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**Information technology — Systems
and software Quality Requirements
and Evaluation (SQuaRE) — Service
quality models**

*Technologies de l'information — Exigences de qualité et évaluation
des systèmes et du logiciel (SQuaRE) — Modèle de qualité du service*



Reference number
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Foreword

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, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

A list of all parts in the ISO/IEC 25000 series is available on the ISO website.

This corrected version of ISO/IEC TS 25011:2017 incorporates the following corrections:

- headers have been corrected and now read “ISO/IEC TS” instead of “ISO/TS”.

Introduction

Information technology (IT) services are increasingly used to perform a wide variety of business and personal functions. IT service quality reflects how well an IT service conforms to its given design or how it compares to competitors in the marketplace.

Specification and evaluation of the quality of an IT service is critical for the IT services to meet the stakeholders' goals and objectives and this can be achieved by comprehensively defining the quality characteristics associated with the stakeholders' goals and objectives for the IT services.

An IT service is provided by an IT service provider using components like people, processes, technology, facilities and information, and can be orchestrated using an IT service provision system; these components interact with each other to support the service as a whole. Existing software and data quality models are not suitable to measure quality of IT service. IT service quality should be defined and measured by using an IT service quality model and quality measures that take account of these five components interacting.

This document provides quality models to support the specification and evaluation of the quality of IT services that makes use of IT systems as tools to provide value to an individual user or a business by facilitating results the user or business wants to achieve.

The quality models in this document include both objective measures of service quality and measures of the users' perceptions of quality. That is, the IT service quality is using objective measurement as far as possible to qualify the service characteristics, and other methods (such as assessment) can be used to collect objective evidence and qualify intangible features or characteristics of the IT service.

This document is a part of the Quality Model Division (ISO/IEC 2501n) of the SQuaRE series. The IT service quality models defined in this document are intended to be used in conjunction with the other SQuaRE series International Standards, which are represented in [Figure 1](#) (adapted from ISO/IEC 25000).

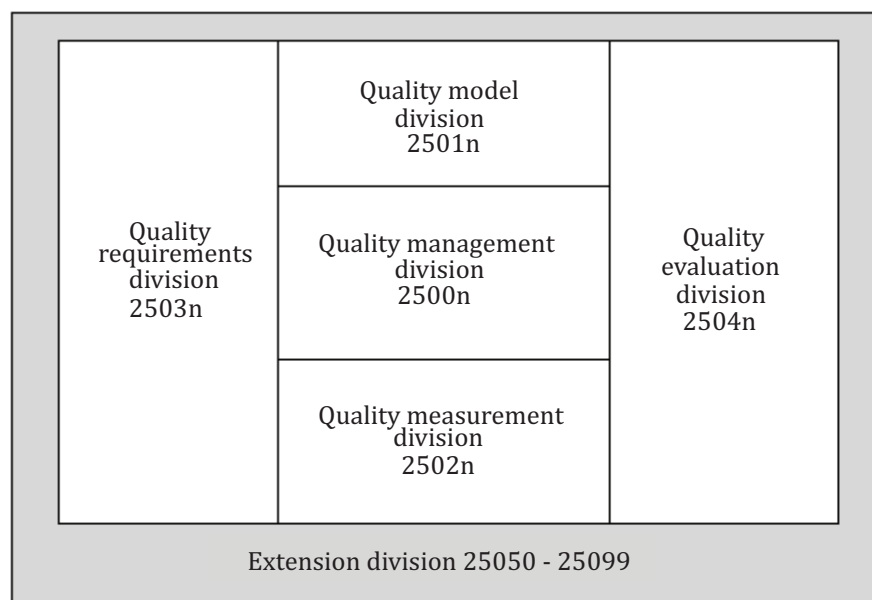


Figure 1 — Organization of SQuaRE series of International Standards

The divisions within the SQuaRE series are as follows.

- **ISO/IEC 2500n — Quality Management Division.** The International Standards that form this division define all common models, terms and definitions further referred to by all other

International Standards from the SQuaRE series. The division also provides requirements and guidance for a supporting function that is responsible for a supporting function which is responsible for the management of the requirements, specifications and evaluations of software products and service quality.

- **ISO/IEC 2501n — Quality Model Division.** The International Standards or Technical Specifications that form this division present detailed quality models for software, data and service. Furthermore, in the software and IT service quality model, the internal and external quality characteristics are decomposed into sub-characteristics. Practical guidance on the use of the quality models is also provided.
- **ISO/IEC 2502n — Quality Measurement Division.** The International Standards that form this division include a software product and service quality measurement reference model, mathematical definitions of quality measures, and practical guidance for their application. Presented measures apply to internal software quality, external software quality, data quality, service quality and quality in use. Quality Measure Elements forming foundations for the latter measures are defined and presented.
- **ISO/IEC 2503n — Quality Requirements Division.** The International Standard that forms this division helps to specify quality requirements. These quality requirements can be used in the process of quality requirements elicitation for a software product to be developed or as input for an evaluation process and also used in the process of quality requirements elicitation for a service to be provided. The requirements definition process is mapped to technical processes defined in ISO/IEC 15288.
- **ISO/IEC 2504n — Quality Evaluation Division.** The International Standards that form this division provide requirements, recommendations and guidelines for software product and service evaluation, whether performed by evaluators, acquirers/customers or developers/providers. The support for documenting a measure as an Evaluation Module is also presented.
- **ISO/IEC 25050 to ISO/IEC 25099** are reserved for SQuaRE extension International Standards, Technical Specifications, Publicly Available Specifications (PAS) and/or Technical Reports.

Information technology — Systems and software Quality Requirements and Evaluation (SQuaRE) — Service quality models

1 Scope

This document is applicable to IT services that support the needs of an individual user or a business. IT services can be delivered personally or remotely by people, or by an IT application that could be in a local or remote location (see [Annex A](#)).

These include two types of IT services:

- a) services completely automated provided by an IT system;
- b) services provided by a human using an IT system.

This document describes the use of two quality models for IT services.

