

## Kapitel 2

# The CommonKADS Methodology

Motivation

2.1 The Knowledge Management Framework of CommonKADS

2.2 Feasibility Study: Organization Modeling

2.3 Impact and Improvement Analysis:

Task and Agent Modeling

2.4 Guidelines for Organization and Task / Agent Study

## 2. The CommonKADS Methodology

[Schreiber et al. 99]

- Originally, CommonKADS aimed at providing a methodology for developing knowledge (-based) systems
  - Thus, CommonKADS is a knowledge engineering methodology
  
- However, there exist strong ties between knowledge engineering and knowledge management
  - Knowledge management exploits the methods and tools of advanced information and knowledge systems
  - Knowledge (-based) systems have to be embedded into the organizational and human resources context

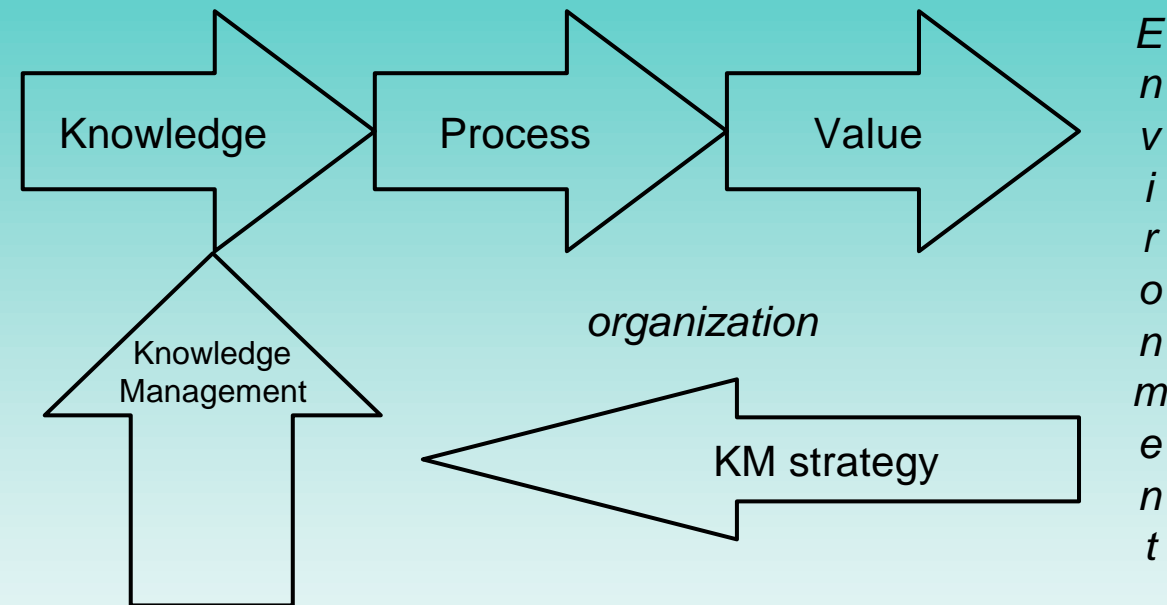
## 2. The CommonKADS Methodology

- Subsequently we consider
  - The overall knowledge management framework as defined by CommonKADS
  - Those models of the CommonKADS model suite that are relevant for knowledge management

## 2.1 The Knowledge Management Framework of CommonKADS

- Knowledge management (KM) strategy is defined in an outside-in direction
  - What are the value-creation goals of the organization?
  - How is this value delivered by the organization's business processes?
  - What knowledge is used in these processes to deliver value?
  
- KM question
  - What actions are useful for increasing the leverage of knowledge underlying these business processes?

