



**Carnegie Mellon**  
**Software Engineering Institute**

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Pittsburgh, PA 15213-3890

# Software Quality Requirements and Evaluation, the ISO 25000 Series

Workshop at the PSM Users Group  
Conference, 16 July 2003

Workshop Leader: Dave Zubrow

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# Background

This workshop will review the latest developments with the ISO 25000 SQuaRE series of standards. This series on Software Quality Requirements and Evaluation (SQuaRE) is an effort to harmonize ISO 9126 and ISO 14598. Using the output of the recent meeting in May, the workshop will review the existing architecture of the series of standards and the predecessor standard on software product quality models.

Note: Many of the slides in this presentation are taken from WG 6 documents and materials, especially slides from Professor Azuma, WG convener.



# Workshop Goal

## Goals:

The main focus will then be to generate draft content for a standard on software product quality modeling. If there is interest, we can independently publish our work in a software journal. In the workshop leader's opinion, this standard is the key to series.

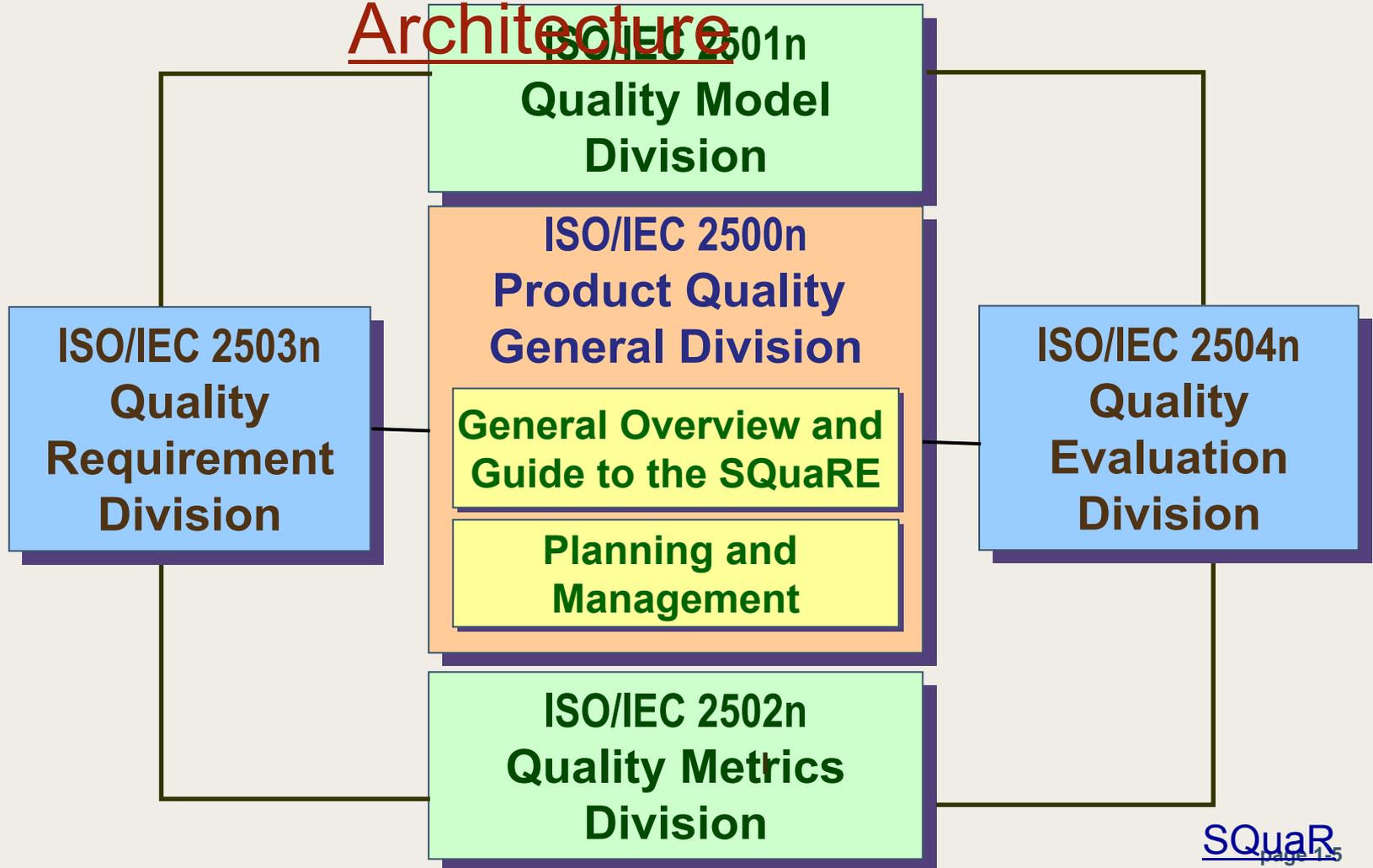


# Agenda

- |             |  |
|-------------|--|
| 1:30 – 2:00 | Introductions and Workshop Overview          |
| 2:00 – 3:00 | Issue Identification and Discussion          |
| 3:00 – 3:30 | Break  |
| 3:30 – 4:00 | Issue Identification and Discussion (cont)   |
| 4:00 – 5:00 | Next Steps, Recommendations and Report Draft |

