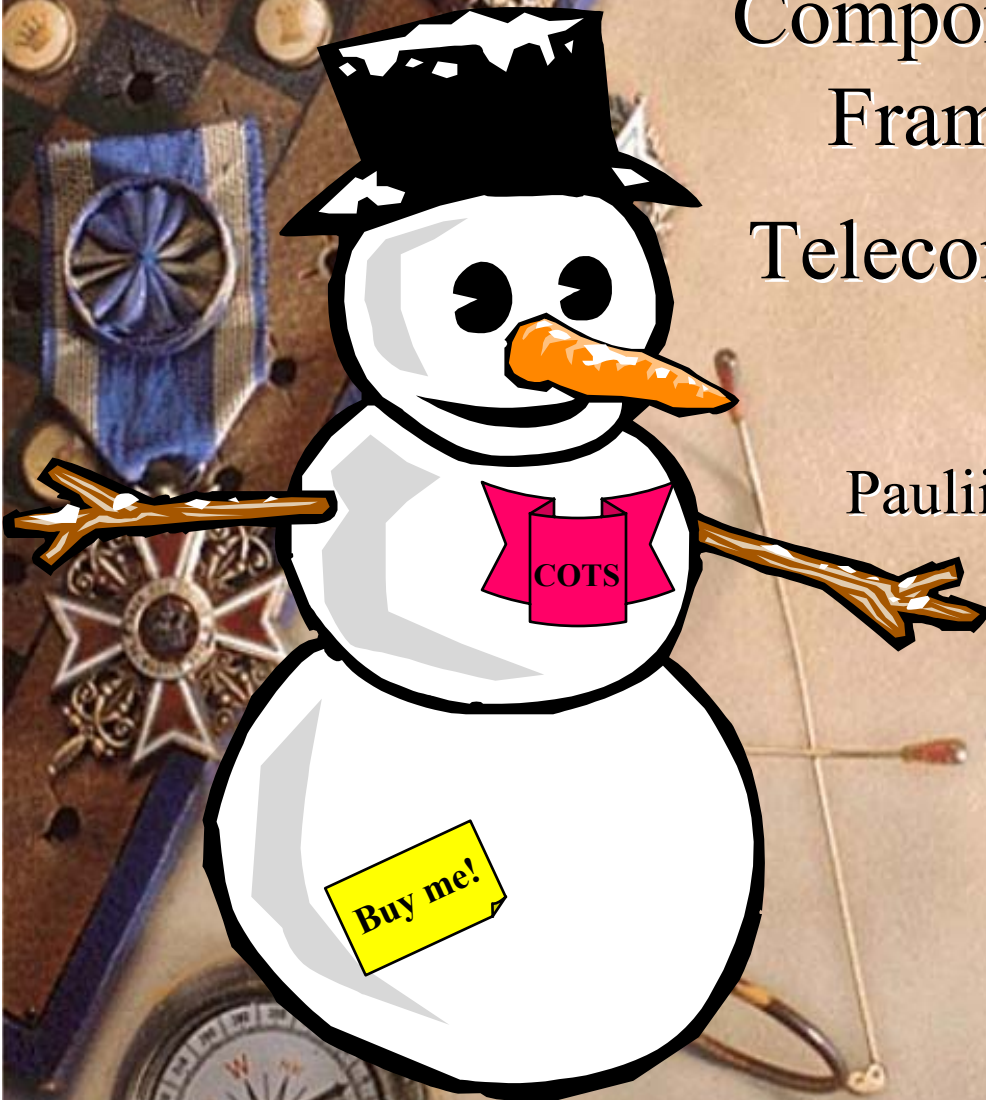


Definition of a COTS Software Component Acquisition Process Framework: The Case of a Telecommunications Company

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**Euromicro 2002 CBSE Track
Dortmund, Germany**





