Increase ICT Project Success with Concrete Scope Management

AEMES, Madrid 2007

Estimation
Benchmarking
Quality management
Process improvement

Carol Dekkers & Pekka Forselius, 4SUM Partners
www.4sumpartners.com

Agenda

1. ICT projects are unique
2. Scope management concepts
3. Northern and Southern SCOPE
4. Scope managers
5. Making change happen
6. Summary

1. Information and Communication Technology (ICT) projects are unique

Definition of an ICT project

A temporary endeavor
undertaken to create
an unique ICT (software)
product or service

Engineering and ICT projects

	Engineering	**ICT**
Industry	Mature	Relatively young
Product	Tangible (road, building)	Intangible (software)
Cost model	Standard (USD/km or /m^2)	? (USD/SLOC?)
Metrics	Common (m^2)	Users/developers → differ
"Project" definition	Discrete: Construction, renovation, upgrade → 1 building at a time	Hybrid mixture: R&D, development, conversion, enhancement → many s/w
Stability & costs	Some renovations, initial capital cost > maintenance	Frequent enhancement, maintenance = 8x develop
Controls, models	Building codes, "sealed" engineering blueprints	Regulatory (e.g., U.S. FDA), CMM®/CMMI®, SPICE

ICT project uniqueness

- 1 in 3 projects → Success
- Young industry → Lack of tools, unit costs, lack of historical data and experience
- Intangible product → Difficult to measure
- Hybrid ‘projects’ → PM challenge
- Risks high → materials, intangible product, requirement completeness & stability

Scope related reasons for ICT project failure

Lack of top management commitment

Misunderstanding the requirements

Not managing change properly

Failure to gain user commitment

Lack of effective project management skills

Lack of adequate user involvement

Failure to manage end user expectations

Lack of effective project management methodology

Unclear/misunderstood scope/objectives

Changing scope/objectives

ICT project breakthroughs

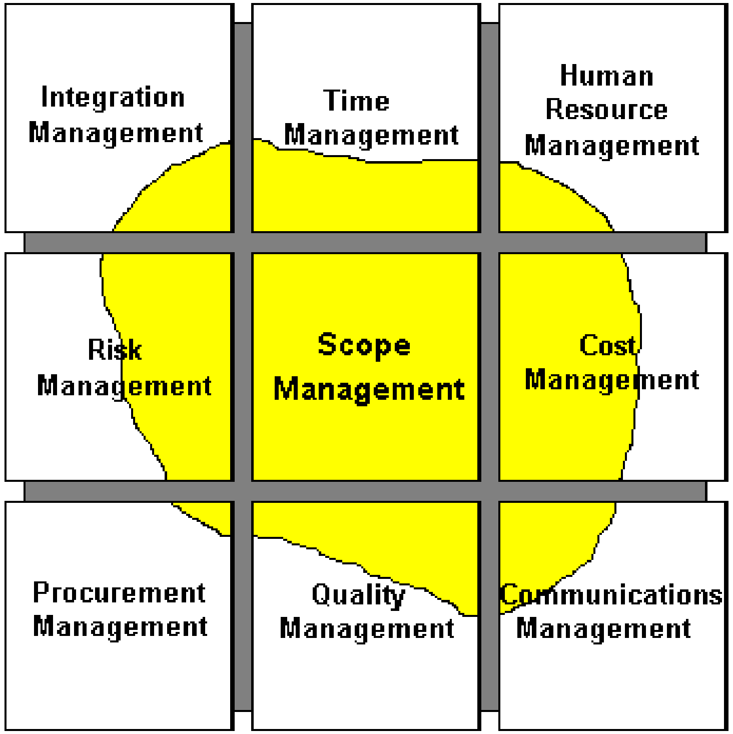
- Australia → Southern SCOPE
- Finland → Northern SCOPE
- Universal applicability
- Based on concrete scope management
- Modeled on PMBOK principles: Initiate, plan, execute, control, close

2. Scope management concepts

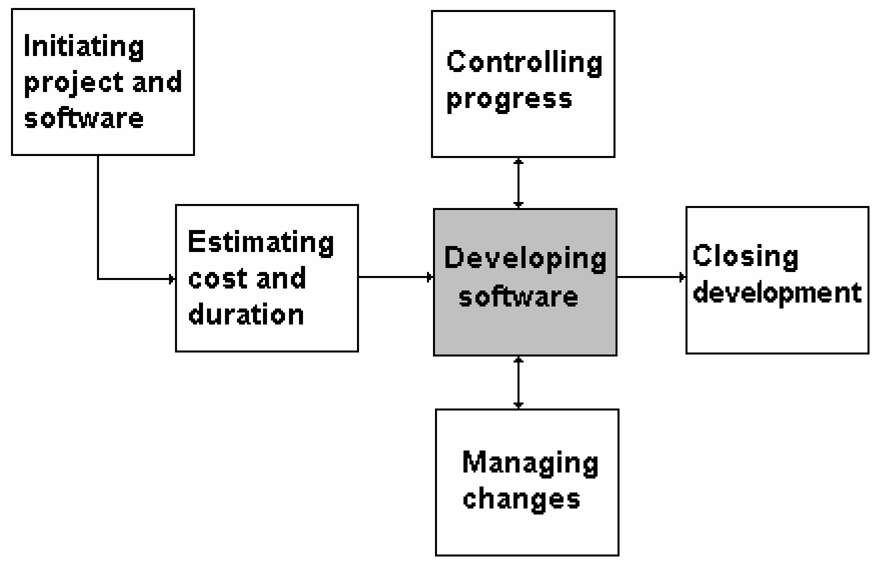
Enhanced scope management

1. Initialize & scope
2. Split into manageable sub-projects (as necessary)
3. Quantify & cost (based on currency per unit size)
4. Manage, track, control, and deliver based on 1-3. Change management based on scope and quantification by unit size