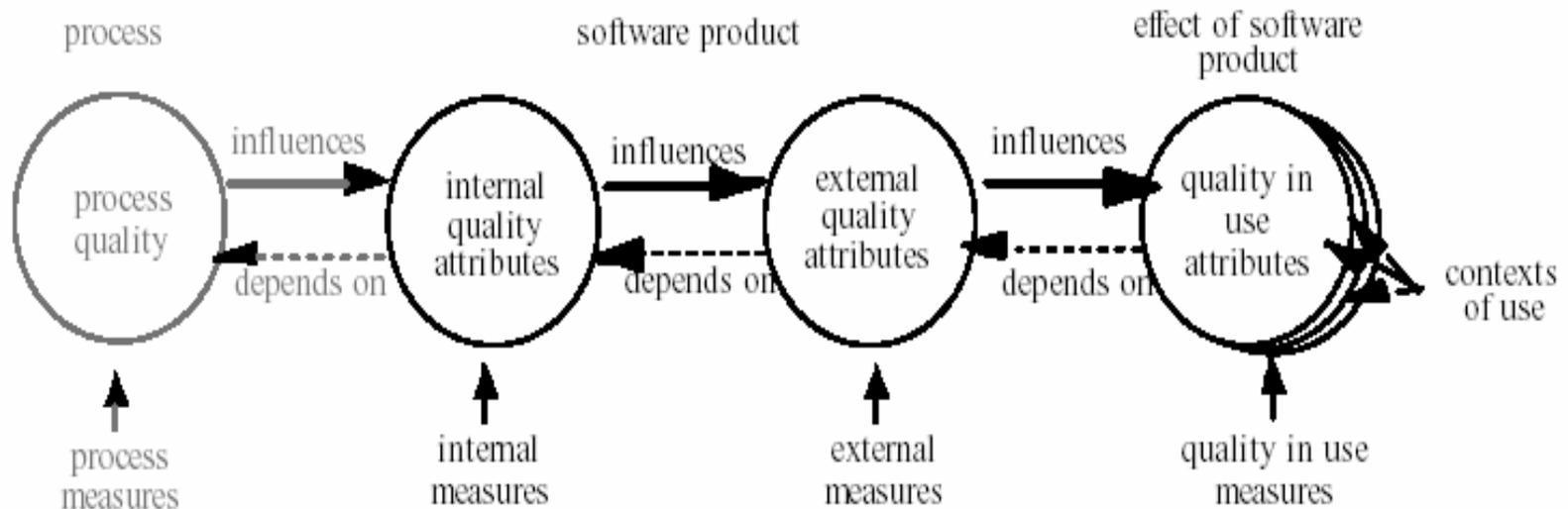


# SQuaRE: Architecture





# The Product Quality Measurement Reference Model





# Titles of the Measurement Standards: **2502n**

Common:

**Software Engineering -**

Software product **Quality Requirements and Evaluation**

**(SQuaRE) -**

Division: **Software Quality Measurement** (For Explanation  
Only)

25020 **Measurement** Reference Model and Guide

25021 **Measurement** Primitives

25022 **Measurement** of Internal Quality

25023 **Measurement** of External Quality

25024 **Measurement** of Quality In Use



# Measurement Primitive

A measure, either a base measure or a derived measure, that is commonly used for deriving internal quality measures, external quality measures and quality in use measures.

No definition (25000)

measure collected during Software Product Lifecycle from which Internal, External and Quality in Use Measures are derived. (**25020** and **25021**)

Single value of measurement primitive generally does not indicate the quality of the measured entity. NOTE The Quality is measured afterwards by calculating the Quality Measures. (**25020** and **25021**)



# Quality Measure and Measurement Method (Concept)

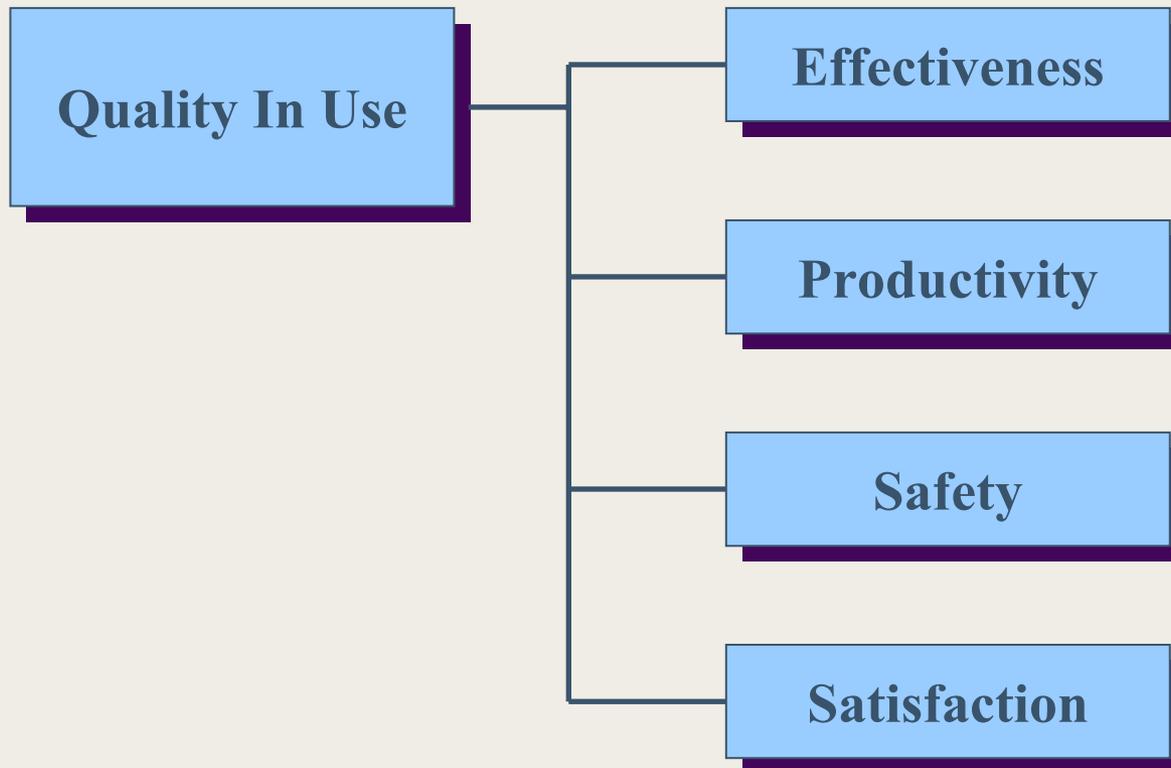
Quality Measures: A variable, *which shows satisfactory levels of a quality characteristic, subcharacteristic or sub-sub-characteristic*, to which a value is assigned as the result of measurement