- a) This document defines an IT service quality model composed of eight characteristics (which are further subdivided into sub-characteristics) that relate to properties of the IT service made up from a combination of elements including people, processes, technology, facilities and information.
- b) This document describes how the quality in use model in ISO/IEC 25010 which is composed of five characteristics (some of them are further subdivided into sub-characteristics) can be applied to the outcome when an IT service is used in a particular context of use. This model is applicable to the complete service provision system composed of people, processes, technology, facilities and information.

The characteristics and sub-characteristics provide consistent terminologies and check lists for specifying, measuring and evaluating IT service quality.

The use of the IT service quality models can help:

- IT service providers to identify service quality requirements, and evaluate and improve the quality of the service provided;
- customers to specify their requirements for the quality of service, define the acceptance criteria for service, and evaluate the quality of an IT service; and
- a third party to evaluate the quality of an IT service.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 25010, *Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality models*

ISO/IEC 25012, *Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Data quality model*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 25010, ISO/IEC 25012 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Quality in use model

The characteristics and their related sub-characteristics are listed in [Table 1](#).

Table 1 — Quality in use characteristics and subcharacteristics

Effectiveness	Freedom from risk
Efficiency	Economic risk mitigation
Satisfaction	Health and safety risk mitigation
Usefulness	Environmental risk mitigation
Trust	Context coverage
Pleasure	Context completeness
Comfort	Flexibility

These quality in use characteristics and sub-characteristics are defined in ISO/IEC 25010 and the specific definitions are provided in [Annex D](#).

When this model is applied to an IT service:

- a) context completeness includes SLA coverage: the degree to which an IT service can be used with effectiveness, efficiency, freedom from risk and satisfaction in the context specified by the SLA;
- b) health and safety risk mitigation includes mitigation of risks to security, confidentiality and privacy.

3.2 IT service quality model

The characteristics and their related sub-characteristics are listed in [Table 2](#).

Table 2 — IT service quality characteristics and subcharacteristics

Suitability	IT service reliability
Completeness	Continuity
Correctness	IT service recoverability
Appropriateness	Availability
Consistency	Tangibility
Usability	Visibility
Appropriateness recognizability	Professionalism
Learnability	IT service interface appearance
Operability	Responsiveness
User error protection	Timeliness
Accessibility	Reactiveness
Courtesy	IT service adaptability
Security	Customizability

Table 2 (continued)

Confidentiality	Initiative
Integrity	IT service maintainability
Traceability	Analysability
	Modifiability
	Testability

3.2.1**suitability**

degree to which an *IT service* (3.3.2) meets stated and implied needs when used in a specified context of use

[SOURCE: ISO/IEC 25010:2011, 4.2.1, modified — “a product or system” has been replaced by “an IT service” and “provides functions” has been deleted.]

3.2.1.1**completeness**

degree to which an *IT service* (3.3.2) supports all the specified goals, objectives and data specified by the *user* (3.3.4)

3.2.1.2**correctness**

degree to which an *IT service* (3.3.2) uses the correct process and produces the correct results with accurate data

3.2.1.3**appropriateness**

degree to which an *IT service* (3.3.2) provides results that are appropriate for the *user* (3.3.4) needs

3.2.1.4**consistency**

degree to which repeated or similar related *IT services* (3.3.2) provided consistent quality

3.2.2**usability**

degree to which an *IT service* (3.3.2) can be used by specified *users* (3.3.4) to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

[SOURCE: ISO/IEC 25010:2011, 4.2.4, modified — “a product or system” has been replaced by “an IT service”.]

3.2.2.1**appropriateness recognizability**

degree to which *users* (3.3.4) can recognize whether an *IT service* (3.3.2) is appropriate for their needs

Note 1 to entry: Appropriateness recognizability will depend on the ability to recognize the *appropriateness* (3.2.1.3) of the service from initial impressions of these services and/or any associated documentation.

Note 2 to entry: The details of the service could be explained to potential means such as documentation, presentation or promotional materials.

[SOURCE: ISO/IEC 25010:2011, 4.2.4.1, modified — “a product or system” has been replaced by “an IT service”.]

3.2.2.2**learnability**

degree to which an *IT service* (3.3.2) can be learned by *users* (3.3.4) to achieve a specified level of effectiveness, efficiency, freedom from risk and satisfaction within a specified amount of time and context of use

3.2.2.3

operability

degree to which an *IT service* (3.3.2) has attributes that make it easy to operate and control

[SOURCE: ISO/IEC 25010:2011, 4.2.4.2, modified — “a product or system” has been replaced by “an IT service”.]

3.2.2.4

user error protection

degree to which an *IT service* (3.3.2) protects *users* (3.3.4) against making errors

3.2.2.5

accessibility

degree to which an *IT service* (3.3.2) can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

Note 1 to entry: The range of capabilities includes disabilities such as those associated with age, sight, hearing and physical mobility.

Note 2 to entry: Accessibility for people with disabilities can be specified or measured either as the extent to which an IT service can be used by *users* (3.3.4) with specified disabilities to achieve specified goals with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use, or by the presence of product properties that support accessibility.

[SOURCE: ISO/IEC 25010:2011, 4.2.4.6, modified — “a product or system” has been replaced by “an IT service”.]

3.2.2.6

courtesy

degree to which the *IT service* (3.3.2) is provided in a polite, respectful and friendly way

3.2.3

security

degree to which an *IT service* (3.3.2) protects both *user's* (3.3.4) assets and access to their information so that users have the degree of information access appropriate to their levels of authorization

3.2.3.1

confidentiality

degree to which an *IT service* (3.3.2) ensures that data are accessible only to those authorized to have access

[SOURCE: ISO/IEC 25010:2011, 4.2.6.1, modified — “a product or system” has been replaced by “an IT service”.]

3.2.3.2

integrity

degree to which an *IT service* (3.3.2) prevents unauthorized access to or modification of data whether accidentally or intentionally

[SOURCE: ISO/IEC 25010:2011, 4.2.6.2, modified — “a system, product or component” has been replaced by “IT service” and “whether accidentally or intentionally” has been added.]