Introduction

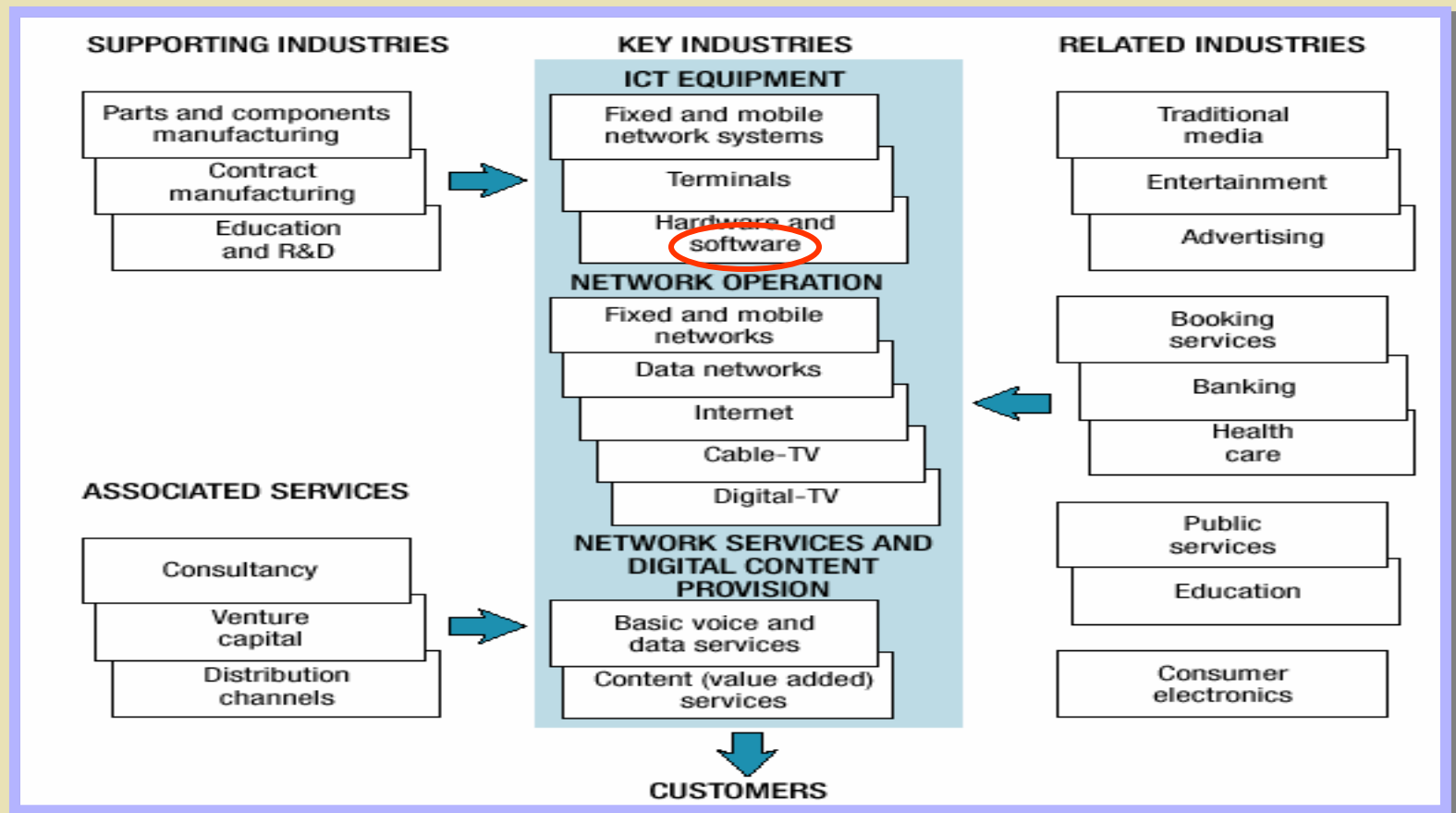
- ◆ Automation, electronics and telecommunication industries as software buyers:
 - Integration of self-developed, subcontracted and COTS software components is an option for buyers.
 - Example: telecommunication equipment developer:
 - Industry structure changing, the role of software increasing
 - Own product-line based CBSE process already established
 - In-house development + subcontracting + COTS buying.
 - Problems:
 - No support from CBSE for COTS software buying
 - Software not bought by the purchasing organization.



Software acquisition goals

- ◆ How to organize software buying, in practice?
 - Where to find software component suppliers?
 - How to manage purchasing of the components?
 - How to integrate external and in-house software?, etc.
- ◆ Case study performed by the authors:
 - Development of a CSCA process framework:
 - From screening of potential software component suppliers to ending the reuse of some components – a holistic view
 - Initial harmonization with the company's CBSE process.
 - Focus on COTS rather than MOTS or OSS software components – the case company's strategic choice.