Quality Measure Set: A set of a Quality Measure, Measurement Primitives that are used for deriving the quality measure, associated Scales and Measurement Methods, a Formula to combine them to generate the value of Quality Measure, and Guide to use them and analyze the results. for a Quality Characteristic or Subcharacteristic. (A line of Quality Measure Table)

Quality Measurement Table: A set of Quality Measure Set for each Quality Subcharacteristic



# ISO/IEC 9126-1 Quality In Use





# ISO/IEC 9126-1 - Quality Model

## Quality Characteristics

## Subcharacteristics

### •Functionality



### •Reliability



### •Usability



### •Efficiency



### •Maintainability

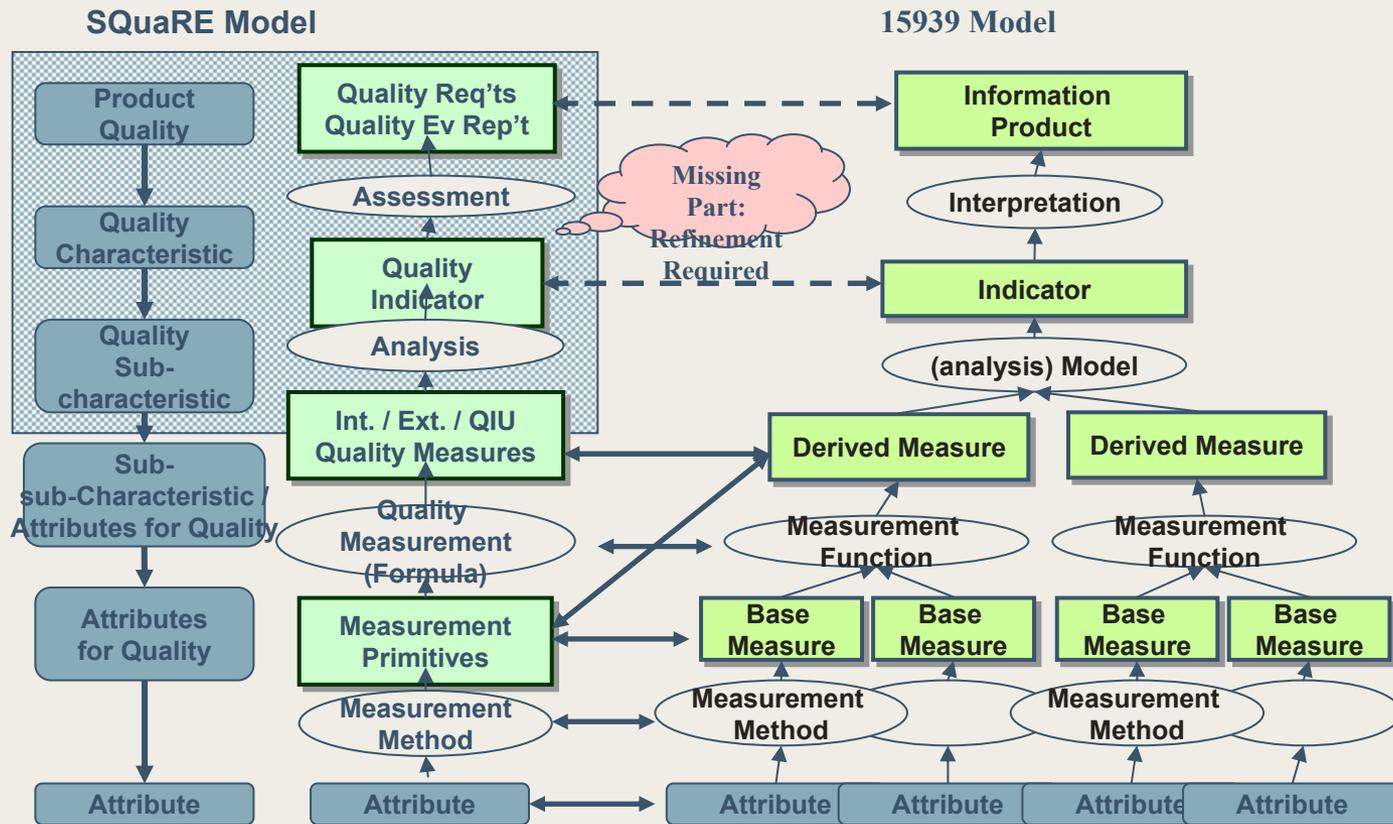


### •Portability





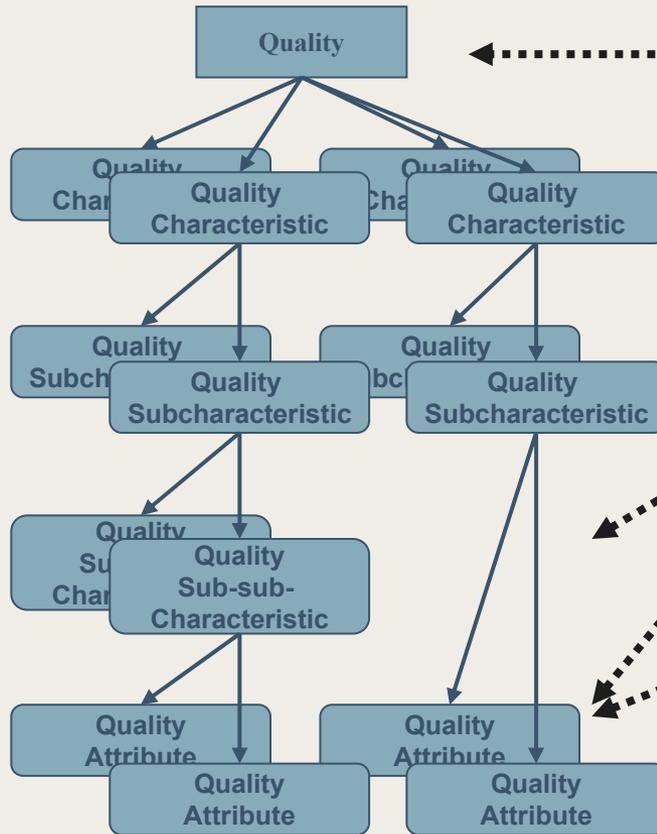
# Relation between SQuaRE Model and 15939 Model