FiSMA scope management concept

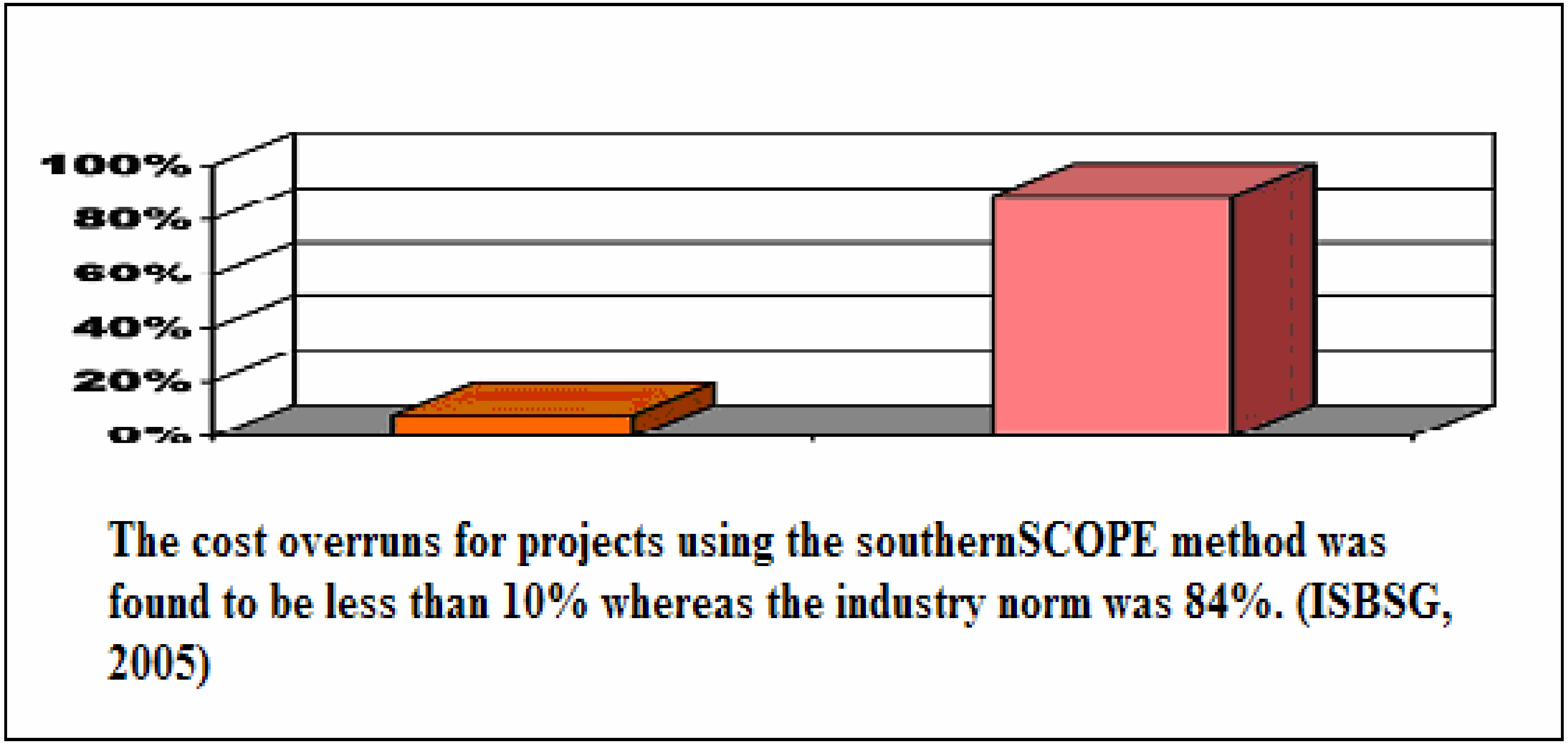


FiSMA scope management concept



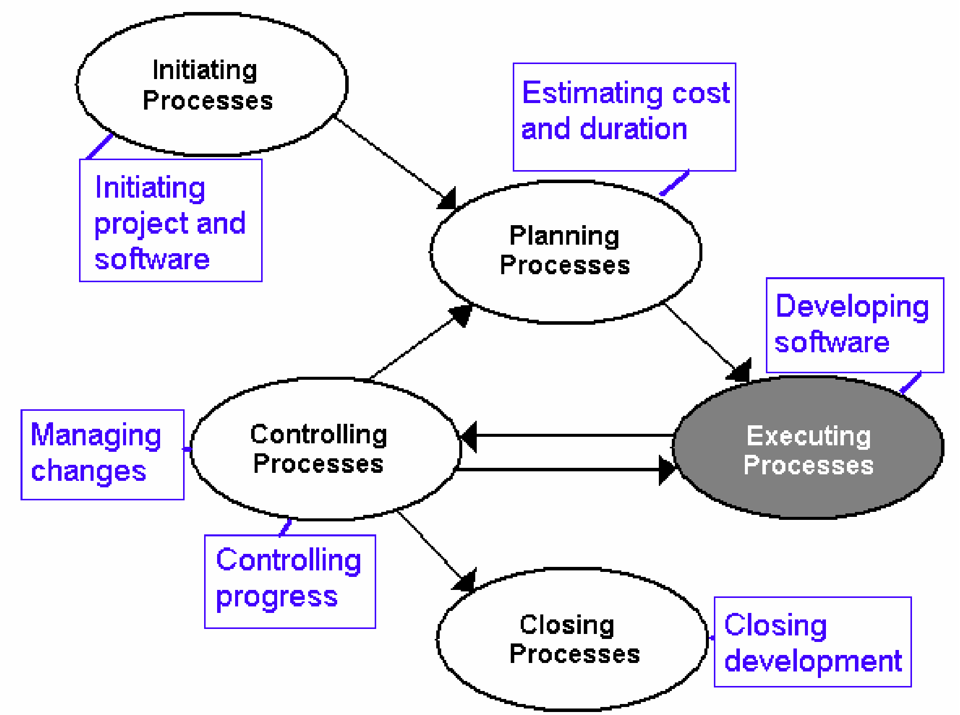
3. Northern and Southern SCOPE

Southern SCOPE



The cost overruns for projects using the southernSCOPE method was found to be less than 10% whereas the industry norm was 84%. (ISBSG, 2005)

Northern SCOPE