Driver: industrial change



Source: Baldauf, L., Lovejoy, M., Karesto, J., Paija, L. 2001. Global Networking in Wireless Teletechnology Business. Tekes Technology Review 114/2001.

Context: three software sources

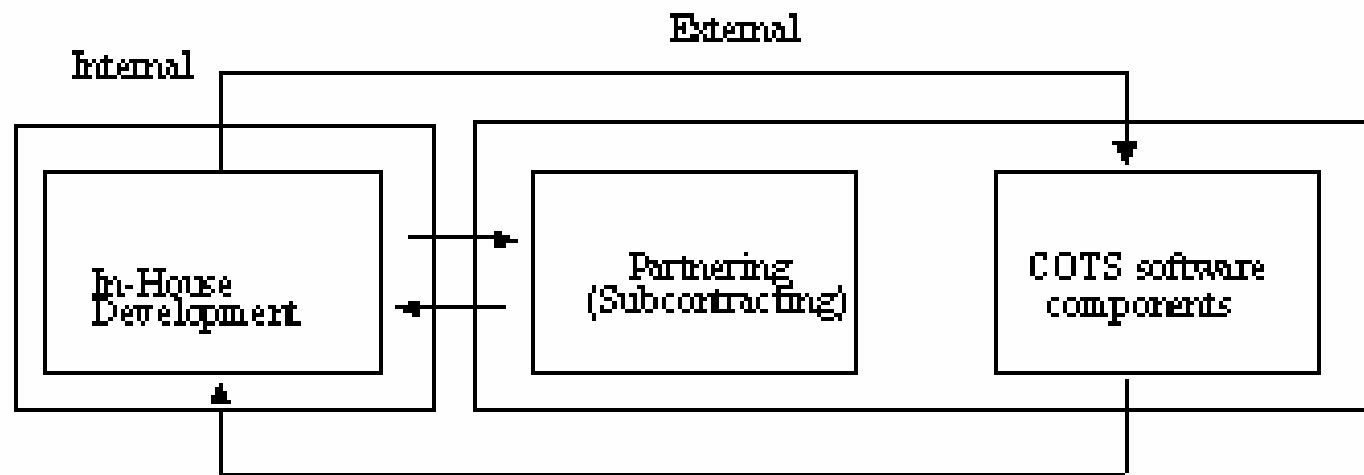
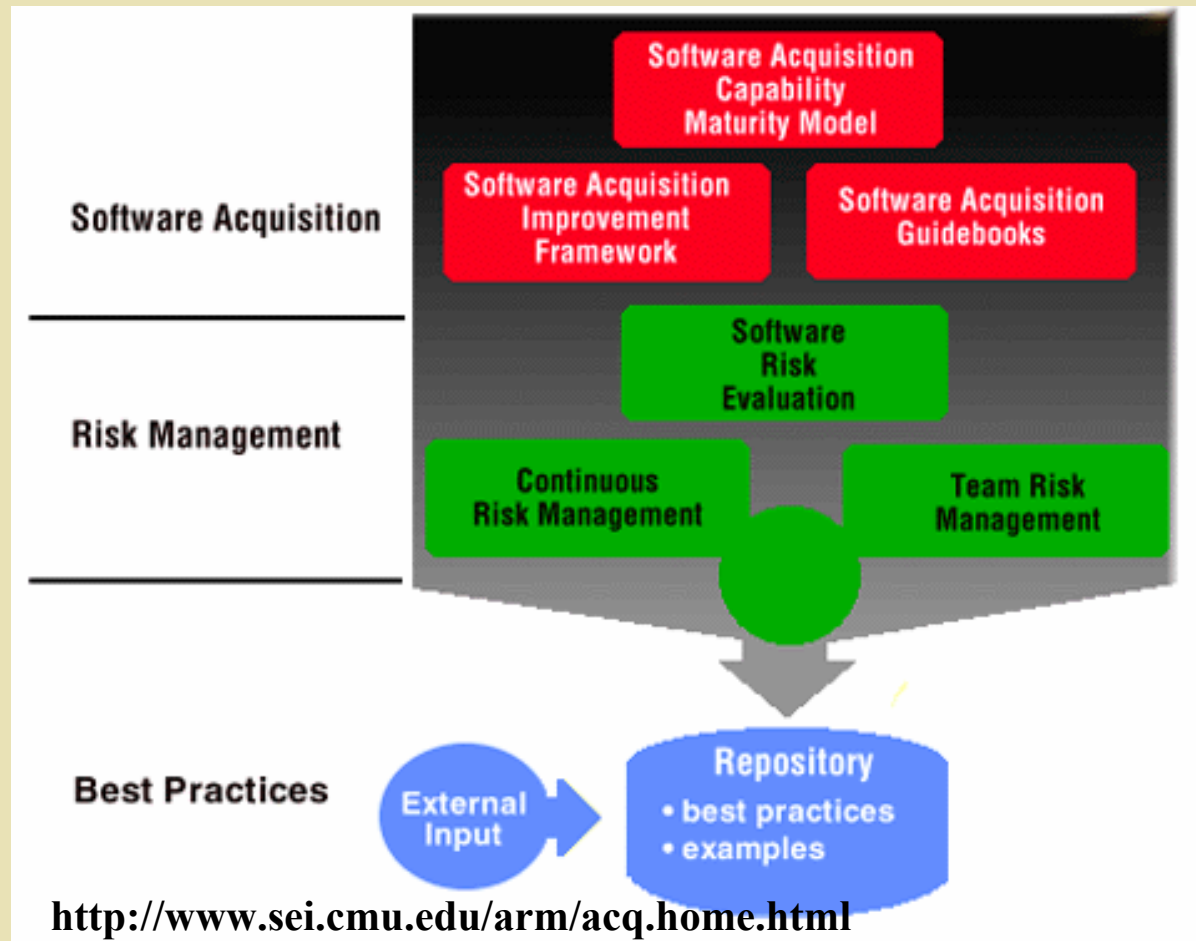