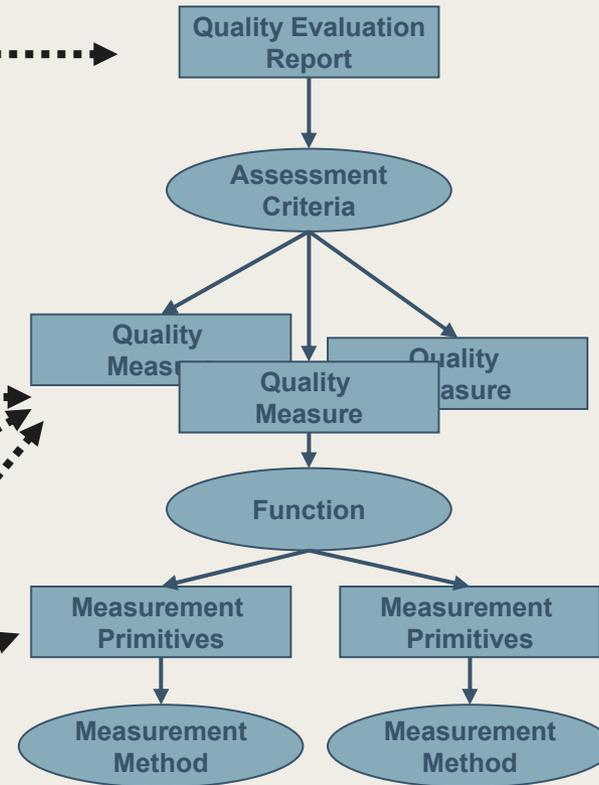


# Quality Model and Quality Measures

Quality Model



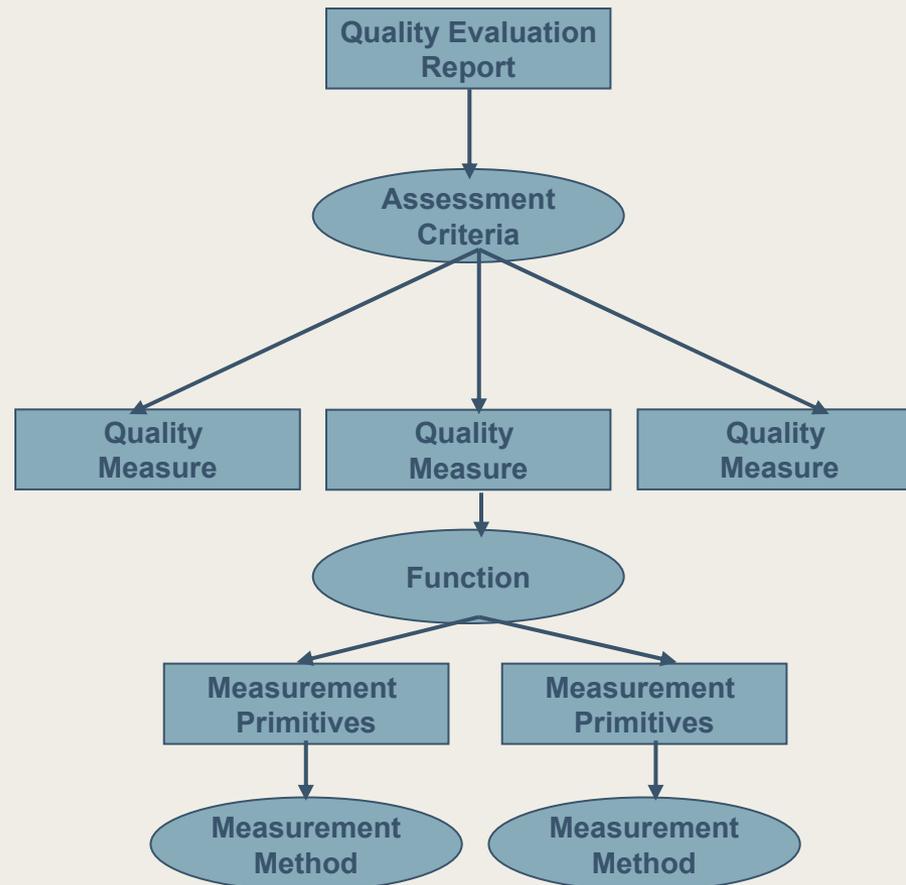
Quality Measures