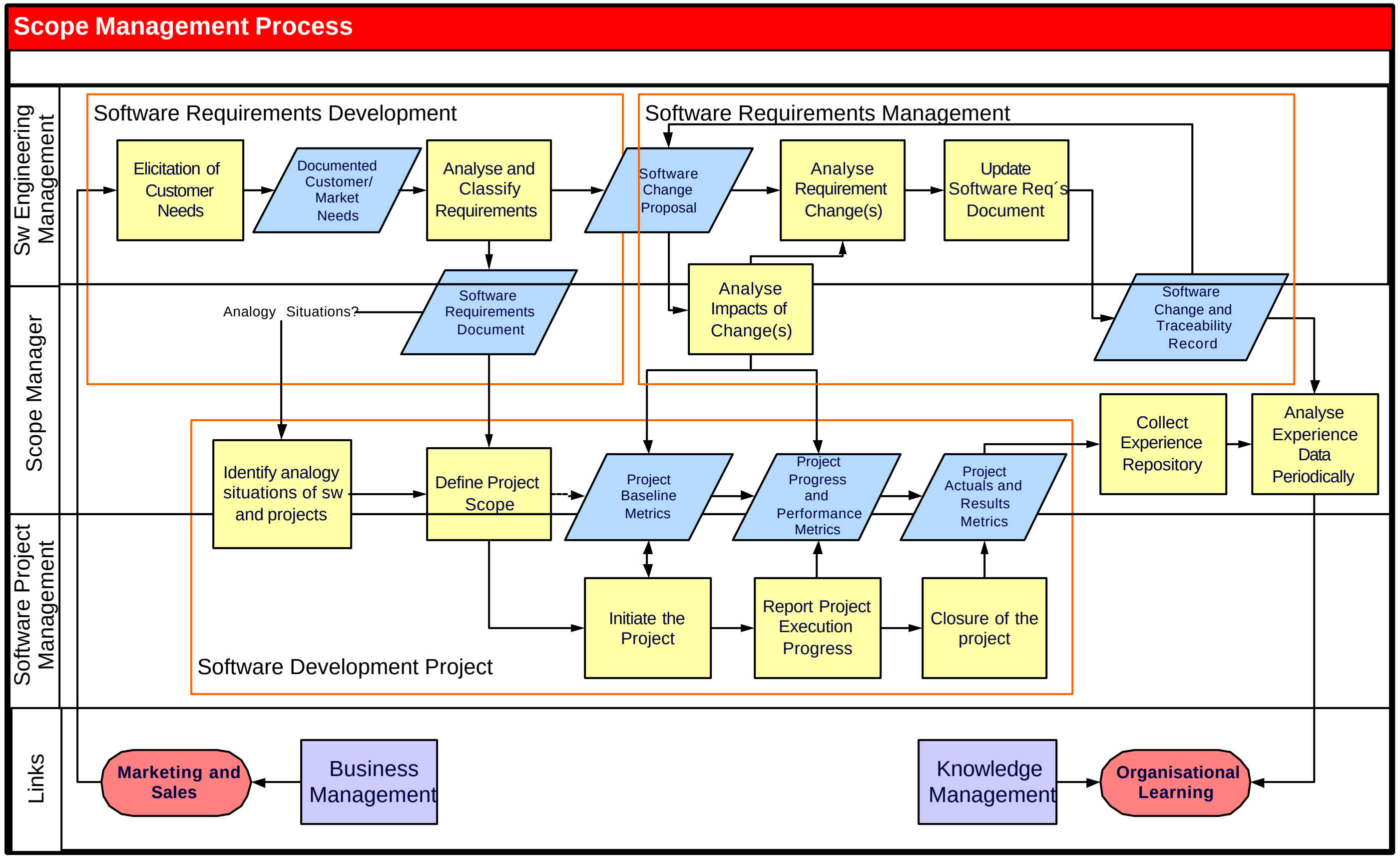
Northern SCOPE
Types of ICT projects

1. CUSTomer specific new development project
2. Software PRODuct new development project
3. Software VERSion enhancement project
4. ICT SERVice development project
5. PACKage software configuration project
6. Data CONVersion project
7. Software INTeGration development project