## 2.1 The Knowledge management Framework of CommonKADS

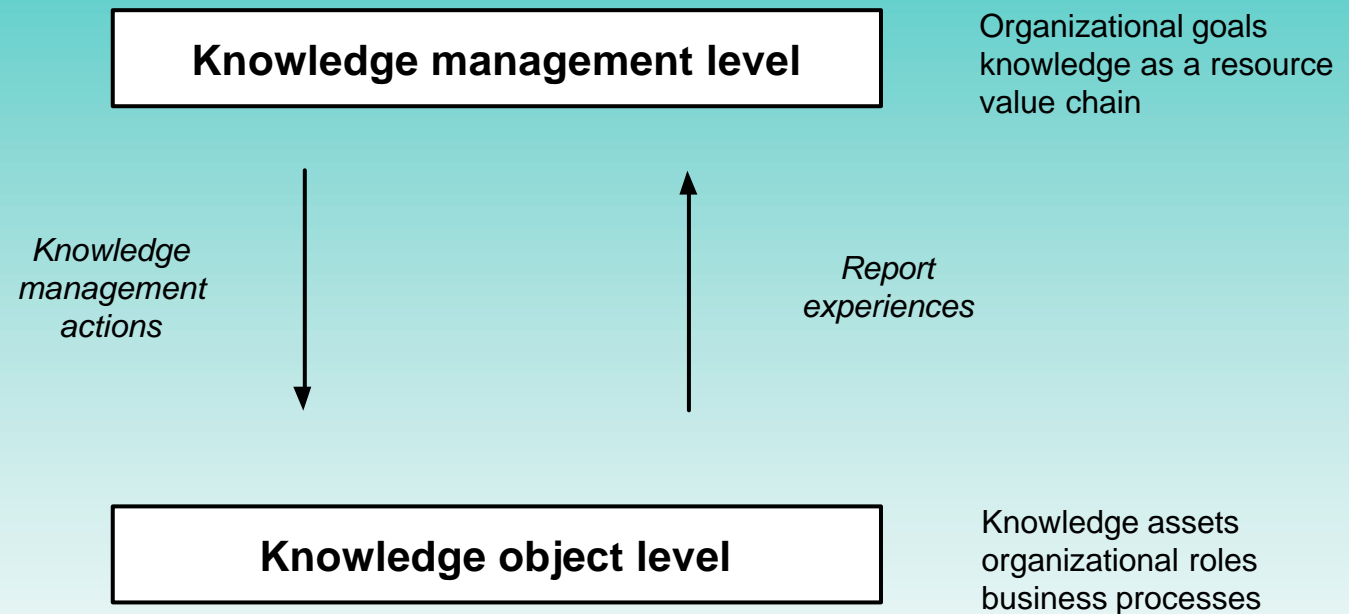


Knowledge management in relation to the business processes and value creation by the organization.

## 2.1 The Knowledge management Framework of CommonKADS

- KM approach distinguishes a
  - Management level
  - Knowledge object level
  
- Management level:
  - Manage knowledge as a resource
  - Execute actions on the knowledge object level
    - Knowledge assets
    - Organizational roles
    - Business processes
  - Monitors the object level actions through reports and observations

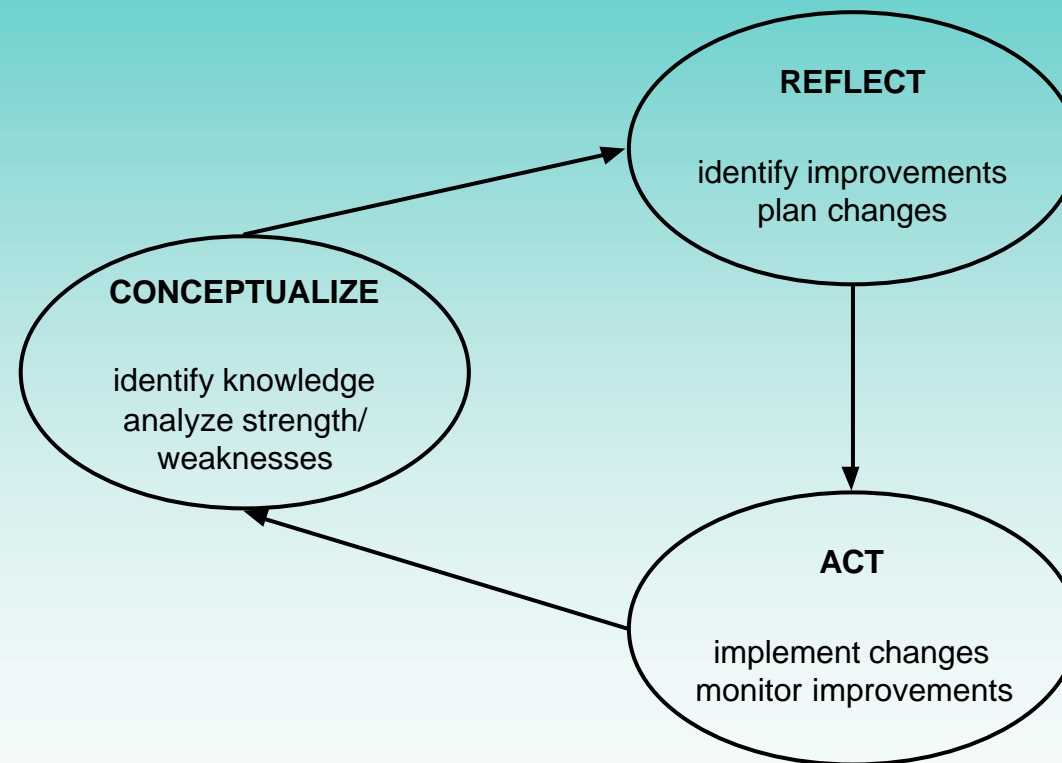
## 2.1 The Knowledge management Framework of CommonKADS



Knowledge management, like other management tasks, can be seen as a metalevel activity that acts on an object level.

