technology infrastructure can be broken down into various elements. A most familiar set of elements would be: *applications* run on *systems* in *environments*. In more technical terms this would be read as [*applications*] run on [*technical infrastructure*] using [*facilities*].

Depending on the technology applied, these high-level domains can be further broken down. For example, the technical infrastructure can be broken down into hardware, system software and networks. Another breakdown might provide infrastructure entities such as middleware, firmware, etc. This breakdown may depend upon the view of the manager and the technology applied, as long as all of the components are properly managed.

The breakdown of the applications can vary in the same way: in a two-tier architecture this could be broken down into application software and databases. In a three-tier architecture this could be a presentation layer, a processing layer and a data layer.

The facilities can, for example, be broken down into power, temperature and space.

Support

The second important term in the context of an IT service is 'support'. The information system (IS) will have to be supported to ensure that it performs according to the agreed requirements.

This means that changes should be made if required, and that the system has to be restored if it does not behave according to plan. Support includes the element of 'maintenance'.

The people of the IS team will perform these supporting actions along the lines of the processes. The actions include restoring an IT service if it is disturbed, adjusting an IT service if the customer wants different characteristics, and delivering more or less of an IT service as applicable. If all of this is done well, the IS will support the business processes in the way in which it was intended.

Quality
The IS will be delivered as agreed with the customer. This means that the quality attributes of the IS should be specified and agreed upon. The quality of an IT service is often expressed in practice as the specific characteristics of a service that satisfy the customer's expectations. These characteristics can refer to behavioral aspects such as response time, or more physical characteristics such as 'a laptop'. The specifications of service quality can be chosen relatively freely between customer and provider, but some attributes are more commonly accepted than others:

- Availability of the information system (IS) is the first of the most essential and widespread service quality attributes. It refers to the IS being available for the user at the agreed time and place.
- Capacity is the second core quality attribute on most lists. It indicates the 'amount' of a characteristic (eg the storage capacity of a disk, the processing capacity of a CPU, the restoration capacity of a service Desk, the power to absorb many changes, etc.).
- Performance is the third common quality attribute. It refers to the speed at which the information processing is done, viewed from the user's position. In ISO 20000, performance is addressed in capacity management. The concept of IS performance is totally different from IT performance, application performance, system performance, facilities performance, staff performance or process performance. The performance of a component is not of direct interest to the customer/user: the user experiences the 'consolidated output' of the performances of all IS components.
- Security is also crucial to most organizations, and will be covered in most agreements on IT services.
- Confidentiality, as an element of security, can be of great importance, depending on the nature of the customer's business.
- Scalability can be an issue for a fast-growing organization, and therefore a provider should be able to ensure growth at the required speed, without disturbing the business.
- Adjustability may be of importance to innovative organizations. A provider will have to choose his development methods, his infrastructure architecture and anything else that supports the adjustability of an IS.
- Portability may be of importance to a customer who wants to be able to change providers, whether it is frequently, or in view of dealing with early or planned end of contract.

Service attributes can be dependent upon each other. For example, incident closure time may directly impact on the availability of the IS.

2.2.3   Relationship between IT services and quality
Organizations often depend on their IT services, and expect the IT services not only to support the organization, but also to provide new options to support the changing needs. Providers of IT

services can no longer afford to focus on technology and their internal organization. They now have to consider the quality of the services they provide and focus on the relationship with their customers.

As the previous section describes, a *product* that we buy in a store can be assessed for its quality *before* we buy it. A *service*, however, is provided through the interaction of the provider with his customers and users. As a result, services cannot be assessed in advance, but only when they are provided.

The quality of a service depends on how the service provider, the customer and users interact. In contrast to the manufacturing process, the customer and provider can still make changes when the services are being delivered. How the customer and users perceive the service and what the provider thinks they supply both depend largely on their personal experiences and expectations. This means that the process of providing a service is a combination of production and use, in which the provider and customer (users) participate simultaneously.

The perception of the customer and users is essential in the provision of services. Customers and users will generally use the following questions to assess the quality of the service:
• Does the service meet the expectations agreed upon?
• Can I expect a similar service the next time?
• Is the service being provided at a reasonable cost?