Figure 1. The case company's software acquisition alternatives.

Software acquisition basics





Capability and reference models

- ◆ Several models for software acquisition exist
 - Reference models - preferred purchasing procedures:
 - IEEE Recommended Practice for Software Acquisition
 - IT Purchasing Guidebook for Small Enterprises, etc.
 - Improvement of the capability of software acquisition:
 - SA-CMM, BOOTSTRAP Acquisition Process, SPICE, etc.
 - Scope of the models varies, no explicit COTS focus.
 - Our view: the 2nd maturity level vs. the IEEE model.
 - Table 1: ideal COTS software acquisition process.

Structure of an ideal view

Table 1. Ideal COTS software acquisition phases and activities.

Process Models	Maturity Models	
<i>Planning Phase</i> - Identify the needs - Specify the - Prepare the RFP	Software acquisition planning	Evaluation Project management
	Requirements development and management	
<i>Contracting Phase</i> - Identify suppliers - Select two to three best candidates - Select the best supplier	Solicitation	
<i>Delivery / Use Phase</i> - Sign the contract - Get the component - Use and maintain the component (guarantee) - Monitor the supplier after the guarantee - End of use	Contract tracking and oversight	


Example: SA - CMM

SA-CMM[®] Key Process Areas

Level	Focus	Key Process Areas
5 Optimizing	<i>Continuous process improvement</i>	<ul style="list-style-type: none"> . Acquisition Innovation Management . Continuous Process Improvement
4 Quantitative	<i>Quantitative management</i>	<ul style="list-style-type: none"> . Quantitative Acquisition Management . Quantitative Process Management
3 Defined	<i>Process standardization</i>	<ul style="list-style-type: none"> . Training Program . Acquisition Risk Management . Contract Performance Management . Project Performance Management . Process Definition and Maintenance
2 Repeatable	<i>Basic project management</i>	<ul style="list-style-type: none"> . Transition to Support . Evaluation . Contract Tracking and Oversight . Project Management . Requirements Development and Mgt . Solicitation . Software Acquisition Planning
1 Initial	<i>Competent people and heroics</i>	

<http://www.sei.cmu.edu/arm/SA-CMM.html>

Other sources of information: DOD Acquisition Deskbook?

