Visualization – A Key Concept for Multidimensional Performance Modeling in Software Engineering Management

VASILE STROIAN
PIERRE BOURQUE
ALAIN ABRAN

AGENDA

- Problems
- Multidimensional performance models
- Visualization
- Tool - High Level Characteristics
- Conclusion
PROBLEMS

Software - complex intangible product
- Does not really have "physical" existence?
- It changes very rapidly
- It always has to be adaptable
- Difficulties when specifying the requirements
- High expectations regarding software

One-dimensional models - various viewpoints must be taken into account concurrently

Represent quantitatively and in a consolidated manner various viewpoints while keeping track of the values of the individual dimensions
PROBLEMS

- A number of tools dealing with quality
- Few in the area of software engineering performance
- Limited on multidimensionality representation
PROBLEMS
QEST prototype
9126 quality tree

ECONOMIC, SOCIAL AND TECHNICAL (E, S, T)
PROBLEMS

QEST prototype
Limited on multidimensionality representation
Multidimensional performance models in SE

- **ISO 9126**

- **1980 Standard**
- **internal and external quality**
- **model is generic**
- **standard framework**

- **hierarchy is strict**: each high-level quality characteristic is related to exactly one set of sub characteristic
Multidimensional performance models in SE

QEST

Abran & Buglione

Open model

Performance: Global vision

QEST + Lime

- Q QUALITY FACTOR
  - E ECONOMIC
    - Dimension Economic (managers)
  - S SOCIAL
    - Dimension Social (users)
  - T TECHNICAL DIMENSIONS
    - Dimension Technical (developers)
Framework available in MANAGEMENT

BSC

Prism

Figure 1: The Performance Prism Framework
Framework available in MANAGEMENT

Generic Framework: SINK & TUTTLE
VISUALIZATION

- representing data in multidimensional space
  - more natural view

- exploring and analyzing vast volumes is difficult

- interactive capabilities are required to allow effective exploration
VISUALIZATION
ISBSG DATABASE
Entreprise DATABASE

INDICATORS

Effectiveness  Quality  Quality of work life  Profitability
Efficiency  Productivity  Innovation

SINK INDICATORS
Open Indicator 1  Open Indicator 2
Open Indicator 3  Open Indicator n

Visualization

Selection Indicators
E.g.: Productivity + Efficiency + Profitability + Open Indicator 1 + Open Indicator 2

Build Viewpoints
E.g.: Economic + Social + Technic

QEST Algorithm

PERFORMANCE
TOOL

high-level characteristics

- adopt the Sink and Tuttle organizational framework
- build on the open, generic and geometrical QEST
- enable different visualization techniques to analyze data
- future potential scenarios on performance

International Software Benchmarking Standards Group (ISBSG)
CONCLUSIONS

- performance - inherently multidimensional
- end-product - intangible
- complex activity
- SE - relatively immature field
- models out of the box
- tools do not include a sophisticated visualization
Question Time!

Merci de votre attention!

Thank you for your attention!