Rules for splitting a project into sub-projects

1. If the program consists of ICT development and other development work, such as manual process development, re-organising staff or technical development, different type of work should be assigned to separate projects.
2. If you apply incremental or iterative development approach, every increment or iteration should be assigned to separate projects.
3. Different type of ICT development work should be assigned to separate projects.
4. If the program must be stopped consciously for long time, for example to wait external decisions, the work before and after the break should be assigned to separate projects.
5. If two parts of product or service development are similar ICT project type but differ from each other by development technology, they should be assigned to separate projects.
6. If two parts of product or service development are similar ICT project type but differ from each other by development environment, they should be assigned to separate projects.
7. If two parts of product or service development are similar ICT project type but differ from each other by development team experience, they should be assigned to separate projects.
8. If two parts of product or service development are similar ICT project type but differ from each other by quality requirements of target result, they should be assigned to separate projects.
9. If two parts of product or service development are similar ICT project type but differ from each other by stakeholder dependencies, they should be assigned to separate projects.
10. If two parts of product or service development are similar ICT project type but differ from each other by risk level, they should be assigned to separate projects.

FiSMA scope management process components


Scope Management Process
Sw Engineering Management
Scope Manager
Software Project Management
Links
Software Requirements Development
Software Requirements Management
Elicitation of Customer Needs
Documented Customer/ Market Needs
Analyse and Classify Requirements
Software Change Proposal
Analyse Requirement Change(s)
Update Software Req´s Document
Software Requirements Document
Analogy Situations?
Analyse Impacts of Change(s)
Software Change and Traceability Record
Collect Experience Repository
Analyse Experience Data Periodically
Identify analogy situations of sw and projects
Define Project Scope
Project Baseline Metrics
Project Progress and Performance Metrics
Project Actuals and Results Metrics
Initiate the Project
Report Project Execution Progress
Closure of the project
Software Development Project
Marketing and Sales
Business Management
Knowledge Management
Organisational Learning

Estimation
Benchmarking
Quality management
Process improvement

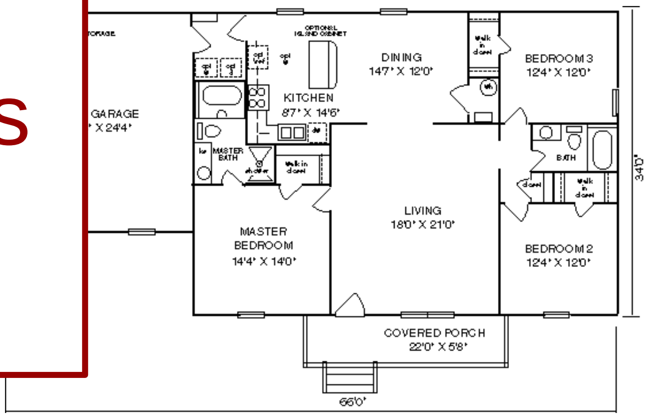
Carol Dekkers & Pekka Forselius, 4SUM Partners
www.4sumpartners.com