3.2.3.3

traceability

degree to which the *IT service* (3.3.2) outcomes can be traced to or from the *user* (3.3.4) needs

EXAMPLE 1 The *customer* (3.3.3) of the online-order room wants to know the progress about the reservation. In this situation, it expresses “from the customer's needs”.

EXAMPLE 2 The hotel wants to know the progress of payment about the reservation of the customer. In this situation, it expresses “to the customer's needs”.

3.2.4**IT service reliability**

degree to which an *IT service* (3.3.2) provides consistent and stable IT service outcomes

3.2.4.1**continuity**

degree to which the *IT service* (3.3.2) is provided under all foreseeable circumstances, including mitigating the risks resulting from interruption to an acceptable level

3.2.4.2**IT service recoverability**

degree to which, in the event of an interruption or a failure or disaster, the original *IT service* (3.3.2) and its functions and data can be re-established and made accessible

3.2.4.3**availability**

degree to which an *IT service* (3.3.2) is available to *users* (3.3.4) when needed

3.2.5**tangibility**

degree to which the tangible aspects of the *IT service* (3.3.2) effectively communicate and support the service

Note 1 to entry: Tangibility aspects typically include website and explanatory material, personnel image, service facilities, service processes, service tools and service deliverables, etc.

3.2.5.1**visibility**

degree to which *users* (3.3.4) have insight into the capabilities of the *IT service* (3.3.2), how they will be delivered, and progress toward their completion during delivery

3.2.5.2**professionalism**

degree to which the content of the *IT service* (3.3.2) is based on appropriate education, skill, expertise and qualification

Note 1 to entry: Professionalism can be communicated to the potential users as part of *tangibility* (3.2.5) but is also a prerequisite for *suitability* (3.2.1).

3.2.5.3**IT service interface appearance**

degree to which the interface of the service has an appearance or other physical properties that are pleasing and satisfying for the *user* (3.3.4)

3.2.6**responsiveness**

degree to which an *IT service* (3.3.2) responds and provides outcomes in a prompt and timely way

3.2.6.1**timeliness**

degree to which an *IT service* (3.3.2) delivers outcomes within time limits

Note 1 to entry: In some cases, service timeliness is affected by a combination of multiple services provided by different *service providers* (3.3.7). For example, online shopping service is expected to provide not only timely retrieval of newly added products on sale, but also timely delivery to the *user* (3.3.4) by the parcel-delivery service provider.

3.2.6.2

reactiveness

degree to which the *IT service* (3.3.2) promptly responds to *user* (3.3.4) requests

Note 1 to entry: The extent to provide emergency services is also addressed in this quality sub-characteristic. For example, an emergency rescue request from a patient is expected to be immediately accepted and appropriately treated through a medical IT service in a hospital.

3.2.7

IT service adaptability

degree to which an *IT service* (3.3.2) can configure itself or be modified to meet new needs

3.2.7.1

customizability

degree to which the *IT service* (3.3.2) can be customized at the request of *users* (3.3.4)

3.2.7.2

initiative

degree to which the *IT service* (3.3.2) recognizes *users'* (3.3.4) goals and service suggests changes to meet users' needs

3.2.8

IT service maintainability

degree of effectiveness and efficiency with which the *IT service* (3.3.2) can be modified by the *service provider* (3.3.7)

3.2.8.1

analysability

degree of effectiveness and efficiency with which an *IT service* (3.3.2) can be analysed for deficiencies, gaps and failures

3.2.8.2

modifiability

degree to which an *IT service* (3.3.2) can be effectively and efficiently modified without introducing defects or degrading existing *IT service quality* (3.3.10)

[SOURCE: ISO/IEC 25010:2011, 4.2.7.4, modified — “a product or system” has been replaced by “an IT service”.]

3.2.8.3

testability

degree of effectiveness and efficiency with which test criteria can be established for an *IT service* (3.3.2) and tests can be performed to determine whether those criteria have been met

[SOURCE: ISO/IEC 25010:2011, 4.2.7.5, modified — “a system, product or component” has been replaced by “an IT service”.]

3.3 General

3.3.1

service

means of delivering value for the *user* (3.3.4) by facilitating results the user wants to achieve

[SOURCE: ISO/IEC 20000-1:2011 modified — “customer” has been changed to “user”.]

Note 1 to entry: Service is generally intangible.

Note 2 to entry: A service can also be delivered to the *service provider* (3.3.7) by another supplier, which may be an internal group or a user acting as a supplier.

3.3.2**information technology service****IT service**

service that makes use of *IT systems* (3.3.5) as tools to provide value to an individual *user* (3.3.4) or a business by facilitating results the user or business wants to achieve

Note 1 to entry: IT services can be delivered remotely by people, or by an IT application that could be in a local or remote location.

3.3.3**customer**

organization or part of an organization that receives a service or services

Note 1 to entry: A customer can be an indirect *user* (3.3.4).

[SOURCE: ISO/IEC 20000-1:2011, 3.7, modified — Note 1 to entry has been added.]

3.3.4**user**

person or an organization that uses an *IT service* (3.3.2)

3.3.5**information technology system****IT system**

set of one or more computers, associated software, peripherals, terminals, human operations, physical processes, information transfer means, that form an autonomous whole, capable of performing information processing and/or information transfer

[SOURCE: ISO/IEC 14662:2010, 3.13]

3.3.6**service provision system**

system to provide *IT service* (3.3.2) to *users* (3.3.4), including people, processes, technology, facilities and information

3.3.7**service provider**

organization or part of an organization that manages and delivers a service or services to the *customer* (3.3.3)

Note 1 to entry: A customer can be internal or external to the service provider's organization.

[SOURCE: ISO/IEC 20000-1:2011, 3.32]

3.3.8**service level agreement****SLA**

documented agreement between the *service provider* (3.3.7) and *user* (3.3.4) that identifies services and service targets

Note 1 to entry: A SLA can also be established between the service provider and a supplier or an internal group acting as a supplier.

Note 2 to entry: A SLA can be included in a contract or another type of documented agreement.

