

2019-10-29
WG6_Rome_Round-Table

(V31)

Toward Next Generation SQuaRE Series Quality Model From Quality in Use Model to Quality Influence Model

1. S&S Quality Improvement – Background, Risk, and Needs
2. S&S Quality Improvement and ISO/IEC 25000 SQuaRE Series
3. Concept of S&S Quality and SQuaRE Series
4. SQuaRE Quality in Use Model and Its Usage

Prof. Motoei AZUMA

Emeritus Professor, Waseda University, Tokyo, Japan
ISO/IEC 25000 SQuaRE Series Prime Project Editor

1

1. S&S Quality – Background, Risk, Improvement

- **Background:** Rapid Improvement of ICT causes “ICT Systems and Software Products” larger **scale**, wide **variety**, and more **complex**.
 - ◆ Example: SNS, Cloud Computing, Big-Data, IoT (Internet of Things)
- **Quality Risk:** “ICT Systems” with **Quality Defects** may cause **Critical Risk**, such as **Human Life** and **Personal Asset**, on various Stakeholders including Public People.
 - ◆ Human Life Critical System, i.e. “Auto-Drive Car”、”Automatic Train Control System”
 - ◆ Personal Information Leakage: Bank Account, Credit Card Number and Password.
- **Improving QUALITY of Critical Systems and Software Products is one of the most important ISSUES for People today!!**
 - ◆ IT engineers are responsible for developing High Quality S&S Products.
 - ◆ IT S&S users are responsible for using High Quality S&S Products.

2

© Motoei AZUMA @ Waseda University

Criticality of Systems and Software Products *(Examples)*

Criticality depends on Types of Target Systems and their Users

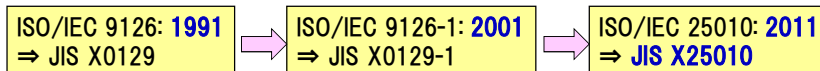
Criticality and Quality Influence	Examples of Typical Systems
National and Local Government Critical: Security, Reliability	National Defense System Government Budget Control System
Human Life Critical: Correctness, Safety	Medical System Automatic Flight Control System
Social Environment Critical Functional Correctness, Reliability, Security	City Traffic Control System Electricity Power Control System Telephone Switching System, Banking System
Business management Critical Functional Correctness, Task efficiency, Security, Usability, Reliability	SCM (Supply Chain Management) Customer Database System Embedded Product, IoT
Users' Health and Asset Critical Usability, Attractiveness, Security	Consumer Interactive System Internet, E-Commerce, Computer Game

3© Motoei AZUMA @ Waseda University

- ### Various Stakeholders of S & S Products and Their Quality Defects Risk
- **S&S Products Developers', Distributers' and Maintainers' Risk**
 - Increase Maintenance Cost and Rearrangement Cost
 - New Order and New Sale Deduction
 - **S&S Products Acquirers', User Company's' Risk**
 - Lose **Profit, Asset** and/or **Trust** on a company
 - **S&S Products Direct Users' and Outcomes Users' Risk**
 - Low Task Efficiency, High mental Stress, Confidential Information Leak
 - **End Users' Risk**
 - Big loss of an enterprise caused by Management Decision based on Outcomes of Unreliable Management Information
 - **Risk to Public who are under influence of S&S use**
 - Public transportation control caused by electricity supply stop
 - Illegal use of personal information
- ➡ **Quality in Use**
- 4© Motoei AZUMA @ Waseda University