Note: Dot-line means correspondence

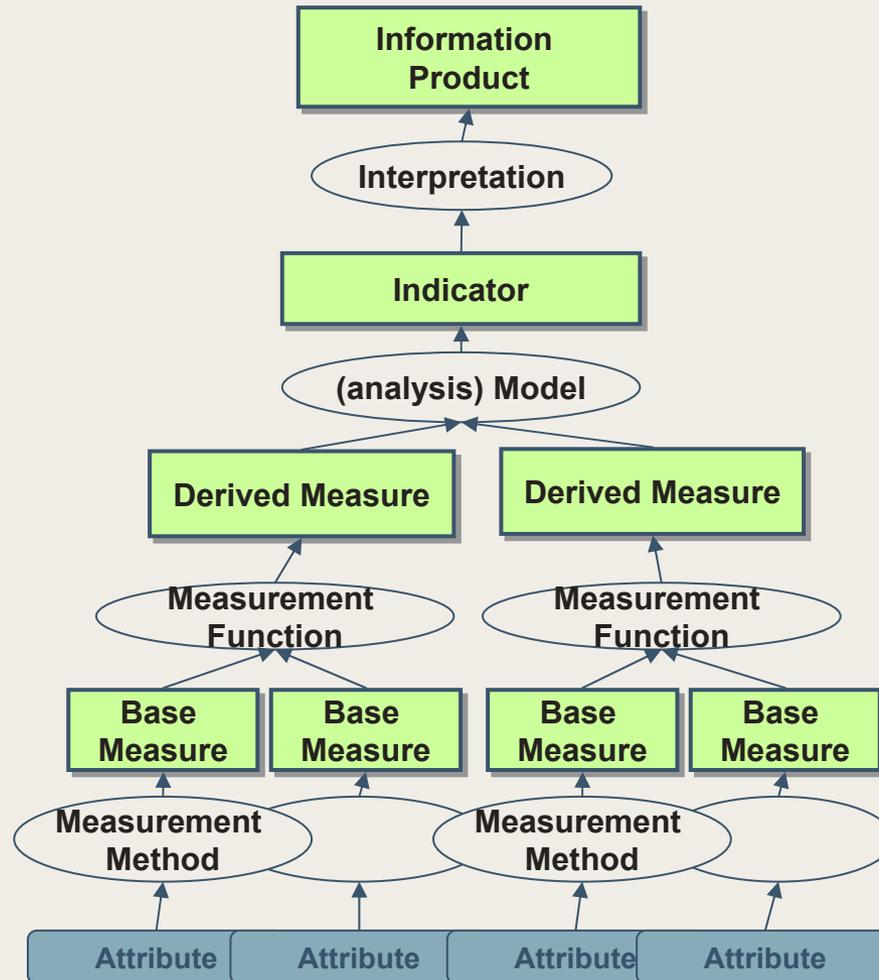


# 1. Software Product Quality Measurement Reference Model SPQM-RM (Draft)

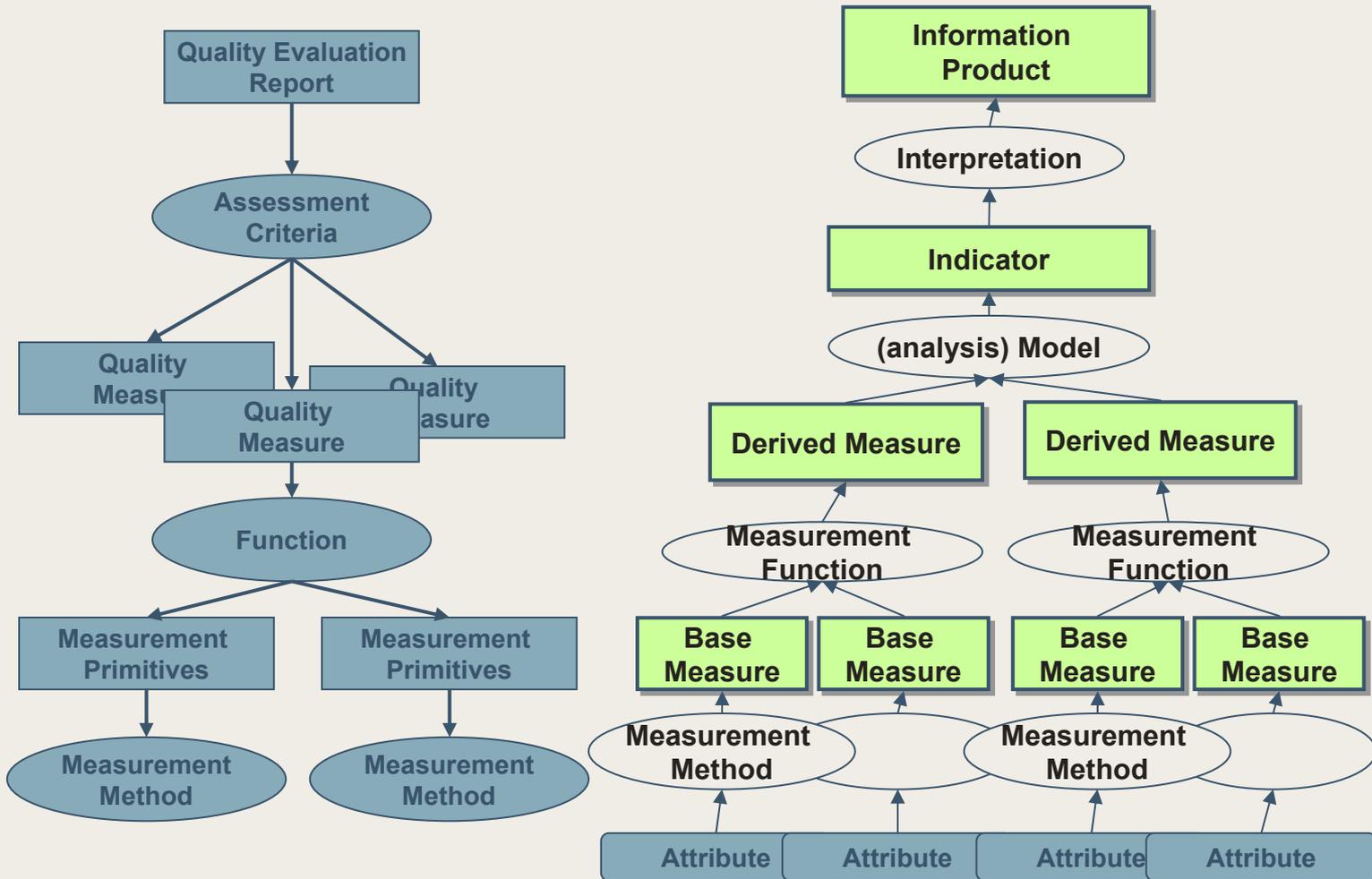