Quality perception
The perception of quality is largely based on expectations, which may be based on the dialogue between provider and customer, or on any other source. These expectations may have more influence on the perceived quality than the actual technical quality of the services delivered by the provider. The perception of service is a crucial issue in the customer-provider relationship. However, quality perception may suffer from various gaps (see Figure 2.6):
• **Gap 1**: the gap between what customers expect and what the provider understands of those expectations; caused by a lack of understanding or a misrepresentation of the customers' needs, wants or desires; communication can be of great value in closing this gap
• **Gap 2**: the gap between what the provider understands of customer expectations and the customer-driven service designs and standards made up by the provider; caused by the inability to translate customer requirements into service specifications
• **Gap 3**: the gap between the service design and standards and the service that is actually provided; caused by the provider's inability to deliver what was agreed
• **Gap 4**: the gap between the services actually delivered and what the customer is told they would receive; caused by miscommunication, perhaps even misleading or deception
• **Gap 5**: the gap between the service that customers perceive of the delivery and the services they expected in the first place; can have many causes; it may be that a customer gets more than they expected to receive, but in most cases this gap draws attention if the service is underperformed and the customer is not satisfied

A continuing dialogue with the customer (including employees) is essential to improve the services and to ensure that both the customer and the supplier know what is expected of the service. To this purpose, common language in terms of agreed concepts is the key. It requires
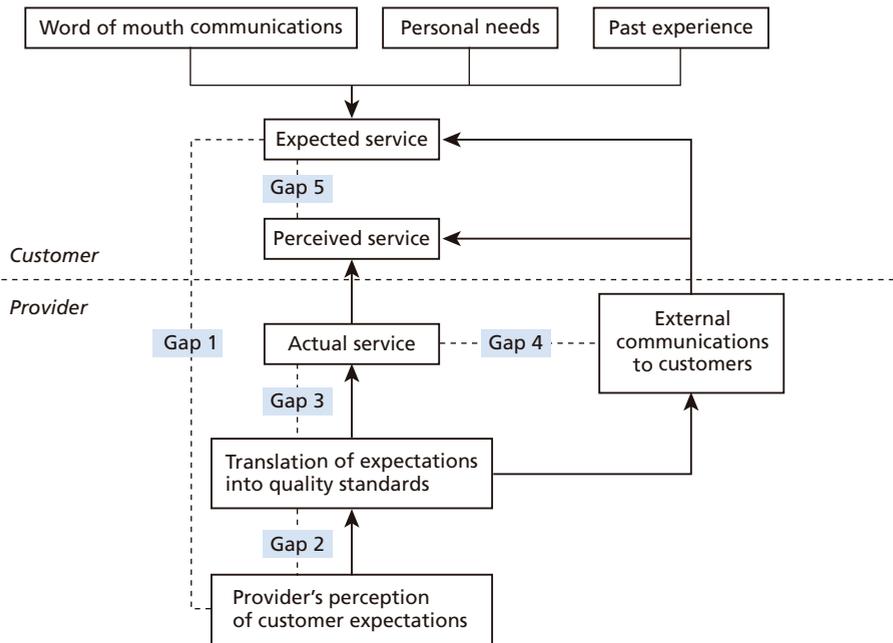
Figure 2.6   Quality perception (Source: the SERVQUAL model by Parasuraman, Zeithaml and Berry)

some effort to be able to match different people's own words to each other, but sharing reference models and best practices (CoBiT®, ITIL®) terminology is of great help

> As an example, in a restaurant, the waiter will first explain the menu, and ask if everything is satisfactory when serving a new course. The waiter actively co-ordinates supply and demand throughout the meal. This experience with customers is then used to improve future customer satisfaction.

The quality of a service refers to the extent to which the service fulfills the requirements and expectations of the customer (including the users). To be able to provide quality, the supplier should continuously assess how the service is being experienced and what the customer expects in the future. What one customer considers normal could be considered as a special requirement by another customer. Also, a customer may become familiar with something as a normal service, which he may have considered special at the start. The results of the continuous service assessment can be used to determine whether the service should be modified, if the customer should be provided with more information, or if the price should be changed.