[SOURCE: ISO/IEC 20000-1:2011, 3.29]

3.3.9**SLA compliance**

degree to which the service complies with the *SLA* (3.3.8) requirements

3.3.10

IT service quality

degree to which an *IT service* ([3.3.2](#)) satisfies stated and implied needs when used under specified conditions

[SOURCE: ISO/IEC 25010:2011, 4.3.13, modified — “a software product” has been replaced by “an IT service”.]

3.3.11

quality model

defined set of characteristics, and of relationships between them, which provides a framework for specifying quality requirements and evaluating quality

[SOURCE: ISO/IEC 25000:2014, 4.27]

4 Conformance

Any quality requirement, quality specification, or evaluation of quality that conforms to this document shall either

- a) use the quality models defined in [5.1.2](#) and [5.1.3](#), or
- b) tailor the quality model giving the rationale for any changes and provide a mapping between the tailored model and the standard model.

5 Quality models framework

5.1 Overview

5.1.1 General

There are four quality models in the SQuaRE series:

- a) the quality in use model in ISO/IEC 25010 that can be applied to products, systems and services;
- b) the product quality model in ISO/IEC 25010;
- c) the IT service quality model defined in this document; and
- d) the data quality model in ISO/IEC 25012.

These models provide a set of quality characteristics and sub-characteristics, as well as their definitions. The relationship among different quality models from SQuaRE series is shown in [Figure 2](#).

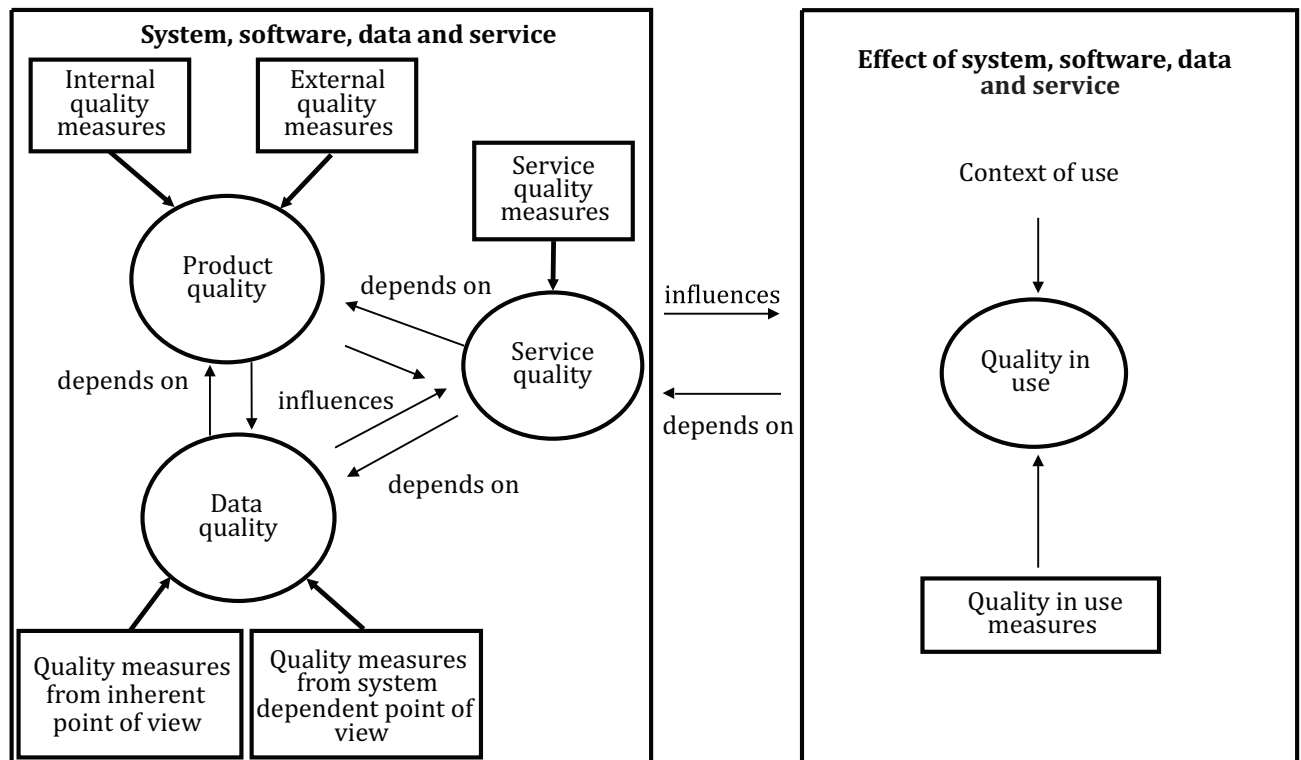


Figure 2 — Relationship among different quality models from SQuaRE series

[Annex C](#) shows the comparison among IT service quality models and other quality models.

5.1.2 Applying the quality in use model to IT services

The quality in use model in ISO/IEC 25010 shown in [Figure 3](#) and [Table 1](#) describes the quality characteristics which can be used to specify and measure the degree to which a service can be used by specific user(s) to meet their needs to achieve specific goals in specific context of use. The five characteristics are related to the extent to which the users' goals are achieved with effectiveness, efficiency, satisfaction, freedom from risk, and context coverage.