## 2. 15939 Reference Model



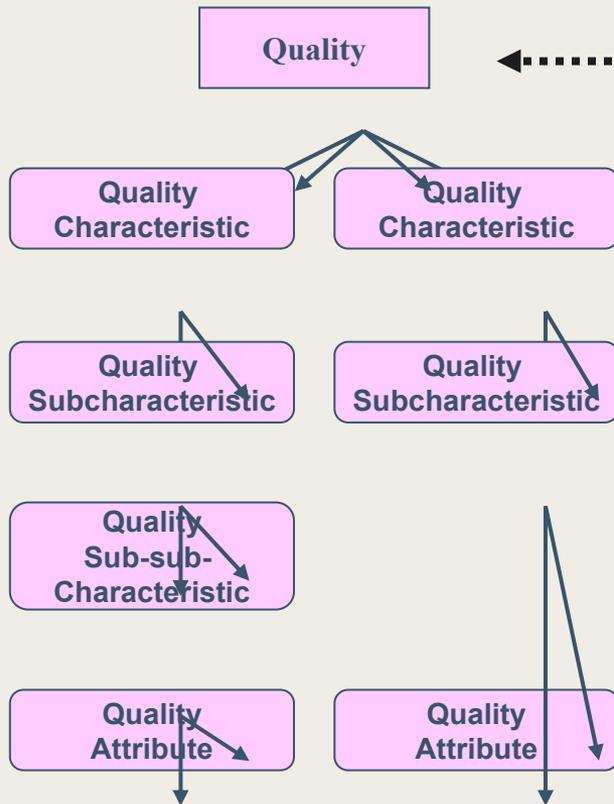
# 3. Relation Between SPQM-RM and 15939 Model and Validation of SPQ-RM