Reasonable costs may be considered as a derived requirement. Once it has been agreed on what is to be expected of the service, the next step is to agree on the cost. Cost can also be thought of as a quality attribute that needs to be considered in conjunction with other quality attributes, to reach an overall balance on which the customer will be more than happy. At this stage, the service provider has to be aware of the costs they incur, and the current market rates for comparable services.

A customer will be dissatisfied with a service provider who occasionally exceeds the expectations but who disappoints at other times. Providing a constant quality is one of the most important, but also one of the most difficult, aspects of the service industry.

Thus, when providing a service, the overall quality is the result of the quality of a number of component processes which, together, form the service. These component processes form a chain, and the links affect each other and the quality of the service. Effective co-ordination of the component processes requires not only adequate quality when performing each process, but also consistent quality.

2.3   Understanding IT Service Management

2.3.1   The concept of IT Service Management

As organizations increasingly need their IT services to correspond to the objectives of the business, more and more attention is paid to the management of IT services, rather than to the development of IT applications. An information system (sometimes referred to as an IT application) only contributes to realizing corporate objectives if the system is available to users, and if it is supported by maintenance and operational management in the event of fault or necessary modifications.

In the overall lifecycle of IT products, the operations phase represents the majority of expenditure. The operating budget, primarily staff costs and ongoing costs associated with maintaining information systems, represents the largest portion of IT spending - about 70% of overall IT spending in the typical enterprise [Gartner[2]]. The other 30% is spent on product development (or procurement). Thus, effective and efficient IT Service Management systems, processes and strategies, are essential to the success of IT. This applies to any type of organization, large or small, public or private, with centralized or decentralized IT services, with internal or outsourced IT services. In all cases, the service has to be reliable, consistent, of a high quality, and of acceptable cost.

> IT **Service Management** is the management of all processes that co-operate to ensure the quality of live IT services, according to the levels of service agreed with the customer.

IT Service Management addresses the initiation, design, organization, control, provision, support and improvement of IT services, tailored to the needs of the customer organization. There are several sources of practical guidance to IT Service Management. Among them are ISO 20000 and maturity models such as CMMI, but there are many other useful standards, best practices and frameworks available, such as ITIL®, and governance frameworks such as CoBiT®.

2.3.2   Benefits and risks of IT Service Management

The main benefit of ITSM is that it provides the quantitative quality criteria for end-to -end customer-focused services. This is the only basis for mature management of IT infrastructure,

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2 IT Spending: How Do You Stack Up? Gartner Research report, 2003.

represented by IT and non-IT components grouped into services while in operation mode and other service life stages.

The lists below identify some benefits and possible problems of using IT Service Management best practices. They are not intended to be definitive, but consider some of the benefits that can be achieved and some of the mistakes that can be made when using common process-based IT Service Management frameworks.

Benefits to the customer or user:
- the provision of IT services becomes more customer-focused and agreements about service quality improve the relationship
- the services are described better, in customer language, and in more appropriate detail
- the availability, reliability, cost and other quality aspects of the services are managed better
- communication with the IT organization is improved by agreeing on the points of contact

Benefits to the IT organization:
- the IT organization develops a clearer structure, becomes more efficient, and more focused on the corporate objectives
- the IT organization is more in control of the infrastructure and services it has responsibility for, and changes become easier to manage
- an effective process structure provides a framework for the effective outsourcing of elements of the IT services
- following best practices encourages a cultural change towards providing service, and supports the introduction of quality management systems based on the ISO 9000 series or on ISO 20000
- frameworks can provide coherent frames of reference for internal communication and communication with suppliers, and for the standardization and identification of procedures

