

Evaluation of the Iceland State Financial and Human Resource System

REPORT OF THE INDIVIDUAL EVALUATOR

Annex 2 SYSTEM AND SOFTWARE QUALITY

This paper lists the properties used in the two main models in the SQuaRE standards and their definitions. Properties marked with an * are included in the Terms of Reference (ToR) of the Evaluation.

Quality in use model¹

Quality in use is the degree to which a product or system can be used by specific users to meet their needs to achieve specific goals with effectiveness, efficiency, freedom from risk and satisfaction in specific contexts of use.

The properties of quality in use are categorized into five characteristics: effectiveness, efficiency, satisfaction, freedom from risk and context coverage.

Effectiveness

accuracy and completeness with which users achieve specified goals

Efficiency

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

¹ ISO/IEC 25010 section 3

Satisfaction	degree to which user needs are satisfied when a product or system is used in a specified context of use
- 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
- Trust	degree to which a user or other stakeholder has confidence that a product or system will behave as intended
- Pleasure	degree to which a user obtains pleasure from fulfilling their personal needs
- Comfort	degree to which the user is satisfied with physical comfort

Freedom from risk	degree to which a product or system mitigates the potential risk to economic status, human life, health, or the environment
- 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
- Health and safety risk mitigation	degree to which a product or system mitigates the potential risk to people in the intended contexts of use
- 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

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
- 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
- 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

Product quality model²

The product quality model categorizes product quality properties into eight characteristics (functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability and portability). Each characteristic is composed of a set of related subcharacteristics

Functional suitability*	degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions
- Functional completeness*	degree to which the set of functions covers all the specified tasks and user objectives

² ISO/IEC 25010 section 4

- Functional correctness* degree to which a product or system provides the correct results with the needed degree of precision
- Functional appropriateness* degree to which the functions facilitate the accomplishment of specified tasks and objectives

Performance efficiency

performance relative to the amount of resources used under stated conditions

- Time behaviour degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements
- Resource utilization degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements
- Capacity degree to which the maximum limits of a product or system parameter meet requirements

Compatibility

degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment

- Co-existence degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product
- Interoperability degree to which two or more systems, products or components can exchange information and use the information that has been exchanged

Usability*

degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

- Appropriateness recognizability degree to which users can recognize whether a product or system is appropriate for their needs cf. functional appropriateness
- Learnability degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use
- Operability* degree to which a product or system has attributes that make it easy to operate and control
- User error protection* degree to which a system protects users against making errors
- User interface aesthetics degree to which a user interface enables pleasing and satisfying interaction for the user
- Accessibility degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

Reliability*	degree to which a system, product or component performs specified functions under specified conditions for a specified period of time
Maturity*	degree to which a system, product or component meets needs for reliability under normal operation
Availability*	degree to which a system, product or component is operational and accessible when required for use
Fault tolerance*	degree to which a system, product or component operates as intended despite the presence of hardware or software faults
Recoverability*	degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system

Security*	degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization <i>Survivability (the degree to which a product or system continues to fulfil its mission by providing essential services in a timely manner in spite of the presence of attacks) is covered by recoverability</i> <i>Immunity (the degree to which a product or system is resistant to attack) is covered by integrity</i>
Confidentiality*	degree to which a product or system ensures that data are accessible only to those authorized to have access
Integrity*	degree to which a system, product or component prevents unauthorized access to, or modification of computer programs or data
Non-repudiation*	degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later
Accountability*	degree to which the actions of an entity can be traced uniquely to the entity
Authenticity*	degree to which the identity of a subject or resource can be proved to be the one claimed

Maintainability	degree of effectiveness and efficiency with which a product or system can be modified by the intended maintainers <i>Maintainability includes installation of updates and upgrades.</i>
Modularity	degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components
Reusability	degree to which an asset can be used in more than one system, or in building other assets
Analysability	degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to

one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified

Modifiability

degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality

Testability

degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met

Portability

degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another

Adaptability*

degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments

Installability

degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment

Replaceability

degree to which a product can replace another specified software product for the same purpose in the same environment