

**Systems and software engineering — Systems and software
Quality Requirements and Evaluation (SQuaRE) — Guidance for
quality evaluation of ~~A~~artificial intelligence (AI) systems**

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ISO/IEC DTS 25058

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 42, *Artificial intelligence*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

An artificial intelligence (AI) system can be challenging to evaluate. Consequently, the impact of an AI system with poor quality can be considerable since it can be developed to facilitate the automation of critical actions and decisions.

The purpose of this document is to guide AI developers through proper quality evaluation of their AI systems. This document does not state exact measurements and thresholds, as ~~they~~these vary depending on the nature of each system. Instead, it specifies comprehensive guidance that covers the relevant facets of an AI system's quality for successful quality evaluation.

Testing is in scope as far as each characteristic and sub-characteristic is verified by testing strategies, but details of testing methods and measurements are covered elsewhere, for example in the ISO/IEC/IEEE 29119 series.

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Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Guidance for quality evaluation of Artificial intelligence (AI) systems

1 Scope

This document provides guidance for evaluation of artificial intelligence (AI) systems using an AI system quality model.

The document is applicable to all types of organizations engaged in the development and ~~the~~ use of artificial intelligence AI.

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 22989:2022~~ ISO/IEC TS 4213 Information technology — Artificial intelligence — Assessment of machine learning classification performance

~~ISO/IEC 22989~~, Information technology — Artificial intelligence — Artificial intelligence concepts and terminology

~~ISO/IEC 4213 23053:2022~~, Information technology — Framework for Artificial Intelligence — Assessment of classification performance (AI) Systems Using Machine Learning (ML)

~~ISO/IEC 25059:—¹~~, ~~Information technology — Artificial intelligence —~~ 2023, Software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — Quality Modelmodel for AI-based systems

~~ISO/IEC 23053:2022~~, Framework for Artificial Intelligence (AI) Systems using machine learning (ML)

~~ISO/IEC/IEEE 29119-1:2022~~, Software and systems engineering — Software testing — Part 1: General concepts

~~ISO/IEC/IEEE 29119 (all parts)~~, Software and systems engineering — Software testing

~~ISO/IEC/IEEE 29148:2018~~, Systems and software engineering — Life cycle processes — Requirements engineering

~~ISO/IEC 23894:2022~~, Information technology — Artificial intelligence — Guidance on risk management

~~ISO/IEC 25023~~, System and software engineering — System and software Quality Requirements and Evaluation (SQuaRE) — Measurements of system and software product quality

~~ISO/IEC 25022~~, System and software engineering — System and software Quality Requirements and Evaluation (SQuaRE) — Measurements of quality in use

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC TS 4213, ISO/IEC 22989:2022, ISO/IEC 23053:2022, ISO/IEC 25059:—, ~~ISO/IEC 4213:2022~~, ISO/IEC/IEEE 29119-1:2022 and ISO/IEC/IEEE 29148:2018 apply.

¹Under development. Stage at the time of publication: ISO/IEC DIS 25059:2022.

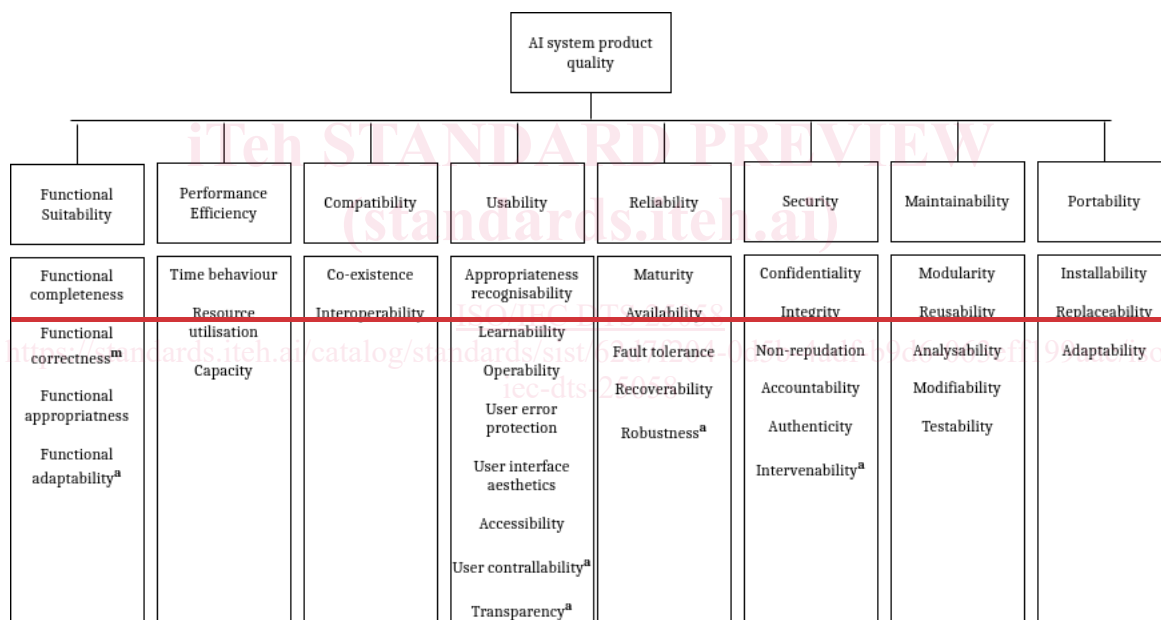
ISO and IEC maintain ~~terminological~~terminology databases for use in standardization at the following addresses:

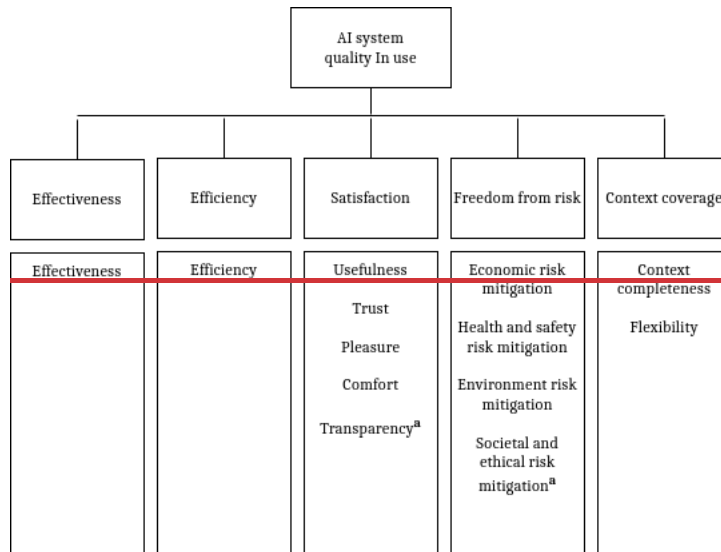
- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Overview

To ensure that relevant facets of an AI system’s quality are covered by the quality evaluation guidance, this document references Systems and software Quality Requirements and Evaluation (SQuaRE) product quality and ~~in-use~~in use quality in use models’ characteristics for an AI system (see ISO/IEC 25059). The product quality and quality in use models’ characteristics, as applicable to a general system, apply to an AI system. Several sub-characteristics have been added, and some have different meanings or contexts.

Figures 1 and 2 ~~from ISO/IEC 25059:~~ illustrate an AI ~~system~~system's product quality and quality in use models’ characteristics and sub-characteristics. Please note that some sub-characteristics have been added or modified from the ~~Systems and software Quality Requirements and Evaluation (SQuaRE)~~SQuaRE quality models for general systems as an AI system differs from a general system and software.