Considerations and challenges:
- The introduction can take a long time and, if incorrectly designed and planned, require significant effort, and may require a change of culture in the organization; an over-ambitious introduction can lead to frustration because the objectives are never met.
- If process structures become an objective in themselves, the service quality may be adversely affected; in this scenario, unnecessary or over-engineered procedures are seen as bureaucratic obstacles, which are to be avoided where possible.
- If there is a lack of understanding about what the relevant processes should provide, what the appropriate performance indicators are, and how processes can be controlled, IT services will not improve.
- Improvement in the provision of services and cost reductions may be insufficiently visible, if no baseline data was available for comparison or the wrong targets were identified.
- A successful implementation requires the involvement and commitment of personnel at all levels in the organization; leaving the development of the process structures to a specialist department may isolate that department in the organization, and it may set a direction that is not accepted by other departments.
- If there is insufficient investment in appropriate training and support tools, justice will not be done to the processes, and the service will not be improved; additional resources and personnel

may be needed in the short-term if the organization is already overloaded by routine IT Service Management activities which may not be using 'best practices'.

2.3.3   Tools used in IT Service Management

In the performance of tasks in IT Service Management, innumerable automated supported aids can be used: these are referred to as 'tools'. With the help of these tools, management tasks can be automated, such as monitoring tasks or software distribution tasks.

Other tools support the performance of the activities themselves, such as service desk tools or Service Management tools. They support the management of several processes and are therefore often referred to as workflow tools - although they may miss actual workflow engines.

The fact that the IT field is fundamentally focused at automated facilities (for information processing) has led to a great number of tools appearing on the market.

Tools also play a large role in meeting the goal of continual cost reduction. With the help of tools for software distribution and tools for taking over remote computers, remote infrastructure management becomes possible to a greater extent. This results in highly efficient centralized operation centers, where the services can be monitored and delivered with higher quality and lower costs.

On the other hand, Service Management tools significantly help to provide evidence for ISO 20000 qualification. Many of the requirements can actually be proven because records are stored in an adequate Service Management system. In the selection of Service Management tools, ISO 20000 requirements should be considered.

Despite all systems and Service Management tooling 'a fool with a tool is still a fool'. Therefore, the use of tools should be based upon the efficiencies gained from performing according to the Service Management processes. Tooling must always consider the context of people, processes and partners to be able to deliver the required performance. Traditionally, tools and technology have received most of the attention in IT organizations, but equal attention should be paid to each aspect, in order to be successful.

2.4   Understanding processes

2.4.1   Benefits and characteristics of a process-based approach

Benefits

Every organization aims to realize its vision, mission, strategy, objectives and policies, which means that appropriate activities have to be undertaken. To be able to control the series of activities that are performed in the day-to-day operations it is important to manage those activities and their links from the beginning to the end of the service chain.

As an example, a restaurant will have to purchase fresh ingredients, which might change over the seasons. The chefs will have to work together to provide consistent results, and there should be no major differences in style among the waiting staff. A restaurant will only be awarded a three-star rating when it manages to provide the same high quality over an extended period of time. This is not always the case: there will be changes among the waiting staff, a successful approach may not last, and chefs often leave to open their own restaurants. Providing a constant high quality also means that the component activities have to be co-ordinated: the better and more efficiently that the kitchen operates, the higher the quality of service that can be provided to the guests.

Appropriate activities include buying vegetables, bookkeeping, ordering publicity materials, receiving guests, cleaning tables, peeling potatoes and making coffee. With just such an unstructured list, something will be left out and staff may become confused. Therefore, it is a better idea to structure the activities. Preferably these should be arranged in such a way as to allow us to see how each group of activities contributes to the objectives of the business, and how they are related.

The logical combination of activities results in clear transfer points where the quality of processes can be monitored. In the restaurant example, we can separate responsibility for purchasing and cooking, so that the chefs do not have to purchase anything and can concentrate on their core skill activities.

Though most businesses are hierarchically organized, with departments that are responsible for the activities of a group of employees, IT services generally depend on several departments or disciplines. For example, if there is an IT service to provide users with access to an accounting program on a central computer, this will involve several disciplines. The computer centre has to make the program and database accessible, the data and telecommunications department has to make the computer centre accessible and the PC support team has to provide users with an interface to access the application.

Processes that span several departments (teams) can monitor the quality of a service by monitoring particular aspects of quality, such as availability, capacity, cost and stability. A service organization will then try to match these quality aspects with the customer's demands. The structure of such processes can ensure that good information is available about the provision of services, so that the planning and control of services can be improved.