## 2.1 The Knowledge management Framework of CommonKADS

- Management level consists of three types of management activities, embedded in a cyclic process



Knowledge management consists of a cyclic execution of three main activities: conceptualize, reflect, and act.



## 2.1 The Knowledge management Framework of CommonKADS

- Conceptualize
  - Get a view on the knowledge in the organization
  - Identify strong and weak points (bottleneck analysis)
  - Guidelines:
    - Define the scope of the KM activity
    - Do not go into too much detail
    - Be aware of “hidden” knowledge
    - Consider different viewpoints
    - Quantify value of knowledge at least to some extent

## 2.1 The Knowledge management Framework of CommonKADS

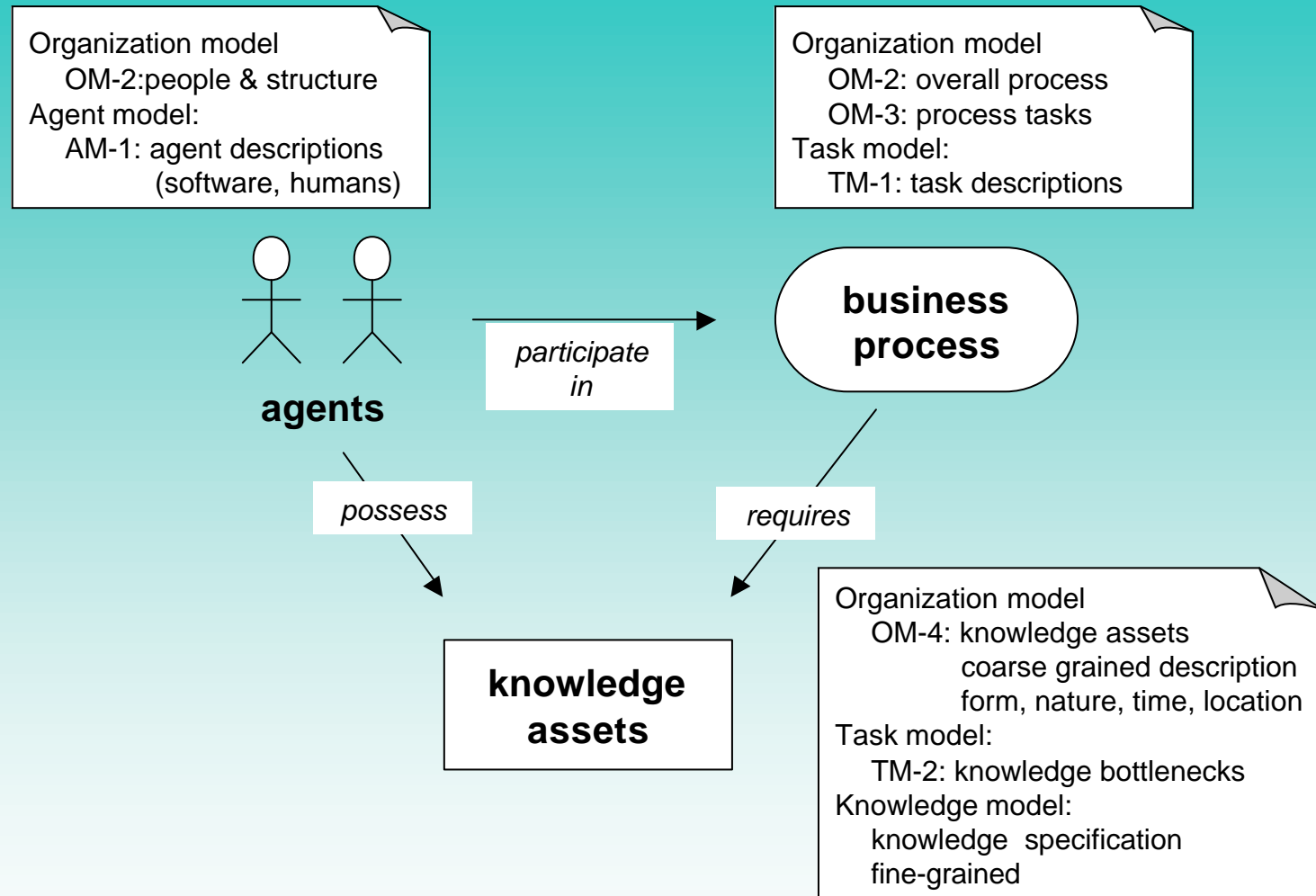
- Reflect
  - Define priorities for identified actions
  - Take all kinds of actions into account
    - IT actions
    - Organizational actions
    - Human resource management actions
  - Identify the risks that are involved when “implementing” the different actions
- Act
  - Performing KM actions interacts with other kinds of management activities, e.g. human resource management
  - Try to define measurable objectives

## 2.1 The Knowledge management Framework of CommonKADS

### ■ Knowledge object level

- Knowledge object level is composed of
  - Knowledge assets
  - Organizational roles
  - Business processes
- Some models of the CommonKADS model suite address the relevant aspects:
  - Organization model
  - Agent model
  - Task model

## 2.1 The Knowledge management Framework of CommonKADS



Knowledge-management actions are defined in terms of three kinds of objects: agents that possess knowledge assets and participate in the business process. The notes indicate which parts of the CommonKADS models describe these objects.