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Deutschland 21. November 2001

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Je größer das Unternehmen, desto schwieriger wird es, den Softwarebedarf und die für die Beschaffung von Software vorgesehenen Budgets effizient zu verwalten. Vor allem bei internationalen Konzernen mit vielen weltweit verteilten Niederlassungen ist die Bestellung von Software in hohen Stückzahlen häufig mit großen Unsicherheiten verbunden. Zwar gibt es mittlerweile entsprechende Bezugsprogramme, doch die lösen das Problem nur teilweise. Was Sie brauchen, ist ein zentraler Service, der die Softwarebeschaffung unternehmensweit koordiniert. Diesen Komplettservice gibt es jetzt - den *Software Acquisition (SWA) Service von Compaq.*



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... as secondary and less interesting issues such as **software (component) acquisition**, packaged **software** customisation or system maintenance. Furthermore, the few ...

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COTS software acquisition concerns in the case company

- ◆ Interviews of some 20 experts of the case company, plus two potential supplier companies.
- ◆ Several brainstorming sessions were held.
- ◆ Recurring themes in interviews included:
 - Benefits/pitfalls of the use of COTS components?
 - Contracting and COTS supplier "control" procedures?
 - Cost and reliability of COTS components?
 - Availability of useful up-to-date market information?
 - Availability and scale of use of components?



Identified challenges

◆ **Contracting and negotiation:**

- In-house purchasing expertise, importance of the case company as a purchaser, time needed for negotiations, legal aspects, mutual responsibilities, maintenance, bug fixes, pricing and payment strategies.

◆ **Evaluation of components and suppliers:**

- Technical component evaluation criteria, business related criteria (future of the supplier; its ownership relations, financial status and links to competitors), cost-benefit analysis of components, own roles and resources needed for component acquisition.



... challenges

- ◆ **Management of components and suppliers:**
 - Management of the purchased component's life cycle (including new releases, corrections, etc.), ending of the use of some component, internal sharing of information regarding components and potential suppliers, finding ways to influence suppliers and the future development of the acquired components, limitation of the number of suppliers but still ensuring second sources, identifications of component needs early enough, criteria for replacing some component.



Key acquisition roles

- ◆ All responsible parties involved in the acquisition process would need to be clearly identified!
- ◆ At least three different roles to be addressed:
 - someone would need to carry out the process, in practice - this would most likely be a person from the project that needs some specific component;
 - someone should be responsible for guiding the project personnel during the acquisition - for example, a team of specialized software subcontracting managers; and
 - someone must take care of the continuous improvement of the software acquisition process – for example, the company’s software quality team.



Illustration of the process

- ◆ A four-phased process framework for COTS software component acquisition and management (CSCA) was defined, Figure 2:
 - the actual process model was documented, too, using the company's process description principles; plus training material, document templates, checklists, etc.
- ◆ Initial harmonization with the CBSE model:
 - use of cross-references in task descriptions
 - definition of COTS-related responsibilities in the CBSE process.