Moreover, the description of the process structure provides a common point of reference which is stable and which can help to maintain the quality of IT services during and after reorganizations. This includes the changing of suppliers and partners. This makes service providers far less sensitive to organizational change, and much more flexible: they can adapt their organization continually to changing conditions, but the core of their processes remain in place. For example, in this way, the shop can stay open during reconstruction work. However, reality may pose some practical problems, making this more difficult in practice than it seems in theory.

IT Service Management covers all of the activities of the IT department. These activities are divided into processes, which, when integrated, provide an effective framework. This framework improves the capability and maturity of IT Service Management. Each of these processes covers

one or more of the tasks of the IT organization, such as service development, infrastructure management and supporting the services. This *process approach* makes it possible to describe the IT Service Management best practices independently from the structure of the organization.

Please refer to Section 2.1.3 for further benefits of the process approach.

Characteristics

> A **process** is a structured set of activities designed to accomplish a defined objective.

When arranging activities into processes, we do not use the existing allocation of tasks, nor the existing departmental divisions. This is a conscious choice. By opting for a process structure, we can often show that certain activities in the organization are unco-ordinated, duplicated, neglected or unnecessary. Instead, we look at the objective of the process and the relationships with other processes. Figure 2.7 illustrates how activities from various organizational elements can be combined in a process (indicated by the dashed lines). Figure 2.8 shows an example of a process.
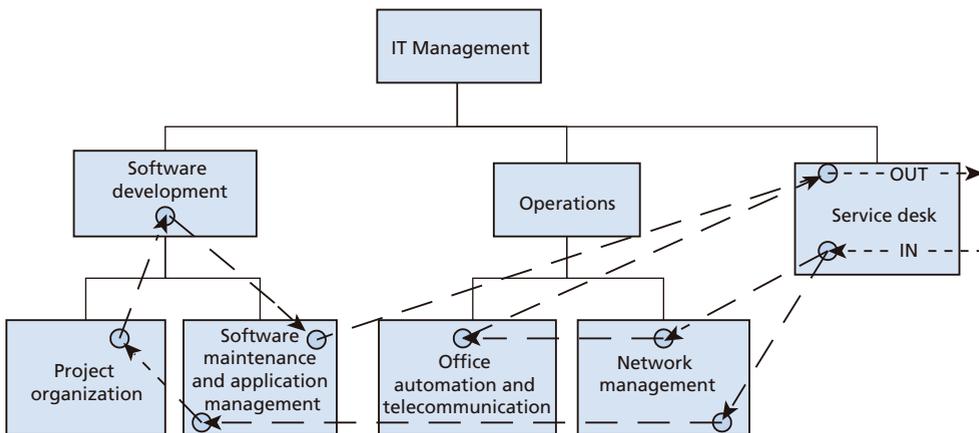
Figure 2.7   Processes and departments (example)

If the process structure of an organization is clearly described, it will show:
• what has to be done
• what are the expected inputs and results
• how we measure whether the processes deliver the expected results
• how the results of one process affect other processes

For the last decade, IT Service Management has been the process and service-focused approach of what was formally known as information technology management. This shift from infrastructure to processes has paved the way for the term IT Service Management as a process and customer-focused discipline.

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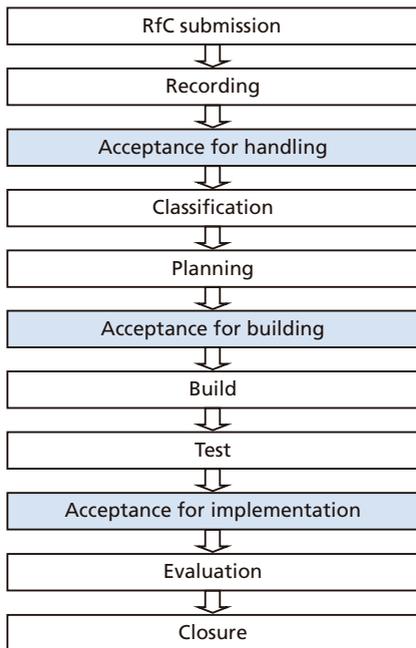
Figure 2.8   Change management: example of a process flow

As processes should always have a defined objective, the aim of IT Service Management processes is to contribute to the quality of the IT services. Quality management and process control are part of the organization and its policies.