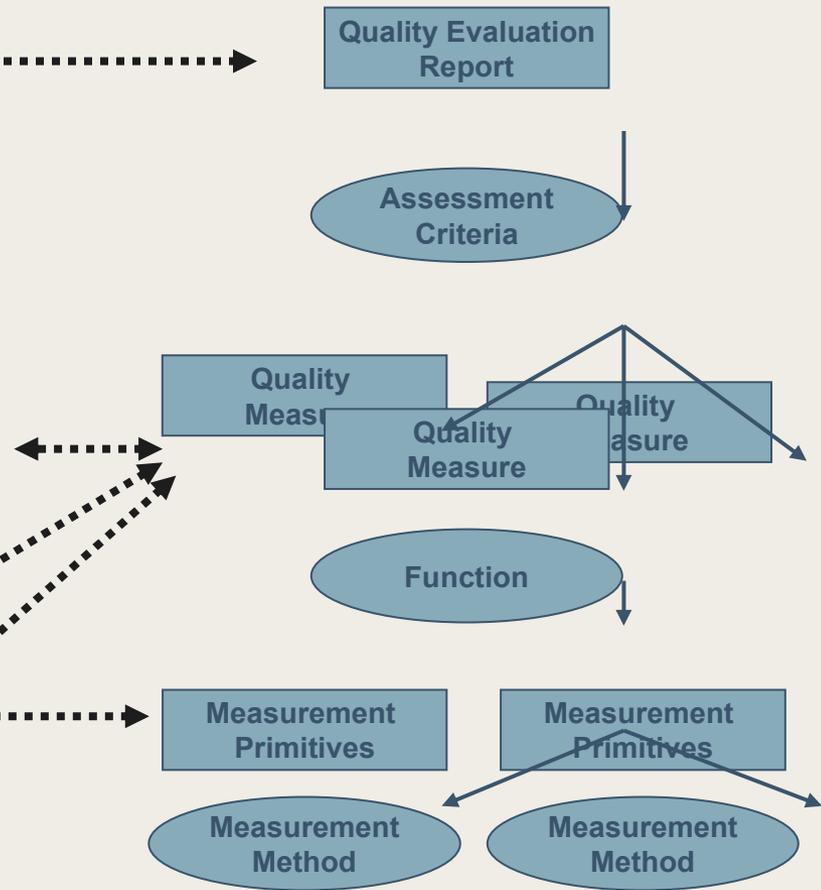


# Quality Model and SPQM-RM (Draft)

## Quality Model



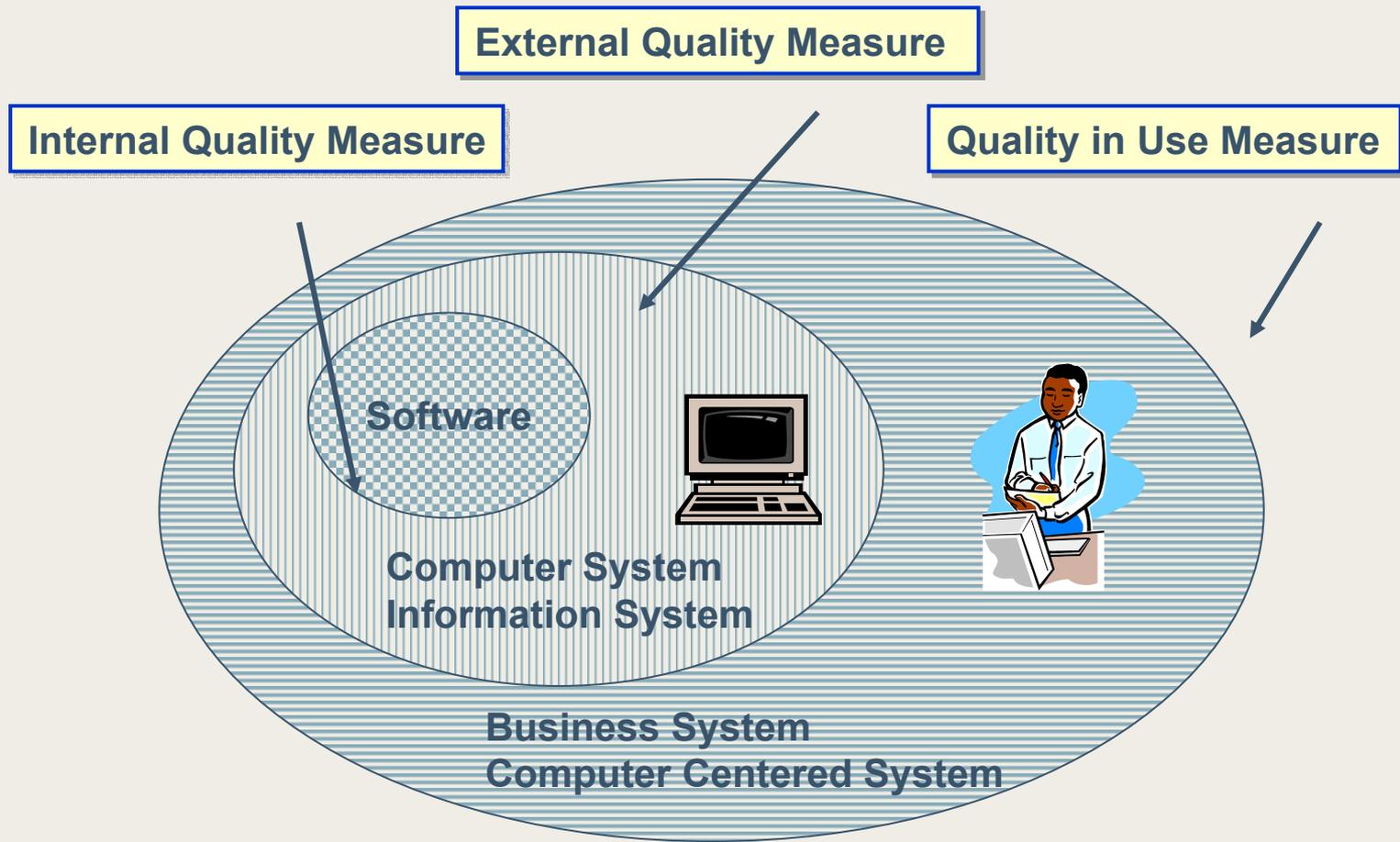
## SPQM-RM



Note: Dot-line means correspondence

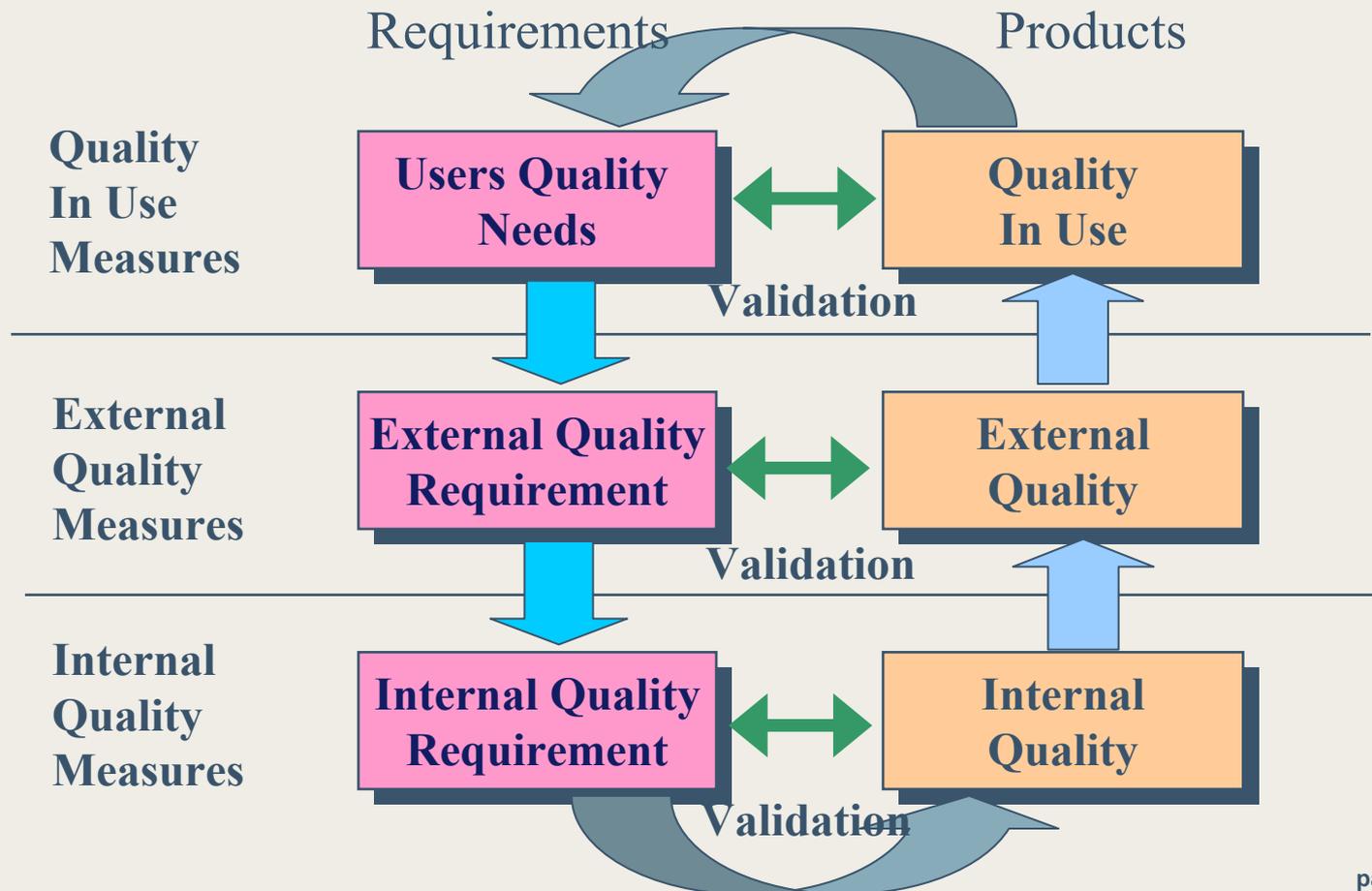


# Process and Product Measurement





# Software Quality Life-Cycle and Quality Measures





## Clause 8: Guides

The guide part can use the SPQM-RM (No.1) and Software Quality Life Cycle Model (No. 6) again.

At the requirements and measurement planning stage (left side of the SQLC), explanation follows SPQM-RM in top-down.

At the quality measurement and evaluation stage, explanation follows bottom-up.



# Initial Issues for Discussion

What is a measurement reference model? What should it do?

What is its connection to the quality model?

What guidance would you expect from such a set of standards?

Does it make sense to have the quality model and measurement model in separate standards?