History of SC7/WG6 and ISO/IEC 9126 to SQuaRE

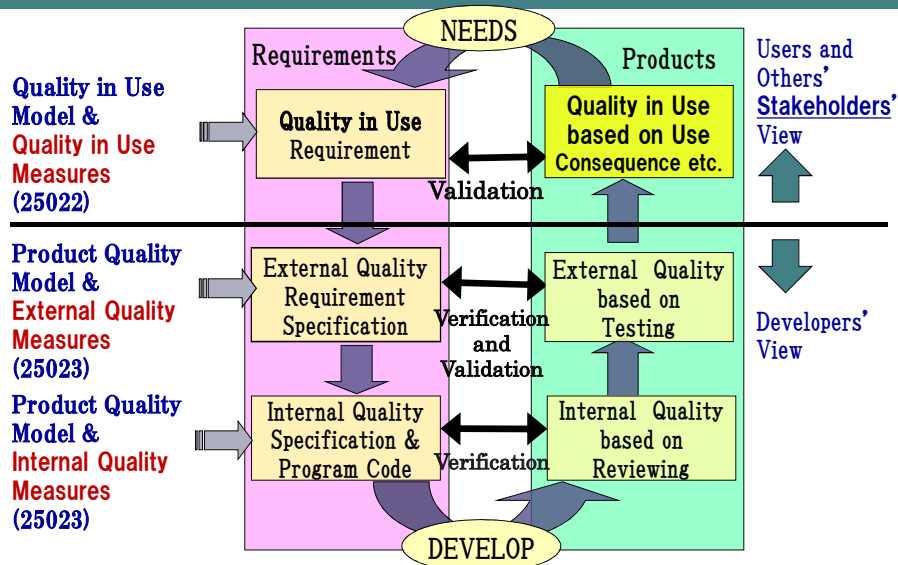
- **1985:** SC7/WG3 meeting in München, Germany, Software Quality
- **1989:** SC7/WG3 meeting in Budapest, Hungary, SC7/WG3 divided into **3 Sub-Groups**
- **1990:** **SC7/WG6 Established** in 1990, at JTC1/SC7 Washington DC meeting
- **1991:** First ISO/IEC JTC1/SC7/**WG6 meeting was held in Torino, Italy**
- **1991:** ISO/IEC **9126 Software Product Evaluation** - Quality Characteristics was Published
- **1994:** Two Software Quality Series were proposed and approved at SC7 Ottawa Plenary Meeting in Canada
 - ① ISO/IEC **9126-Part 1~4** Software **Product Quality** Series
 - ② ISO/IEC **14598-Part 1~6** **Software Product Evaluation** Series
- **1999:** WG6 decided to merge SO/IEC 9126 series and 14598 series as SQuaRE Series at WG6 Kanazawa meeting in Japan
- **2000:** SC7/WG6 proposed **SQuaRE series** at SC7 plenary Madrid meeting, in Spain and approved



5

© Motoei AZUMA @ Waseda University

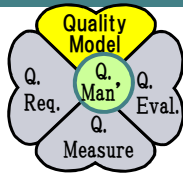
Systems and Software Quality Lifecycle Model in SQuaRE Series Quality View, Quality Model and Quality Measures



6

© Motoei AZUMA @ Waseda University

3. S & S Quality in Use Model is Misleading !!



- Quality Model: defined set of characteristics, and of relationships between them.
- Quality in Use Model focus on mainly “USABILITY”

Q Char.	Quality Subcharacteristics			
Effectiveness	Effectiveness Of Direct User			
Efficiency	Efficiency			
Satisfaction	Usefulness	Trust	Pleasure	Comfort
Freedom from Risk	Economic Risk Mitigation	Health and Safety Risk Mitigation	Environment Risk Mitigation	
Context Coverage	Context Completeness	Flexibility		

7

© Motoei AZUMA @ Waseda University

Needs for change the Definition of QUALITY IN USE and Quality Characteristics

- ◆ Extend the target from Direct Users to various **Stakeholders including Public People**
- ◆ Current “Quality in use” is defined “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”.
- ◆ Quality in Use depend on Context of Use, and **can be evaluated, measuring influence on various stakeholders.**
- ◆ Quality in Use Model should be revised based on influenced people, such as “Direct User”, “indirect user, including owner of the system” and “Public”.

8

© Motoei AZUMA @ Waseda University

Conclusion

- Product quality shall satisfy (stated and implied) needs of **various stakeholders**, including **owner** of the target system, **public people**, and shall be assured in order to avoid ill influence.
- JTC1/SC7/WG6, must try very hard to revise Quality model of ISO/IEC 25000 SQuaRE (S&S Quality Requirement and Evaluation) Series International Standards, aiming to **support developing, using and maintaining** very “High Quality ICT Systems & Software Product”.
- SC7/WG6 must focus on not only direct users, but also “**Various types of stakeholders**”.

Thank You for Listening !!