## 2.1 The Knowledge management Framework of CommonKADS

- The analysis of organizational and task aspects is divided in 2 phases:

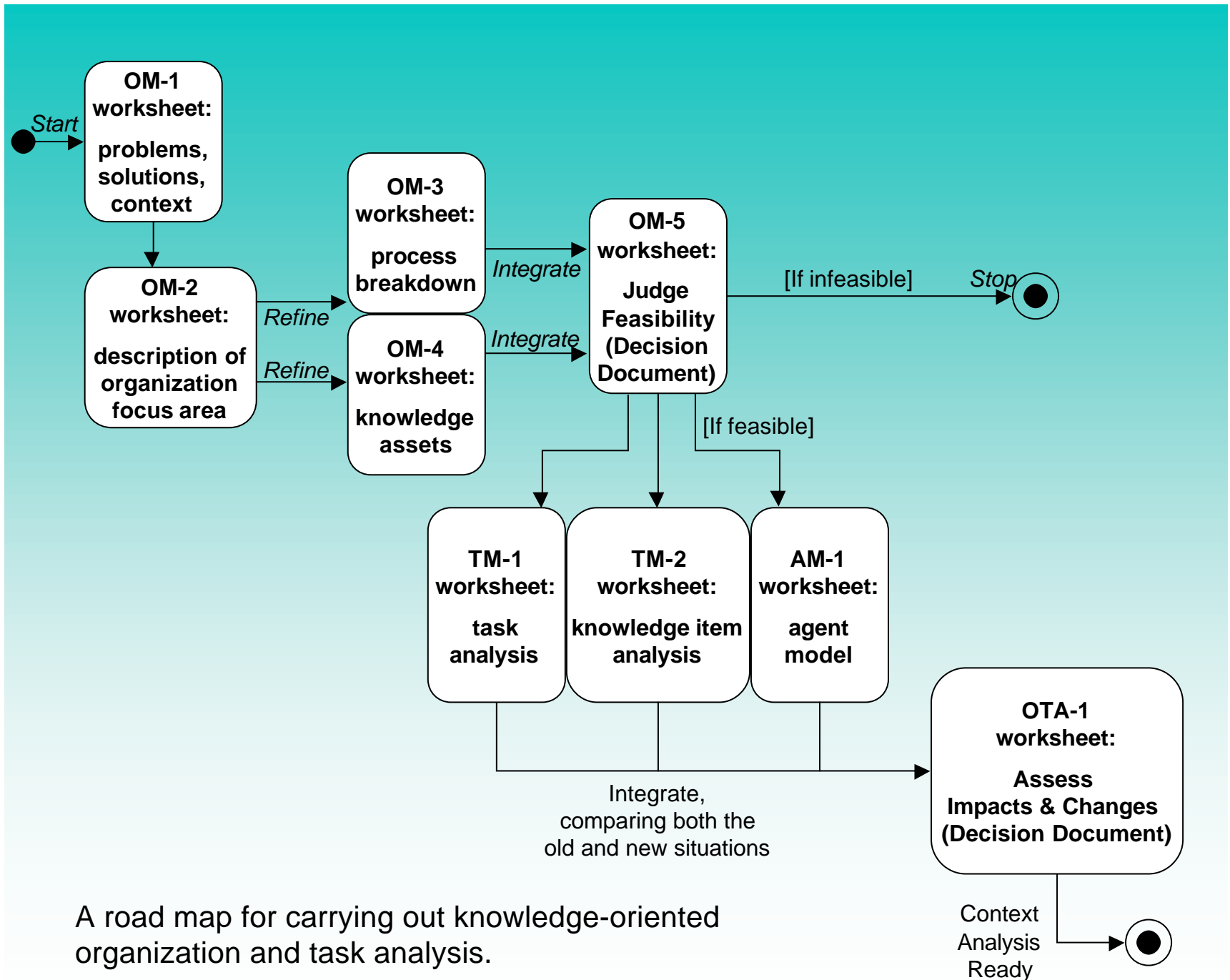
Phase 1: Scoping and feasibility study

- Identify problem/opportunity areas and potential solutions, embedded into an organizational perspective
  - Oriented towards modeling and analysis
- Decide about economic, organizational, technical feasibility in order to select the most promising focus area
  - Oriented towards managerial decision making
- Organization model is used for this purpose