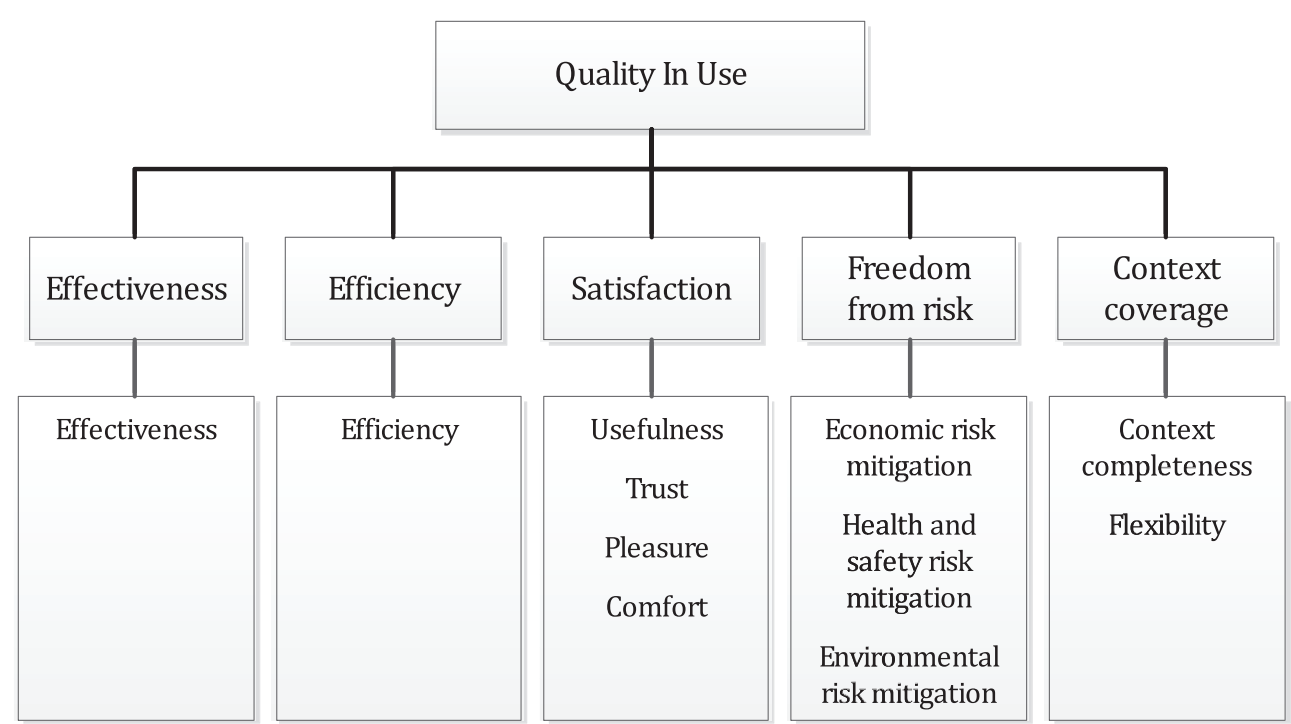


Figure 3 — Quality in use model

The quality in use of a service is the degree to which a service can be used by specific users to meet their needs to achieve specific goals for intended IT service outcomes with agreed level of effectiveness, efficiency, satisfaction, freedom from risk and context coverage. It can be used to assess the extent to which the service outcomes meet the user’s intended goals.

Generally, the quality in use model is used to measure the IT service quality from the perspective of the users, and each characteristic can be assigned to different activities of the stakeholders. The quality in use characteristic and sub-characteristics are listed in [3.1](#).

5.1.3 IT service quality model

The IT service quality is the degree to which the properties of an IT service can satisfy stated and implied needs for the IT service when used under specified conditions.

The IT service quality model shown in [Figure 4](#) and [Table 2](#) categorizes IT service quality properties into eight characteristics: suitability, usability, security, IT service reliability, tangibility, responsiveness, IT service adaptability and IT service maintainability. The definitions and explanations of each characteristics and their sub-characteristics are given in [3.2](#).

NOTE Many of the IT service quality characteristics and sub-characteristics have the same name and similar meaning as characteristics and sub-characteristics in ISO/IEC 25010 (see [Annex C](#)).

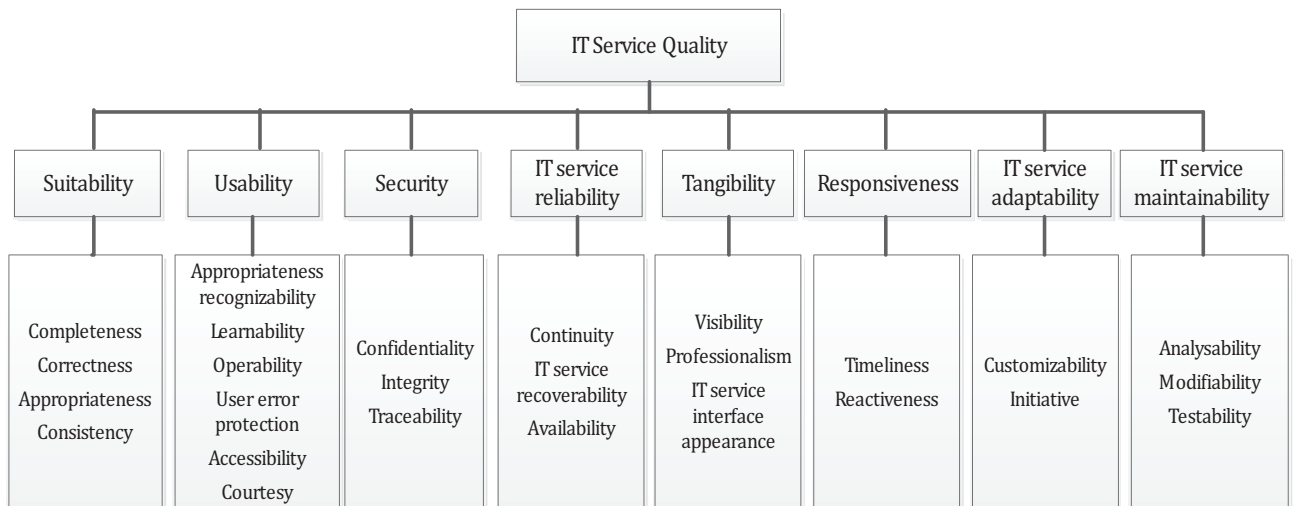
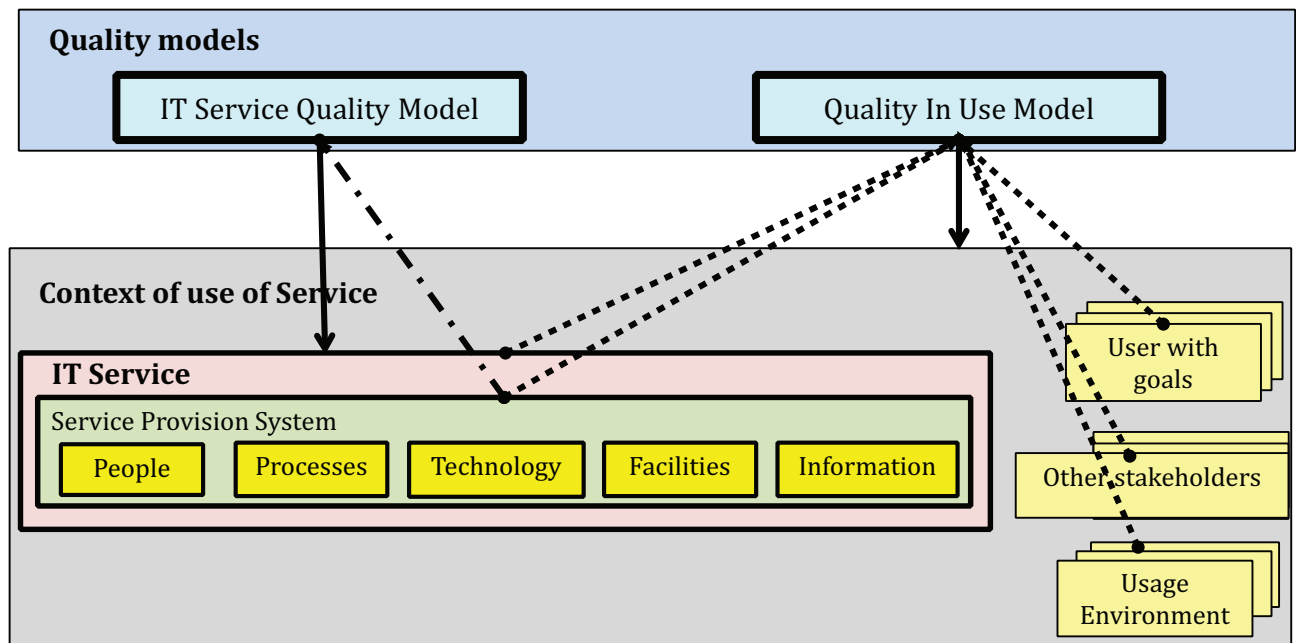