... the process

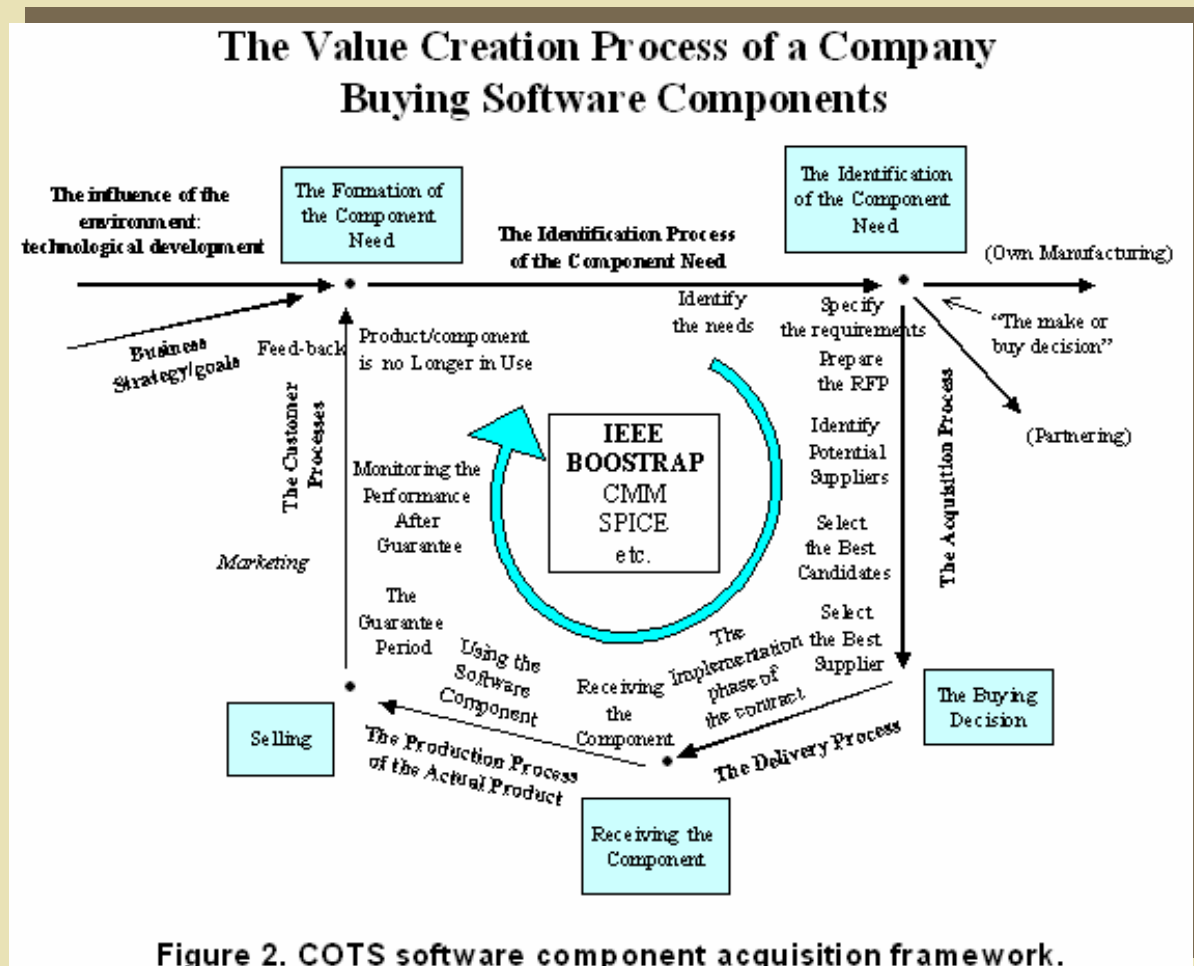


Figure 2. COTS software component acquisition framework.



... the process

- ◆ The CSCA process revolves around the underlying customer value creating principles:
 - “COTS Software Component Acquisition and Management Processes”
 - The outer circle of the framework includes processes through which value is created for the purchaser.
- ◆ Phases derived from the ideal acquisition model form the centre of the framework:
 - 1. Planning, 2. Analysing and Evaluating, 3. Negotiating, and 4. Managing and Reusing.