## 2.1 The Knowledge management Framework of CommonKADS

### Phase 2: Impact and improvement study

- Gather insights into the interrelationship between task, agents involved and use of knowledge and potential improvements
  - Oriented towards modeling and analysis
- Identify required organizational measures and task changes in order to ensure organizational acceptance
  - Oriented towards managerial decision making
- Two models are offered
  - Task model
  - Agent model

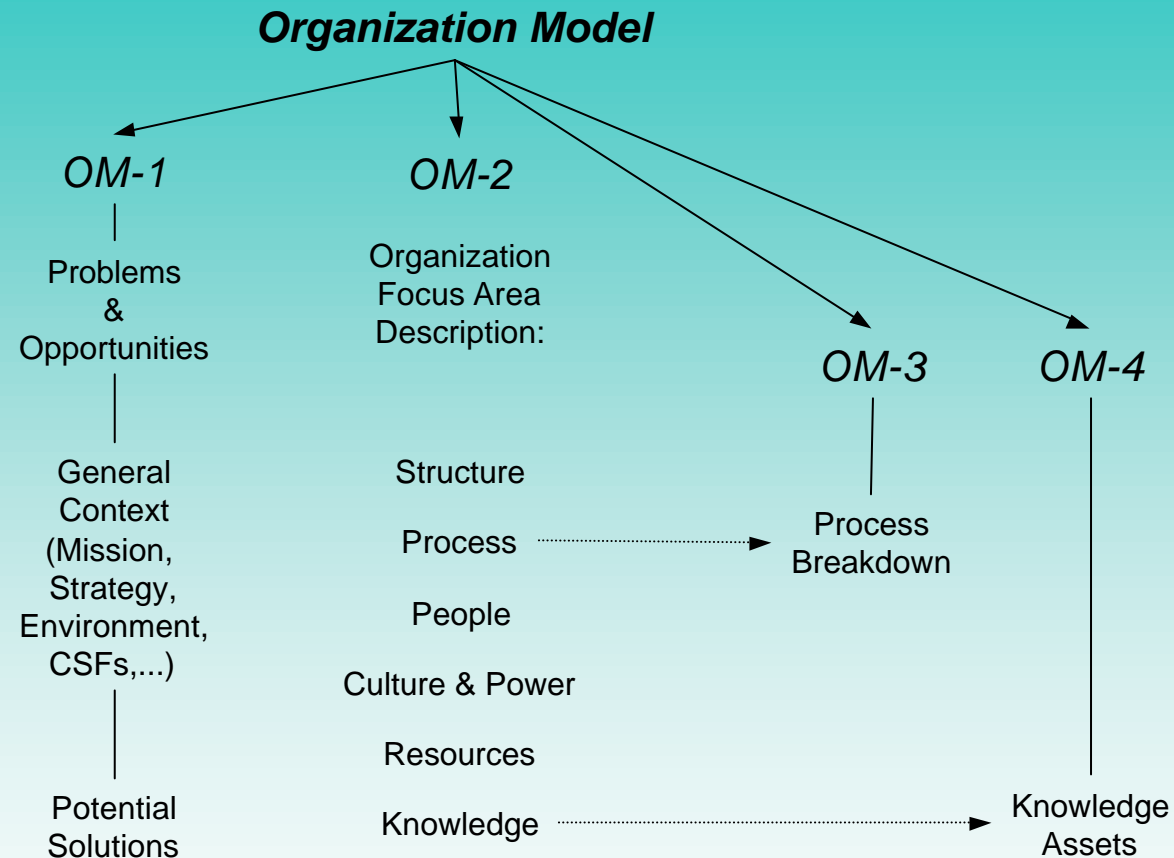


## 2.2 Feasibility Study: Organization Modeling

- Organization is analyzed from a KM point of view
- Integrate aspects from organization theory, business process analysis, information management
- Model is composed of different components addressing different aspects like
  - Organization structure
  - Processes
  - Staff
  - Resources



## 2.2 Feasibility Study: Organization Modeling



Overview of the components of the CommonKADS organization model.