2.4.2   Measure and control a process

Processes are composed of two kinds of activities: the activities involved in the realization of goals (operational activities concerned with the throughput) and the activities associated with the management of goals (control activities). The control activities make sure that the operational activities (the workflow) are performed to time and in the right order. For example, in the processing of changes it is always ensured that a test has been performed before (rather than after) a release is taken into production.

Figure 2.9 shows this philosophy, it is also known as the ITOCO model. According to this model, a process is a series of activities carried out to convert *input* into an *output*, and ultimately into an *outcome*:
- **i**nput
- **t**hroughput
- **o**utput
- **c**ontrol
- **o**utcome

The *input* is concerned with the resources being used in the process. The (reported) *output* describes the immediate results of the process, while the *outcome* indicates the long-term results of the process (in terms of meaningful effect). Through *control activities*, we can associate the
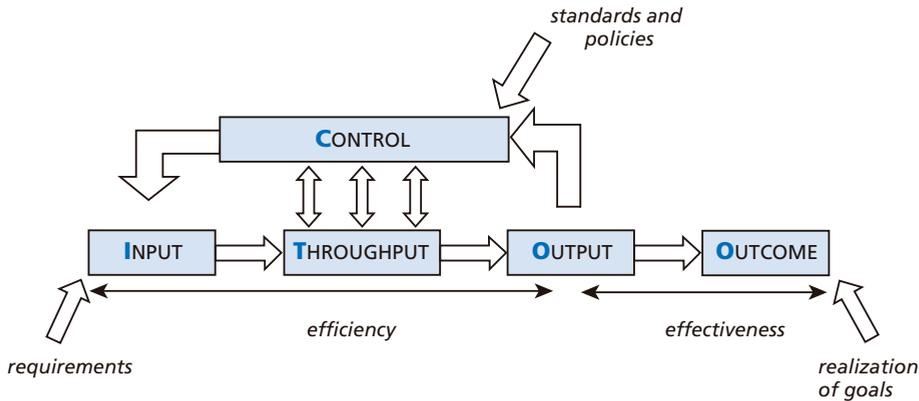
Figure 2.9   Process diagram, based on the ITOCO model

input and output of each of the processes with policies and standards to provide information about the results to be obtained by the process.

Control regulates the input and the *throughput*, in case the throughput or output parameters are not compliant with these standards and policies. This produces chains of processes which show what input goes into the organization and what the result is, as well as monitoring points in the chains, in order to check the quality of the products and services provided by the organization.

The standards for the output of each process have to be defined, such that the complete chain of processes in the process model meets the corporate objective. If the output of a process meets the defined requirements, then the process is *effective* in transforming its input into output. To be really effective, the outcome should be taken into consideration.

If the activities in the process are also carried out with the minimum required effort and cost, then the process is *efficient*. It is the task of process management to use planning and control to ensure that processes are executed in an effective and efficient way.

2.4.3   Roles needed for process management

Roles are sets of responsibilities, activities and authorities granted to a person or team. Each process needs a *process owner*, who is responsible for the process results. The *process manager* is responsible for the realization and structure of the process, and they report to the process owner. The *process operatives* are responsible for defined activities, and these activities are reported to the process manager.

The management of the organization can provide control based on quality assessments of each process. In most cases, the relevant *performance indicators* and standards will already be agreed upon. The day-to-day control of the process can then be left to the process manager. The process owner will assess the results based on a report of performance indicators, and whether they meet the agreed standard. Without clear indicators, it would be difficult for a process owner to determine whether the process is under control, and if planned improvements are being implemented.

One person or team may have multiple roles. For example, the roles of configuration manager and change manager may be carried out by a single individual.