New!
Non-traditional ICT project tasks

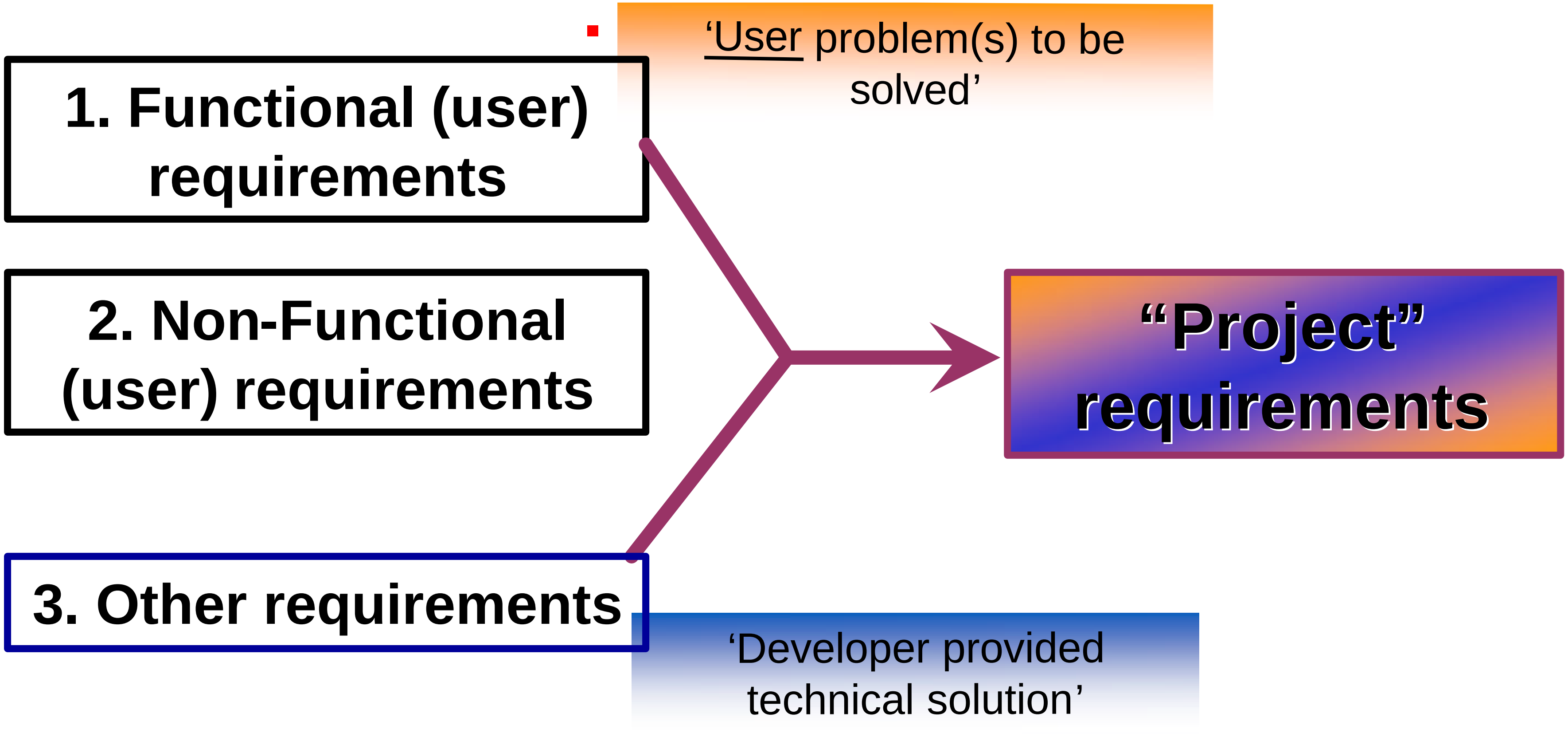
- Division into independent sub-projects
- Functional size measurement
- Baselined project metrics
- Effort, duration, & cost estimates based on historic project actuals
- Feedback loop for change

Introduction to Functional Size Measurement (FSM)

> “Function Points are the square feet or square meters for software”
>
> *Carol Dekkers*



Project requirements - simplified



1. Functional (user) requirements

2. Non-Functional (user) requirements

3. Other requirements

‘User problem(s) to be solved’

“Project” requirements

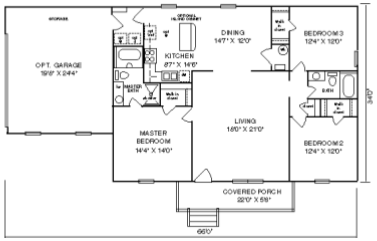
‘Developer provided technical solution’

1. Functional user requirements

→**What** the software must do:

- ❑Business processes performed by / supported by the software (user problem to be solved by software)
- ❑Examples: Record air temperature and pressure; Add new customer
- ❑Important for estimating
- ❑Like a floor plan for software: size is “Functional Size”

Size = functional size (function points FP)



2. Non-functional user requirements

→**HOW** software must perform -ilities: (Suitability, Quality, Interoperability, Security, Reliability, Efficiency, Maintainability, Portability…)

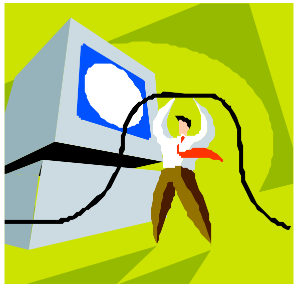
- ❑ Constrains the software → increases complexity
- ❑ Important for estimating
- ❑ Like a building code or contract specifications (part of user problem to be solved)

Not part of functional size

3. Other requirements

→ How software will be developed / ‘built’

- ❑ Includes: tools, methods, skills, language, WBS tasks, platforms, software, type of project, etc.
- ❑ Part of solution
- ❑ Important for estimating
- ❑ Like “blueprint” drawings



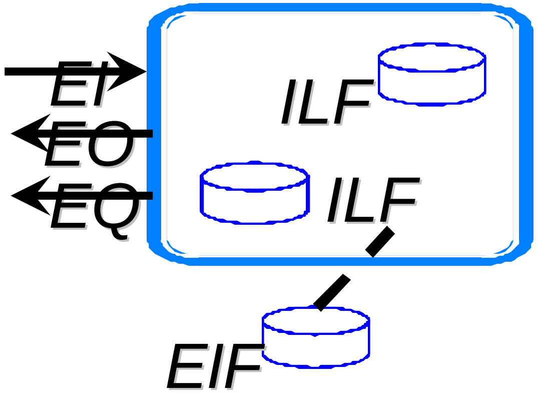
Not part of functional size

Functional size measurement (e.g., Function Points)