Figure 4 — IT service quality model

5.2 Scope of the quality models

The IT service quality model focuses on the quality properties of IT service itself provided by service provision system, and the quality in use model in ISO/IEC 25010 focuses on the extent to which the service quality satisfies the goals of the user in the particular context of use. [Figure 5](#) illustrates the scope of each quality model and the related entities.



Key

- what is measured by the model
- ←····· some of the factors that influence service quality in use
- ← · · — some of the factors that influence service quality

Figure 5 — Scope of the quality models

IT service has its own provision system which consists of people, processes, technology, facilities and information which are described in Reference [7].

[Figure 5](#) also shows the service quality from the perspectives of different stakeholders. This means the quality models provide a framework for collecting the needs of service stakeholders. The stakeholders include:

- a) user with goals: person who uses the IT service provided by IT system and/or by the person or people who delivers the IT service, in order to achieve intended goals;
- b) other stakeholders:
 - secondary user: person who provides support to sustain service through the IT system;

EXAMPLE 1 Content provider, general service manager, service system manager/administrator, security manager, maintainer, analyser or installer.

- indirect user: person who receives output, but does not interact with the IT system or person who delivers service;

EXAMPLE 2 Users who receive services.

- other interested parties: relevant to the service other than the users.

EXAMPLE 3 Service providers, the third party service providers, suppliers and users.

5.3 Applying the quality models to IT services

The quality in use model and IT service quality model are useful for specifying service requirements, establishing quality measures, and performing quality evaluations (see [Annex B](#)). The defined quality characteristics and sub-characteristics can be used as a checklist for ensuring a comprehensive treatment of quality requirements, thus assisting in estimating the consequent effort and activities that will be needed in the course of IT service design, transition, delivery and improvement. The characteristics in quality in use model and IT service quality model are intended to be used as a set when specifying or evaluating IT service quality.

The need for compliance with standards or regulations can be identified as part of requirements for a system, but these are outside the scope of the service quality models.

Annex A (informative)

Context of using the model and different IT service types

A.1 Context of using the model

The ultimate goal of IT service quality model is to enable the service provider to provide IT services that meet the requirements of users and provide user satisfaction. The context of using the model includes:

- service providers decide whether to release an IT service;
- service providers compare with a competing IT service;
- service providers decide when to upgrade an IT service;
- users select one of the competing IT services;
- users decide whether to accept an IT service;
- users evaluate the quality of an IT service; and
- third parties evaluate the quality of an IT service.

A.2 IT service types

The requirements of service quality evaluation are different in different service types and therefore the service type should be firstly determined to tailor quality model for evaluating IT service. There are the following different IT service types.

- Services completely automated provided by an IT system. Depending on the intelligence of IT and Internet businesses, some services (e.g. check-in, ATM, user support, reservation, taking orders, etc.) can be completely automated. Person-to-person interactions are mostly replaced by person-to-IT interactions. Person-to-person interactions only occur when self-service fails. The quality of IT system plays the most important role in shaping user experience of overall service quality.
- Services provided by a human using an IT system. The IT service is the main channel that carries out the human-delivered services for users, such as call centre, online live chat, tele-medicine, etc. The quality of the channel itself plays an important role in shaping user experience of overall service quality. The quality of service interactions between human service agent and users is also important. However, the “tangible” dimension might lose its importance in measuring service quality. This is because typical users rarely experience face-to-face interactions with service providers in those scenarios unless IT-mediated service channel fails.