2.5   Understanding continual improvement

As stated in Section 2.1.3, continual improvement is one of the eight quality management principles from ISO 9000. It is necessary to increase performance, and satisfaction of customers and other interested parties. This should be a permanent objective of the organization.

In this manner, continual improvement keeps the wheel of the PDCA cycle turning. Please refer to Figure 2.1 in Section 2.1.1 for an explanation of this cycle.

The following section explains how maturity models work and their relationship with capability assessments.

2.5.1   Maturity models

From the moment *Richard Nolan* introduced his 'staged model' for the application of IT in organizations in 1973, many people have used stepwise improvement models. These models were quickly recognized as suitable instruments for quality improvement programs, thereby helping organizations to climb up the maturity ladder.

Dozens of variations on the theme can easily be found, ranging from trades such as software development, acquisition, systems engineering, software testing, website development, data warehousing and security engineering, to help desks and knowledge management.

After Nolan's staged model in 1973, the most appealing application of this modeling was identified when the Software Engineering Institute (SEI) of Carnegie Mellon University, USA, published its Software Capability Maturity Model (SW-CMM). The CMM was copied and applied in most of the cases mentioned above, making CMM something of a standard in maturity modeling. The CMM was later followed by newer editions, including CMMI (CMM Integration). Another well-known maturity model is the World Class IT Maturity Model.

The CMMI describes the organizational maturity levels as follows:
- **Maturity Level 1: Initial -** Processes are ad hoc and chaotic. The organization does not provide a stable environment to support the processes. Success depends on the competence and heroics of the people in the organization, and not on the use of proven processes. In spite of this chaos, maturity level 1 organizations often produce products and services that work; however, they frequently exceed their budgets and do not meet their schedules.
- **Maturity Level 2: Repeatable (Managed) -** The projects of the organization have ensured that processes are planned and executed in accordance with policy. They employ skilled people who have adequate resources to produce controlled outputs, involve relevant stakeholders, are monitored, controlled and reviewed, and are evaluated for adherence to their process descriptions.
- **Maturity Level 3: Defined -** Processes are well characterized and understood, and are described in standards, procedures, tools and methods. The organization's set of standard processes, which is the basis for maturity level 3, is established and improved over time. These

standard processes are used to establish consistency across the organization. Projects establish their defined processes by tailoring the organization's set of standard processes according to tailoring guidelines.

- **Maturity Level 4: Quantitatively Managed -** The organization and projects establish quantitative objectives for quality and process performance, and use them as criteria in managing processes. Quantitative objectives are based on the needs of the customer, end users, organization and process implementers. Quality and process performance is understood in statistical terms, and is managed throughout the life of the processes.
- **Maturity Level 5: Optimizing -** This level focuses on continually improving process performance through incremental and innovative process and technological improvements. Quantitative process improvement objectives for the organization are established, continually revised to reflect changing business objectives, and used as criteria in managing process improvement. The effects of deployed process improvements are measured and evaluated against the quantitative process improvement objectives. Both the defined processes and the organization's set of standard processes are targets of measurable improvement activities.

Later, these models were applied in quality management models, like the European Foundation for Quality Management (EFQM). Apart from the broad quality management models, there are several other industry-accepted practices, such as Six Sigma and TQM, which are complementary to ITIL®.

The available standards, and frameworks of best practice, offer guidance for organizations in achieving 'operational excellence' in IT Service Management. Depending upon their stage of development, organizations tend to require different kinds of guidance.

As the ISO 9000 and 20000 standards emphasize the definition, description and design of processes, developing and maintaining a quality system which complies with their requirements, they can be considered as a tool to enable the organization to reach and maintain the system to a pre-defined level of maturity.

2.5.2   Capability assessments and their relationship with maturity models

An assessment compares the performance of a process against a performance standard. This can be an agreement in a service level agreement (SLA), a maturity standard, or an average compared to companies in the same industry. In this last case, this is known as a benchmark.

An assessment for ISO 20000 is clearly a capability assessment; it shows whether or not the requirements of ISO 20000 are being met. If all requirements are met, then the organization is capable of delivering services against the quality level that is specified by the standard. A maturity assessment indicates what maturity level is achieved, so one can identify what actions have to be taken to achieve the next maturity level.