## 2.2.1 Steps in Organization Modeling

### a) Organizational Context, Patterns, and Solutions Portfolio

- Describe wider organizational context
  - Visioning part of the organization study
  - Strategy of the organization
  - External influencing factors
- Identify various stakeholders
  - Knowledge providers
    - Specialists of a certain domain/task
  - Knowledge users
    - Persons that need the knowledge to carry out their work successfully
  - Knowledge decision makers
    - Persons that make decisions that affect the work of the knowledge providers/users

## 2.2.1 Steps in Organization Modeling

| Organization Model         | Problems and Opportunities Worksheet OM-1   |
|----------------------------|---|
| Problems and opportunities | Make a shortlist of perceived problems and opportunities, based on interviews, brainstorm and visioning meetings, discussions with managers, etc.   |
| Organizational context     | <p>Indicate in a concise manner key features of the wider organizational context, so as to put the listed opportunities and problems into proper perspective. Important features to consider are:</p> <ul style="list-style-type: none"> <li>• Mission, vision, goals of the organization</li> <li>• Important external factors the organization has to deal with</li> <li>• Strategy of the organization</li> <li>• Its value chain and the major value drivers</li> </ul> |
| Solutions                  | List possible solutions for the perceived problems and opportunities, as suggested by the interviews and discussions held, and the above features of the organizational context.  |

Worksheet OM-1: Identifying knowledge-oriented problems and opportunities in the organization

## 2.2.1 Steps in Organization Modeling

### b) Description of Focus Area in the Organization

- Analyze the more variant aspects of an organization
  - Structure of the business process
  - Involved staff
  - Used resources
  - Needed knowledge
  
- Process aspect may be described in some more detail
  - Construct UML activity diagram
    - Identify involved departments
    - Describe process flow
    - Specify information objects involved

## 2.2.1 Steps in Organization Modeling

| Organizational Model | Variant Aspects Worksheet OM-2   |
|----------------------|--|
| STRUCTURE            | Give an organization chart of the considered (part of the) organization in terms of its departments, groups, units, sections,...   |
| PROCESS              | Sketch the layout (e.g., with the help of a UML activity diagram) of the business process at hand. A process is the relevant part of the value chain that is focused upon. A process is decomposed into tasks, which are detailed in worksheet OM-3.   |
| PEOPLE               | Indicate which staff members are involved, as actors or stakeholders, including decision makers, providers, users or beneficiaries ("customers") of knowledge. These people do not need to be actual people, but can be functional roles played by people in the organization (e.g., director, consultant) |

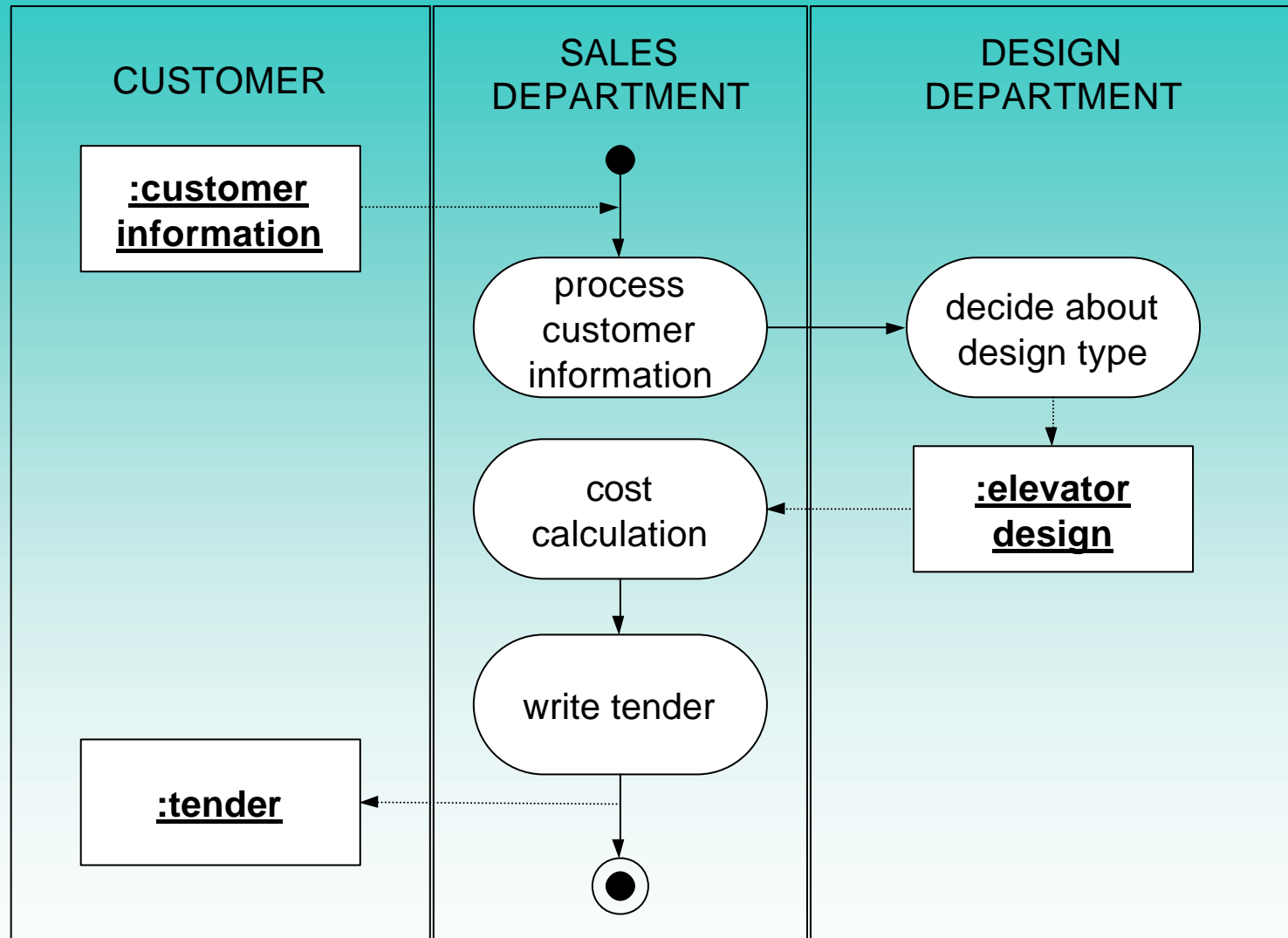
Worksheet OM-2: Description of organizational aspects that have an impact on and/or are affected by chosen knowledge solutions. (Part I)