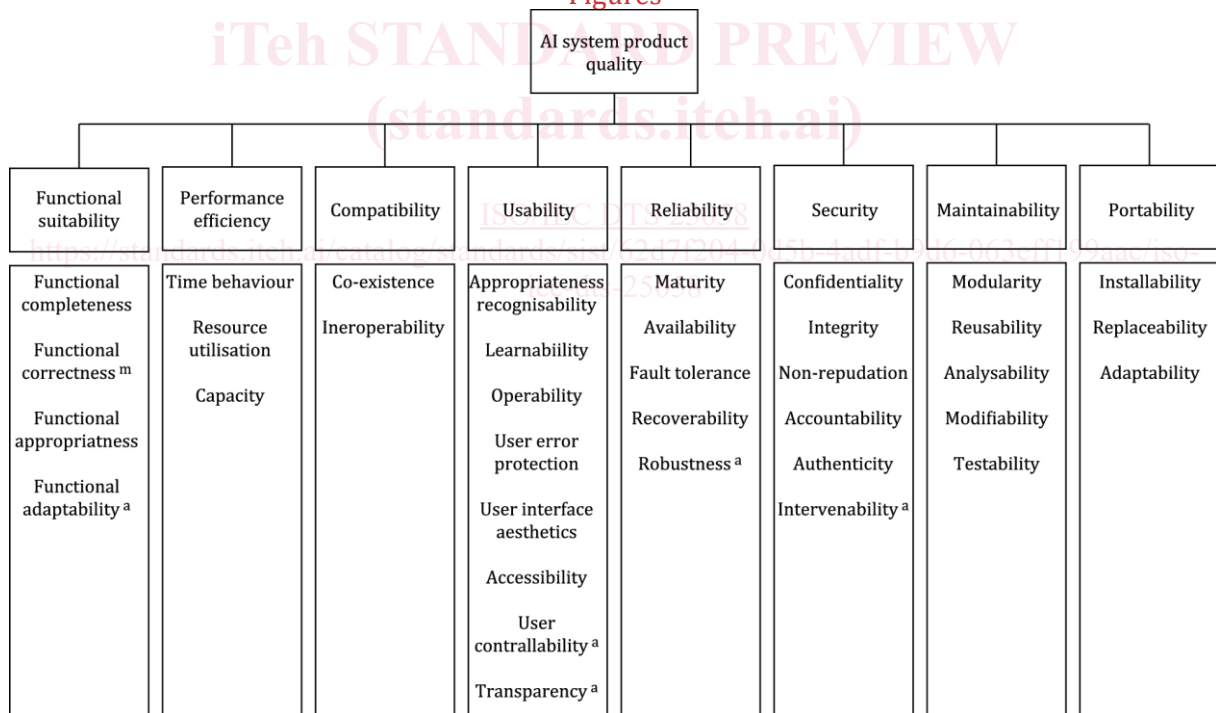




Key

- a — New sub-characteristics
- m — Modified sub-characteristics

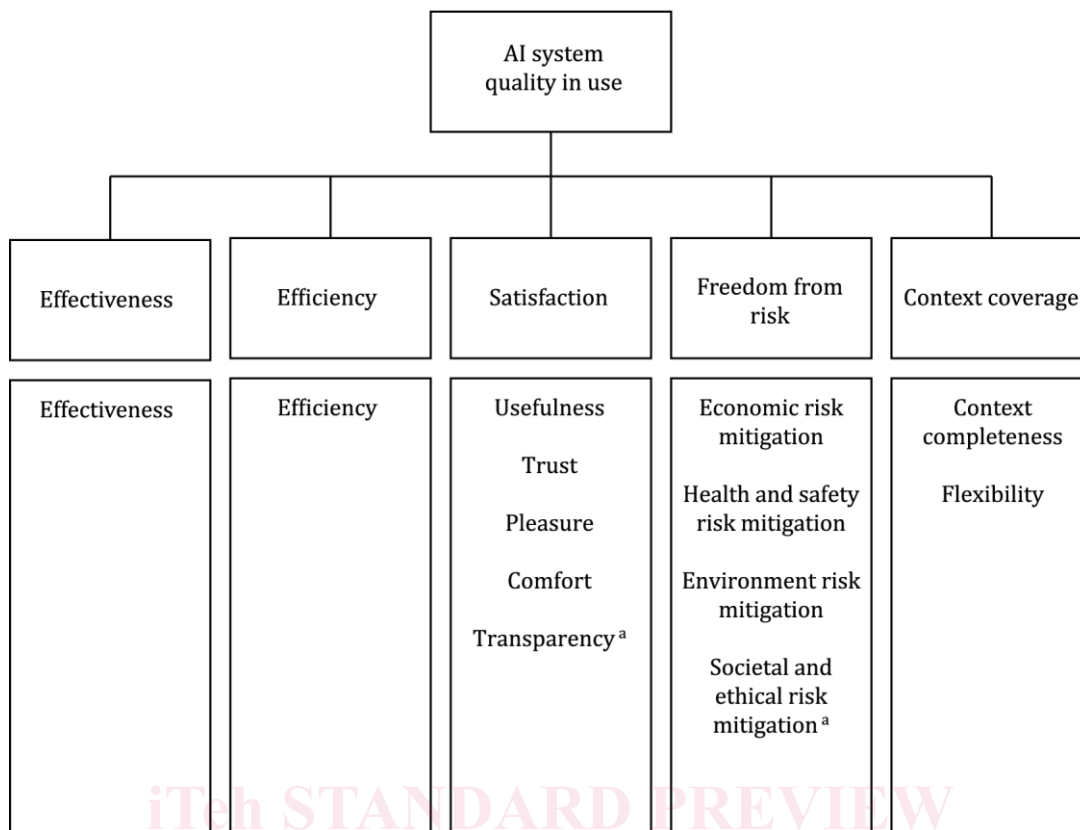
Figures



-
- a — New sub-characteristics.
- m — Modified sub-characteristics.

SOURCE ISO/IEC 25059:2023, Figure 1 and 2 — Product

Figure 1 — AI system product quality model for



-
^a [New sub-characteristics.](#)

SOURCE ISO/IEC 25059:2023, Figure 2.

ISO/IEC DTS 25058
<https://standards.iteh.ai/> **Figure 2 — AI systems and system quality in-use model for AI systems** <https://standards.iteh.ai/standards/iso-iec-dts-25058>

5 Quality evaluation methodology

Quality evaluation guidance is defined by relevant quality model sub-characteristics.

All the sub-characteristics from the SQuARE product quality and ~~in-use~~ quality in use models are covered in this document.

The guidance in this document should complement the SQuARE quality evaluation process described in ISO/IEC 25040 for AI systems.

6 Functional suitability

6.1 Functional completeness

Quality of the functional completeness sub-characteristic should be measured against quality measures according to ISO/IEC 25023:2016, 8.2.1.

6.2 Functional correctness

Quality of the functional correctness sub-characteristic should be measured against quality measures according to ISO/IEC 25023:2016, 8.2.2.

Functional correctness should be evaluated with the proper key performance indicators (KPIs) and measurements.