- Quantifies “Base functional components (BFC)”
- Number of “points” based on standard methods
- Similar to sizing rooms in a floor plan

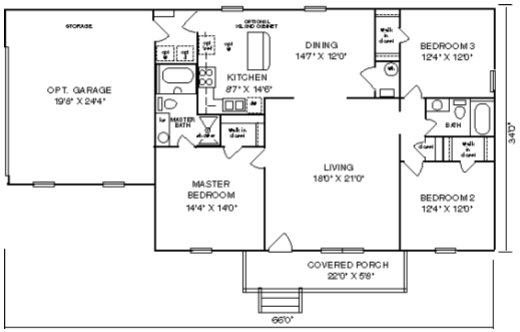
International Function Point Users Group (IFPUG) has 5 BFCs:

- Persistent data: ILF, EIF
- Elementary processes: EI, EO, EQ

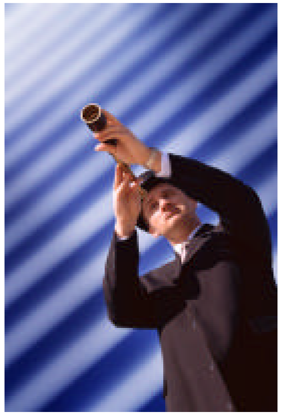


Functional size measurement

- Five standard ISO/IEC conformant FSM methods:
  - IFPUG 4.1 unadjusted – ISO/IEC 20926
  - COSMIC – ISO/IEC 19761
  - NESMA – ISO/IEC 24570
  - Mark II – ISO/IEC 20968
  - FiSMA 1.1 - ISO/IEC 29881



4. Scope managers



What is a scope manager

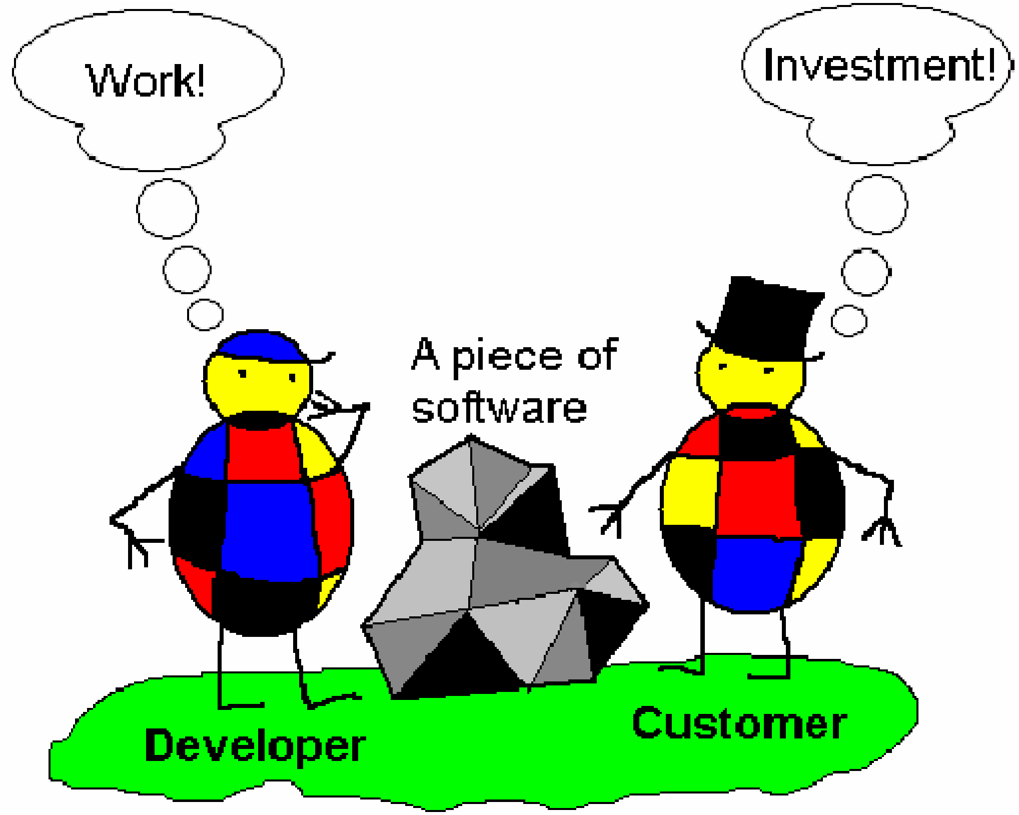
The Scope Manager provides **metrics based project governance**. …very successful in objectively quantifying key project attributes … to enable decision making with respect to project estimates and project risk…

Typically a metrics specialist who has excellent skills in business analysis, project estimation and functional size measurement.

…**Independent of the project team** … able to report the status of the project objectively without bias, to a management level that has the authority to proceed, change direction or cancel the project.