There are different types of services provided by a human using an IT system:

- a) services provided by a human in front-office using an IT system, such as a travel information desk or bank clerk (the final user is indirect, passive and does not interact with the IT system);
- b) services provided by a human in back-office using an IT system (the final user is active and operates in front-end with IT system); and
- c) services provided by a human in back-office supporting IT systems, such as consultancy for technical services for supporting IT systems (the user is a secondary user and provides support to sustain service through the IT system, the final user is indirect user, passive and generally internal to the organization).

Annex B (informative)

IT service quality life cycle

The IT service quality life cycle model ([Figure B.1](#)) addresses quality in three principal phases of the IT service life cycle:

- the IT service under design and deployment phase is the subject of internal measures of service quality;
- the IT service under delivery phase is the subject of external measures of service quality; and
- the IT service in use phase is the subject of quality in use.

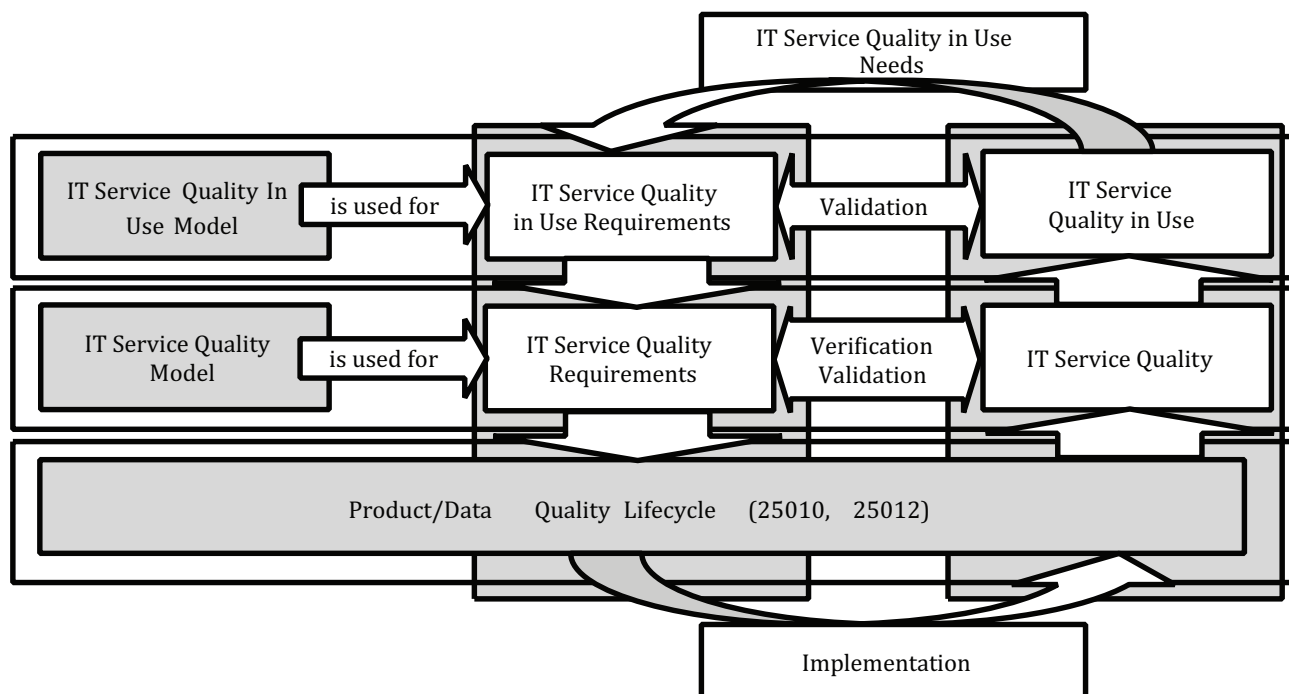


Figure B.1 — IT service quality life cycle model

The IT service quality life cycle model also indicates that achieving acceptable levels of quality should be an integral part of the development process for each type of quality including requirements, implementation and validation of the results.

Requirements for quality in use of IT service specify the required levels of quality from the users' point of view. These requirements are derived from the needs of users and other stakeholders (such as owners). Quality in use requirements are used as the target for validation of the IT service by the user. Requirements for quality in use characteristics should be stated in the quality requirements specification using criteria for quality in use measures that are used when a product is evaluated.

NOTE 1 IT service quality in use requirements contribute to identifying and to defining IT service quality requirements.

NOTE 2 Requirements for IT service measures of quality contribute to identifying and to defining requirements for quality requirements of IT service provision, like system/software product.

NOTE 3 IT service quality evaluation can be used to predict IT service quality in use. Quality of IT service provision also can be used to predict IT service.

To provide IT services, IT service quality depends on IT system/product and data qualities.

Annex C

(informative)

Comparison with the quality models in ISO/IEC 25010 and ISO/IEC 25012

Clause	ISO/IEC/TS 25011 Service quality models	Clause	ISO/IEC 25010 Product quality model	Clause	ISO/IEC 25012 Data quality model
3.2.1	Suitability	4.2.1	Functional suitability		
3.2.1.1	Completeness	4.2.1.1	Functional completeness	5.3.1.2	Completeness
3.2.1.2	Correctness	4.2.1.2	Functional correctness	5.3.1.1	Accuracy
3.2.1.3	Appropriateness	4.2.1.3	Functional appropriateness		
3.2.1.4	Consistency				
				5.3.2.2	Compliance
3.2.2	Usability	4.2.4	Usability		
3.2.2.1	Appropriateness recognizability	4.2.4.1	Appropriateness recognizability		
3.2.2.2	Learnability	4.2.4.2	Learnability		
3.2.2.3	Operability	4.2.4.3	Operability		
3.2.2.4	User error protection	4.2.4.4	User error protection		
3.2.2.5	Accessibility	4.2.4.6	Accessibility	5.3.2.1	Accessibility
3.2.2.6	Courtesy				
3.2.3	Security	4.2.6	Security		
3.2.3.1	Confidentiality	4.2.6.1	Confidentiality	5.3.2.3	Confidentiality
3.2.3.2	Integrity	4.2.6.2	Integrity		
3.2.3.3	Traceability	4.2.6.4	Accountability	5.3.2.6	Traceability
		4.2.6.3	Non-repudiation		
		4.2.6.5	Authenticity		
3.2.4	IT service reliability	4.2.5	Reliability		
3.2.4.1	Continuity				
3.2.4.2	IT service recoverability	4.2.5.4	Recoverability	5.3.3.3	Recoverability
3.2.4.3	Availability	4.2.5.2	Availability	5.3.3.1	Availability
				5.3.1.3	Consistency
		4.2.5.1	Maturity		
		4.2.5.3	Fault tolerance		
3.2.5	Tangibility				
3.2.5.1	Visibility				
3.2.5.2	Professionalism				
3.2.5.3	IT service interface appearance	4.2.4.5	User interface aesthetics		
3.2.6	Responsiveness	4.2.2	Performance efficiency		
3.2.6.1	Timeliness	4.2.2.1	Time behaviour		
3.2.6.2	Reactiveness				
		4.2.2.2	Resource utilization		