... the process

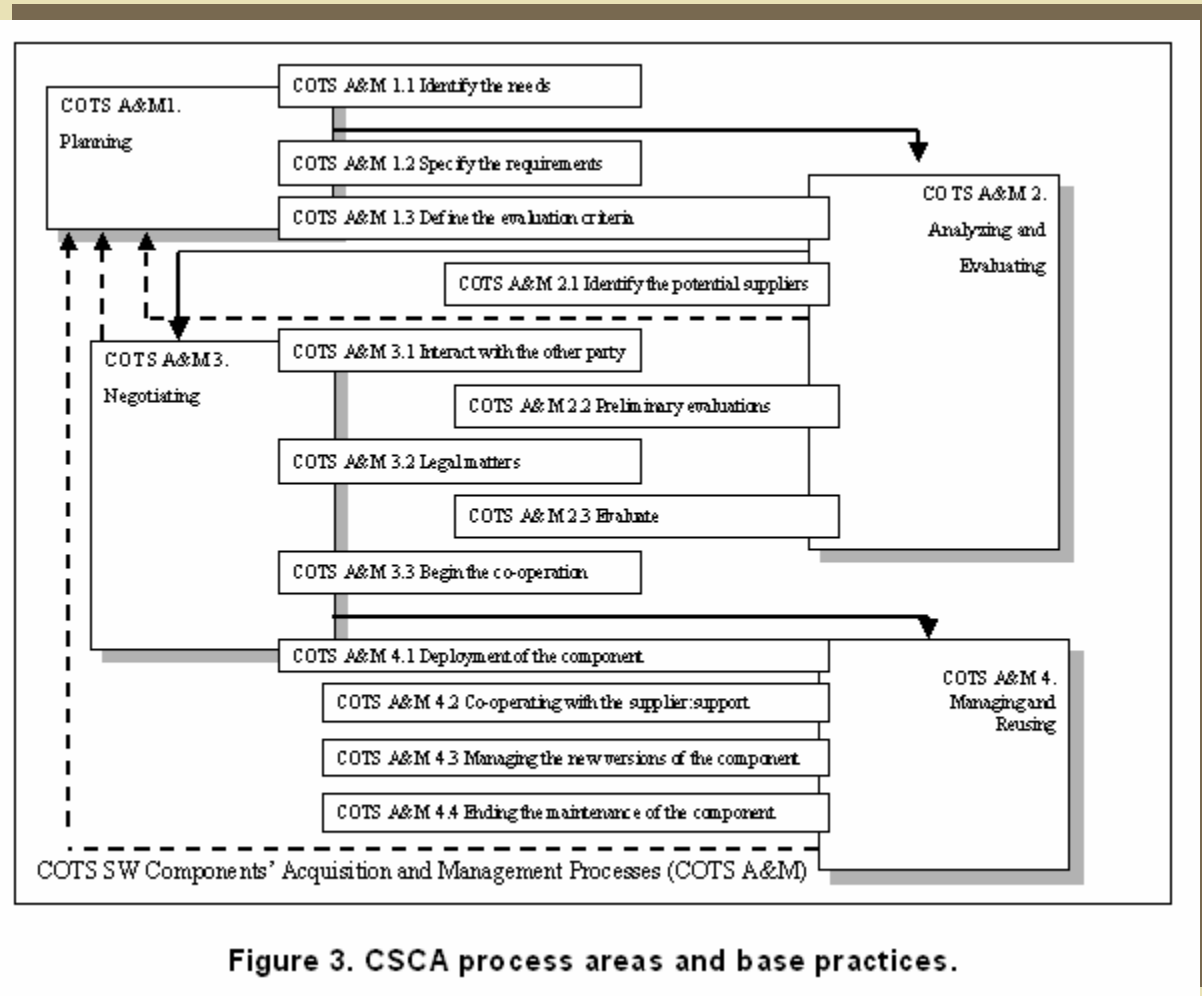


Figure 3. CSCA process areas and base practices.



... the process

- ◆ Each of the four process areas is composed of base practices that describe the phases and issues of the areas in more details.
- ◆ The process areas do not form any successively ordered phases (cf. the ideal software acquisition process schema, but rather of parallel and overlapping process activities:
 - Many process activities would need to be conducted continuously and concurrently.



Evaluation

- ◆ The CSCA process framework was evaluated in one project that aimed at reusing as many external software components as possible:
 - Several kinds of software components were intended to be bought, ranging from system software to application frameworks and middleware solutions.
- ◆ The project was in the middle of the “The Acquisition Process” phase wrt. the framework:
 - comparison of the project’s COTS software component acquisition process with the CSCA framework (document analysis and interviews).



Findings


- ◆ *Definition of a product strategy* would be needed as a starting point for the CSCA process.
- ◆ Criteria for preferred COTS software components and *acceptable risk levels* should be made explicit.
- ◆ Even more detailed definition of the *roles and responsibilities* would be needed, involving especially legal and business expertise.
- ◆ The *persons involved* in the process should be explicitly *named* (roles are not enough).




Findings ...

- ◆ *Owners of software components and supplier relationships should be appointed.*
- ◆ *Determination of the costs of COTS software components would concretize value creation:*
 - Pricing of internal and subcontracted software development is, in comparison, very straightforward.
- ◆ *The supplier relationship continuum should be more carefully investigated – what kind of relationship to create and how to maintain it:*
 - Market place vs. strategic partnership?

Marketplace - example

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Alliance Manager

Qualifications:

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Time's up - thanks!

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