(Morris, 2004)

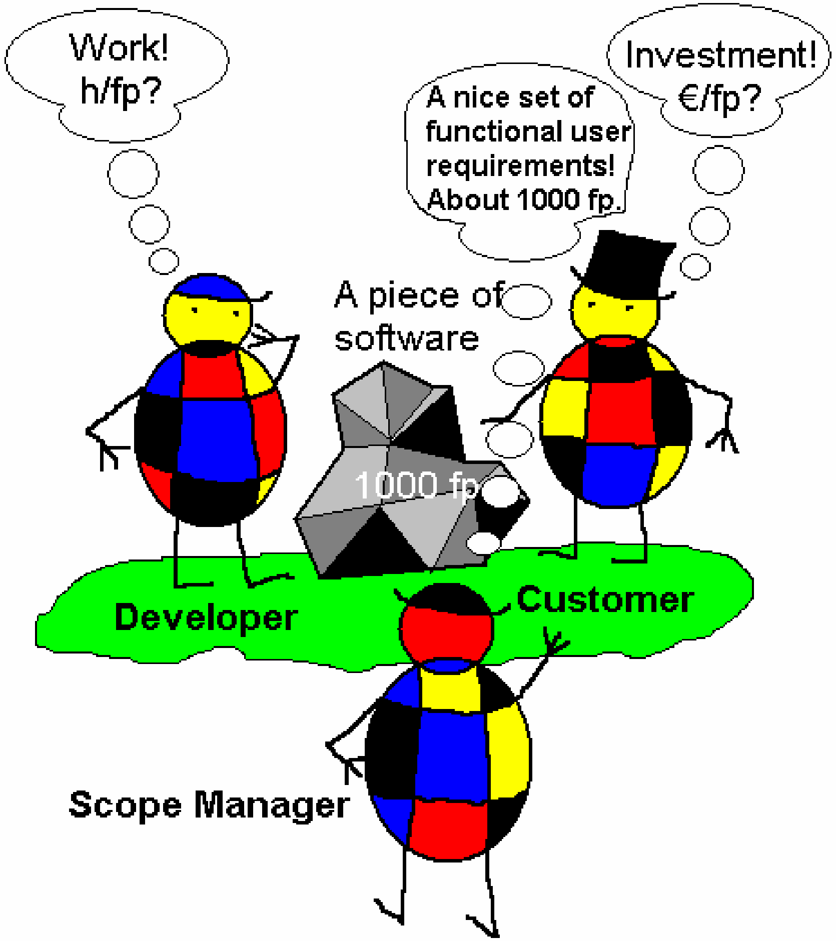
Customer & supplier views



1. A big problem is that there are very few **customers** who understand the size of software, even if they are good at specifying requirements. **<u>They want fixed price!</u>**
2. Due to missing FSM skills, the **developers** cannot measure or estimate the size of software. **<u>They want to be paid based on hours worked.</u>**

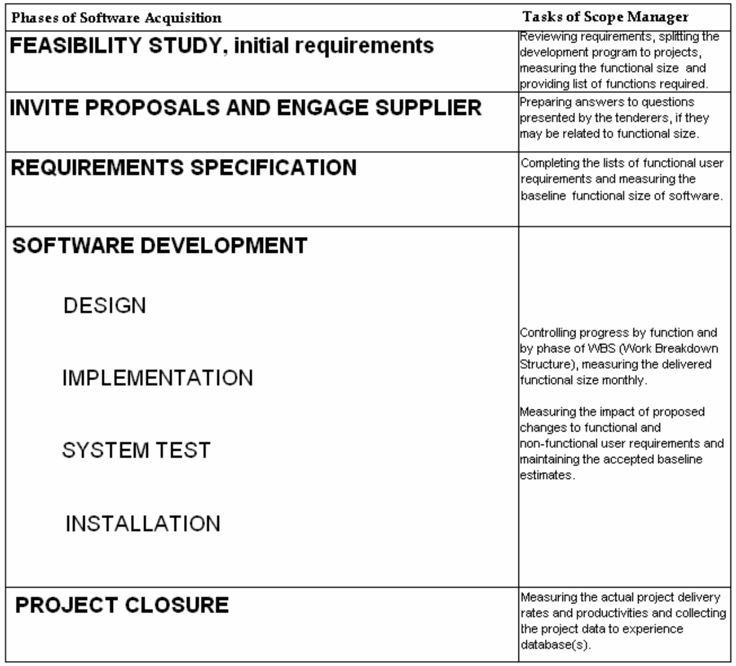
Scope manager – the Equaliser

- A Scope Manager is neutral software measurement specialist with good understanding of requirements and development work.
- The customer organisation can hire a professional Scope Manager to help from early tendering phase to the end of the development life-cycle.
- **The customer and developer can use unit pricing e.g. €/fp.**



Scope manager’s tasks in theory

1. Help customer to organise the development program into measurable subsystems and projects.
2. Measure the size of each piece of software to be developed.
3. Help customer to answer the questions of candidate suppliers.
4. Baseline the size with the selected supplier.
5. Help customer to control changes and progress.
6. Ensure that the project data will be collected and submitted to a common repository.



Phases of Software Acquisition	Tasks of Scope Manager
FEASIBILITY STUDY, initial requirements	Reviewing requirements, splitting the development program to projects, measuring the functional size and providing list of functions required.
INVITE PROPOSALS AND ENGAGE SUPPLIER	Preparing answers to questions presented by the tenderers, if they may be related to functional size.
REQUIREMENTS SPECIFICATION	Completing the lists of functional user requirements and measuring the baseline functional size of software.
SOFTWARE DEVELOPMENT DESIGN IMPLEMENTATION SYSTEM TEST INSTALLATION	Controlling progress by function and by phase of WBS (Work Breakdown Structure), measuring the delivered functional size monthly. Measuring the impact of proposed changes to functional and non-functional user requirements and maintaining the accepted baseline estimates.
PROJECT CLOSURE	Measuring the actual project delivery rates and productivities and collecting the project data to experience database(s).