Clause	ISO/IEC/TS 25011 Service quality models	Clause	ISO/IEC 25010 Product quality model	Clause	ISO/IEC 25012 Data quality model
		4.2.2.3	Capacity		
3.2.7	IT service adaptability				
3.2.7.1	Customizability				
3.2.7.2	Initiative				
3.2.8	IT service maintainability	4.2.7	Maintainability		
3.2.8.1	Analysability	4.2.7.3	Analysability		
3.2.8.2	Modifiability	4.2.7.4	Modifiability		
3.2.8.3	Testability	4.2.7.5	Testability		
		4.2.7.1	Modularity		
		4.2.7.2	Reusability		
				5.3.2.4	Efficiency
				5.3.1.4	Credibility
		4.2.3	Compatibility		
		4.2.3.1	Co-existence		
		4.2.3.2	Interoperability		
		4.2.8	Portability	5.3.3.2	Portability
		4.2.8.1	Adaptability		
		4.2.8.2	Installability		
		4.2.8.3	Replaceability		
				5.3.1.5	Currentness
				5.3.2.5	Precision
				5.3.2.7	Understandability

Annex D **(informative)**

Definitions of the quality in use characteristics and sub-characteristics from ISO/IEC 25010

This annex reproduces the definitions of the quality in use characteristics and sub-characteristics from ISO/IEC 25010.

For the purposes of this document, “product or system” in the quality in use model refers to “IT service”. The “user” in the quality in use model is the “user with goals” described in [5.2](#) a). The quality in use characteristics and sub-characteristics apply to the quality in use of an IT service.

D.1 **effectiveness**

accuracy and completeness with which users achieve specified goals

[SOURCE: ISO 9241-11]

D.2 **efficiency**

resources expended in relation to the accuracy and completeness with which users achieve goals

[SOURCE: ISO 9241-11]

NOTE Relevant resources can include time to complete the task (human resources), materials, or the financial cost of usage.

D.3 **satisfaction**

degree to which user needs are satisfied when a product or system is used in a specified context of use

NOTE 1 For a user who does not directly interact with the product or system, only purpose accomplishment and trust are relevant.

NOTE 2 Satisfaction is the user’s response to interaction with the product or system, and includes attitudes towards use of the product.

D.3.1 **usefulness**

degree to which a user is satisfied with their perceived achievement of pragmatic goals, including the results of use and the consequences of use

D.3.2 **trust**

degree to which a user or other stakeholder has confidence that a product or system will behave as intended

D.3.3 **pleasure**

degree to which a user obtains pleasure from fulfilling their personal needs

NOTE Personal needs can include needs to acquire new knowledge and skills, to communicate personal identity and to provoke pleasant memories.

D.3.4 **comfort**

degree to which the user is satisfied with physical comfort

D.4**freedom from risk**

degree to which a product or system mitigates the potential risk to economic status, human life, health, or the environment

NOTE Risk is a function of the probability of occurrence of a given threat and the potential adverse consequences of that threat's occurrence.

D.4.1**economic risk mitigation**

degree to which a product or system mitigates the potential risk to financial status, efficient operation, commercial property, reputation or other resources in the intended contexts of use

D.4.2**health and safety risk mitigation**

degree to which a product or system mitigates the potential risk to people in the intended contexts of use

D.4.3**environmental risk mitigation**

degree to which a product or system mitigates the potential risk to property or the environment in the intended contexts of use

D.5**context coverage**

degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in both specified contexts of use and in contexts beyond those initially explicitly identified

NOTE Context of use is relevant to both quality in use and some product quality (sub)characteristics (where it is referred to as "specified conditions").

D.5.1**context completeness**

degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in all the specified contexts of use

NOTE Context completeness can be specified or measured either as the degree to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, freedom from risk and satisfaction in all the intended contexts of use, or by the presence of product properties that support use in all the intended contexts of use.

EXAMPLE The extent to which software is usable using a small screen, with low network bandwidth, by a non-expert user; and in a fault-tolerant mode (e.g. no network connectivity).

D.5.2**flexibility**

degree to which a product or system can be used with effectiveness, efficiency, freedom from risk and satisfaction in contexts beyond those initially specified in the requirements

NOTE 1 Flexibility can be achieved by adapting a product for additional user groups, tasks and cultures.

NOTE 2 Flexibility enables products to take account of circumstances, opportunities and individual preferences that had not anticipated in advance.

NOTE 3 If a product is not designed for flexibility, it might not be safe to use the product in unintended contexts.

NOTE 4 Flexibility can be measured either as the extent to which a product can be used by additional types of users to achieve additional types of goals with effectiveness, efficiency, freedom from risk and satisfaction in additional types of contexts of use, or by a capability to be modified to support adaptation for new types of users, tasks and environments, and suitability for individualization as defined in ISO 9241-110.

Annex E (informative)

Feedback on this document

E.1 Address for feedback

Comments on the content can be sent to sc7wg6@itscj.ipsj.or.jp.

E.2 Feedback invited

Feedback on this document is particularly invited on the following issues:

- experiences of usage, case studies, and any published results;
- suggestions for improvements; and
- anything missing or adding to this document.

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