## 2.2.1 Steps in Organization Modeling

| Organizational Model | Variant Aspects Worksheet OM-2 (continued)  |
|----------------------|---|
| RESOURCES            | Describe the resources that are utilized for the business process. These may cover different types, such as: <ol style="list-style-type: none"> <li>1. Information systems and other computing resources</li> <li>2. Equipment and materials</li> <li>3. Technology, patents, rights</li> </ol> |
| KNOWLEDGE            | Knowledge represents a special resource exploited in a business process. Because of its key importance in the present context, it is set apart here. The description of this component of the organization model is given separately, in worksheet OM-4 on knowledge assets.                    |
| CULTURE & POWER      | Pay attention to the unwritten rules of the game, including styles of working and communicating ("the way we do things around here"), related social and interpersonal (nonknowledge) skills, and formal as well as informal relationships and networks.  |

Worksheet OM-2: Description of organizational aspects that have an impact on and/or are affected by chosen knowledge solutions. (Part II)

## 2.2.1 Steps in Organization Modeling



Business process of a company designing and selling elevators, specified through a UML activity diagram

## 2.2.1 Steps in Organization Modeling

### c) Breakdown of the Business Processes

- Decomposition of given process into collection of tasks
  - How knowledge-intensive is each of these tasks?
  - What knowledge is used?
  - How significant is each of these tasks?
    - Required effort, resources
    - Task complexity



## 2.2.1 Steps in Organization Modeling

| Organization Model |  | Process Breakdown Worksheet OM-3   |  |   |  |   |
|--------------------|--|--|--|---|--|---|
| NO.                | TASK   | PER-FORMED BY  | WHERE?   | KNOWL-EDGE ASSET                              | INTEN-SIVE?  | SIGNIFI-CANCE   |
| Task identifier    | Task name (some part of the process in OM-2) | A certain agent, either a human (see „People“ in OM-2) or a software system (see „Resource“ in OM-2) | Some location in the organization structure (see OM-2) | List of knowledge resources used by this task | Boolean indicating whether the task is considered knowledge-intensive? | Indication of how significant the task is considered to be (e.g., on a five point scale in terms of frequency, costs, resources or mission criticality) |
|                    |  |  |  |   |  |   |
|                    |  |  |  |   |  |   |
|                    |  |  |  |   |  |   |
|                    |  |  |  |   |  |   |

Worksheet OM-3: Description of the process in terms of the task of which it is composed.

## 2.2.1 Steps in Organization Modeling

### d) Knowledge Assets

- First overview about important knowledge (first-cut analysis)
  - Knowledge that is in active use by the workers within the organization for the purpose of a specific task
  - Dimensions of improvement
    - Form
    - Accessibility in time or space
    - Quality

## 2.2.1 Steps in Organization Modeling

| Organization Model              |                                  | Knowledge Assets Worksheet OM-4 |                          |                          |                          |                          |
|---------------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| KNOWL-<br>EDGE<br>ASSET         | POS-<br>SESSED BY                | USED IN                         | RIGHT<br>FORM?           | RIGHT<br>PLACE?          | RIGHT<br>TIME?           | RIGHT<br>QUALITY?        |
| Name (cf.<br>worksheet<br>OM-3) | Agent (cf.<br>worksheet<br>OM-3) | Task (cf.<br>worksheet<br>OM-3) | (Yes or no;<br>comments) | (Yes or no;<br>comments) | (Yes or no;<br>comments) | (Yes or no;<br>comments) |
|                                 |                                  |                                 |                          |                          |                          |                          |
|                                 |                                  |                                 |                          |                          |                          |                          |
|                                 |                                  |                                 |                          |                          |                          |                          |
|                                 |                                  |                                 |                          |                          |                          |                          |

Worksheet OM-4: Description of the knowledge component of the organization model.