FiSMA Scope Manager rule definition document 2005

Scope manager’s tools in Finland

- Characteristics analysis

  A method and a simple MS Excel tool for analysing and pointing out the characteristics of a large software development program.

- Experience® Pro 3.1

  Packaged software supporting functional size measurement and determination of the quality requirements, as well as providing the related attachment reports for the contracts. The tool includes several project databases to check the reality and feasibility of the target projects.

- MS Word

  Used to provide a 1 page summary of the system size and quality requirements by sub-system.

5. Making change happen

Sustainable change needs **P.O.W.E.R.**

Predisposition → we see success

Outlook → we will do it

Wherewithal → we can do it

Evaluation → we will measure it

Resources → we commit to it

Source: C.Dekkers 2000

“ Motivation moves mountains…

Motivation is everything! ”

Principle 6 of Tom Gilb’s <u>Ten Most Powerful Principles for Quality in (Software and) Software Organizations</u>, 2nd World Congress on Software Quality, Tokyo, September 2000

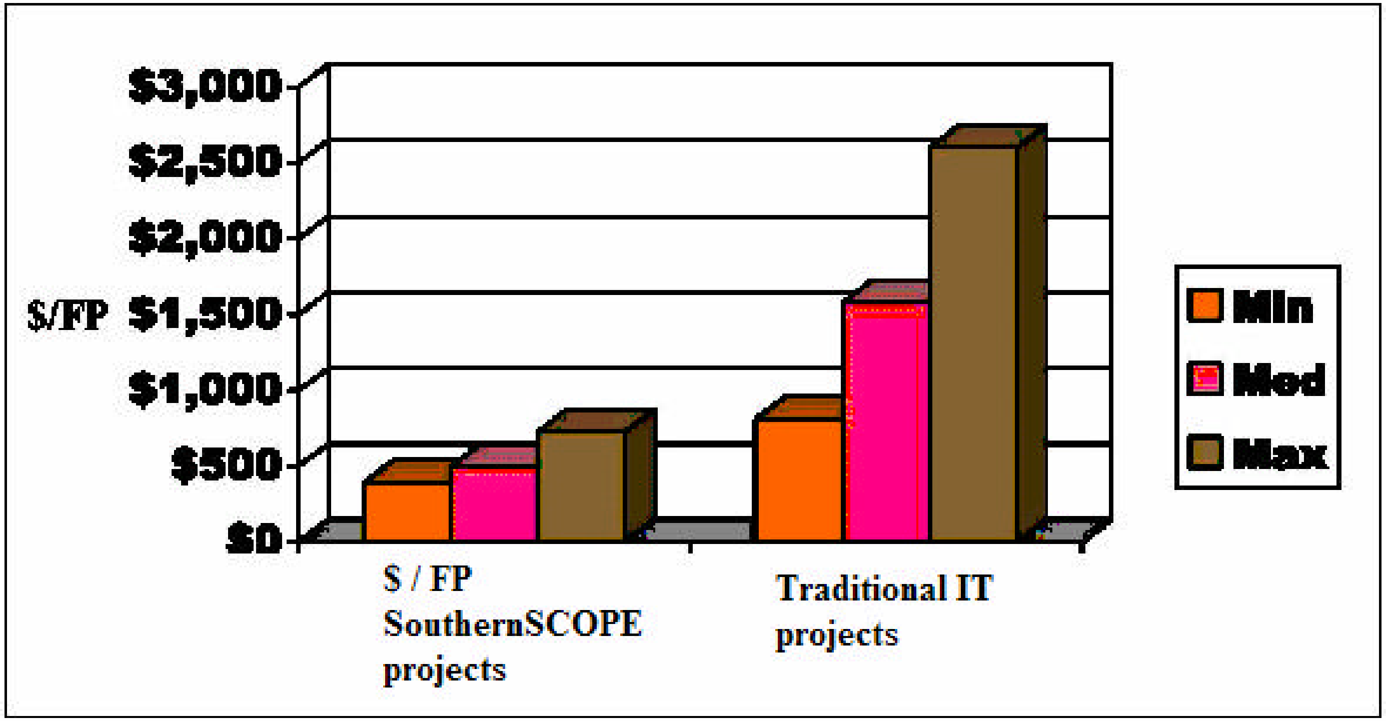
Critical success factors of SPI:

Pressure for change	Leadership and vision	Capable people	Actionable first steps	Effective rewards	**Results**
+	+	+	+	+	Successful implementation
	+	+	+	+	Disinterest
+	+	+	+		Evaporation
+	+	+		+	Frustration
+	+		+	+	Disengagement
+		+	+	+	Dissolution

Source: P.Willman

6. Summary

Results speak for themselves



Thank you !

Carol Dekkers
dekkers@qualityplustech.com

Pekka Forselius
pekkaf@sttf.fi