Assessments are very well suited to answer the question 'where are we now?', and to determine the extent of the gap with 'where we want to be'. Using an accepted framework will help in benchmarking the maturity. Keep in mind that the desired performance or maturity level of a process depends on the impact that the process has on the customer's business processes.

First, determine the relationship between business processes, IT services, IT systems and components. Then, assess the effectiveness and efficiency results for each component. This helps in identifying areas for improvement.

It is crucial to define clearly what is being assessed. This should be based on the goals and on the expected use of the reports. An assessment can take place on three levels:
- **process only** - only assess process components from the process description
- **people, process and technology** - also assess skills, roles and talents of managers and staff who participate in the process and the process-supporting technology
- **complete** - also assess the ability and level of preparation for process acceptance, and the possibility of formulating and following a process strategy and goals

All of these can be compared to the selected maturity model.

Assessments are useful in the:
- **Planning phase** - as starting point (baseline) for process performance
- **Do phase** - to measure whether the estimates are correct
- **Check phase** - to complete the balance and to identify further possible improvements

Advantages of assessments are:
- they can measure certain parts of a process independently of the rest, and determine the impact of that specific component on the rest of the process
- they can be repeated
- they can be used in benchmarking

Disadvantages of assessments are:
- they only offer a picture of one moment, and do not give insight into the cultural dynamic of an organization
- they can become a goal in themselves instead of a means
- they are labour intensive
- the results are still dependent on subjective assessors and therefore not entirely objective, even if the measurements are
- interviewers and interviewees may sometimes fail to understand what the questions mean, and this might lead to inaccurate results and miscommunication

We will now discuss how quality management systems can be evaluated.

Evaluating processes within the quality management system
When evaluating quality management systems, there are four basic questions to be asked in relation to every process being evaluated:
- Is the process identified and appropriately defined?
- Are responsibilities assigned?
- Are the procedures being implemented and maintained?
- Is the process effective in achieving the required results?

The collective answers to the above questions will determine the result of the evaluation. Evaluation of a quality management system can vary in scope, and encompass a range of activities, such as auditing and reviewing the quality management system, and self-assessments.

Auditing the quality management system

Audits are used to determine the extent to which the quality management system requirements are fulfilled.

Audit findings are used to assess the effectiveness of the quality management system and to identify opportunities for improvement.

First-party audits are conducted by, or on behalf of, the organization itself for internal purposes and can form the basis for an organization's self-declaration of conformity.

Second-party audits are conducted by customers of the organization or by other persons on behalf of the customer.

Third-party audits are conducted by external independent organizations. Such organizations, usually accredited, provide certification or registration of conformity, with requirements such as those of ISO 9001. ISO 19011 provides guidance on auditing.

Reviewing the quality management system

Top management should systematically evaluate the suitability, adequacy, effectiveness and efficiency of the quality management system with respect to the quality policy and quality objectives. This can include consideration of the need to adapt the quality policy and objectives, in response to changing needs and expectations of interested parties. The review includes determination of the need for actions.

Amongst other sources of information, audit reports are used for review of the quality management system.

Self-assessment

An organization's self-assessment is a comprehensive and systematic review of the organization's activities and results, referenced against the quality management system or a model of excellence.

Self-assessment can provide an overall view of the performance of the organization and the degree of maturity of the quality management system. It can also help to identify areas requiring improvement in the organization, and to determine priorities.

The itSMF benchmark

Benchmark projects, such as the project currently being developed by itSMF Netherlands, combine all of the above. The process-model part is a design based on the ISO 20000 norm, expanded with operations management. Each comprehensive process questionnaire combines the specific items of 20000-1 and 20000-2 with CMMI Maturity questions. This results in detailed lists of activities for performance improvement, and eases the steps towards certification. An external consultant needs to assist and validate the results, as without it, organizations typically score 25% more positive than in reality. Also, a trustworthy database is required. Knowing where you are when compared to the standard and CMM, combined with the results of what other organizations do in each area, offers a great insight and makes it easier to set meaningful and achievable targets.