## 2.2.1 Steps in Organization Modeling

### e) Feasibility Decision Making

- Wrap-up the key implications
  - Basis for decision making
- What is the most promising opportunity area and what is the best solution direction?
- What are the benefits versus the costs?  
(business feasibility)
- Are the needed technologies for this solution available and within reach? (technical feasibility)
- What actions can successfully be undertaken?  
(project feasibility)

## 2.2.1 Steps in Organization Modeling

| Organizational Model  | Checklist for Feasibility Decision Document: Worksheet OM-5  |
|-----------------------|--|
| BUSINESS FEASIBILITY  | <p>For a given problem/opportunity area and a suggested solution, the following questions have to be answered:</p> <ul style="list-style-type: none"> <li>■ What are the expected benefits for the organization from the considered solution? Both tangible economic and intangible business benefits should be identified here.</li> <li>■ How large is this expected added value?</li> <li>■ What are the expected costs for the considered solution?</li> <li>■ How does this compare to possible alternative solutions?</li> <li>■ Are organizational changes required?</li> <li>■ To what extent are economic and business risks and uncertainties involved regarding the considered solution direction?</li> </ul>   |
| TECHNICAL FEASIBILITY | <p>For a given problem/opportunity area and a suggested solution, the following questions have to be answered:</p> <ul style="list-style-type: none"> <li>■ How complex, in terms of knowledge stored and reasoning processes to be carried out, is the task to be performed by the considered knowledge-system solution? Are state-of-the-art methods and techniques available and adequate?</li> <li>■ Are there critical aspects involved, relating to time, quality, needed resources, or otherwise? If so, how to go about them?</li> <li>■ Is it clear what the success measures are and how to test for validity, quality, and satisfactory performance?</li> <li>■ How complex is the required interaction with end users (user interfaces)? Are state-of-the-art methods and techniques available and adequate?</li> <li>■ How complex is the interaction with other information systems and possible other resources (interoperability, systems integration)? Are state-of-the-art methods and techniques available and adequate?</li> <li>■ Are there further technical risks and uncertainties?</li> </ul> |

Worksheet OM-5: Checklist for the feasibility decision document (Part I).

## 2.2.1 Steps in Organization Modeling

| Organizational Model | Checklist for Feasibility Decision Document: Worksheet OM-5 (continued)  |
|----------------------|--|
| PROJECT FEASIBILITY  | <p>For a given problem/opportunity area and a suggested solution, the following question have to be answered:</p> <ul style="list-style-type: none"> <li>■ Is there adequate <i>commitment</i> from the actors and stakeholders (managers, experts, users, customers, project team members) for further project steps?</li> <li>■ Can the needed <i>resources</i> in terms of time, budget, equipment, staffing be made available?</li> <li>■ Are the required <i>knowledge</i> and other <i>competences</i> available?</li> <li>■ Are the <i>expectations</i> regarding the project and its results realistic?</li> <li>■ Are the <i>project organization</i> and its internal as well as external <i>communication</i> adequate?</li> <li>■ Are there further project risks and uncertainties?</li> </ul>      |
| PROPOSED ACTIONS     | <p>This is the part of the feasibility decision document that is directly subject to managerial commitment and decision making. It weights and integrates the previous analysis results into recommended concrete steps for action:</p> <ul style="list-style-type: none"> <li>■ <i>Focus</i>: What is the recommended focus in the identified problem.opportunity areas?</li> <li>■ <i>Target solution</i>: What is the recommended solution direction for this focus area?</li> <li>■ What are the expected <i>results</i>, <i>costs</i>, and <i>benefits</i>?</li> <li>■ What <i>project actions</i> are required to get there?</li> <li>■ <i>Risks</i>: If circumstances inside or outside the organization change, under what <i>conditions</i> is it wise to reconsider the proposed decisions?</li> </ul> |

Worksheet OM-5: Checklist for the feasibility decision document (Part II).

## Remarks

- CommonKADS approach is biased towards initiating a development project for a knowledge (-based) system
- Feasibility has to include aspects like
  - Are the required organizational changes feasible?
  - Are the required changes for human resource management feasible?

## 2.2.2 Case Study: Social Security Service

- Illustrate organization model study by real-life case study

### Step 1: Problem Opportunity Context (OM-1):

- Handling of applications for general assistance benefits
- Amsterdam office is overwhelmed with applications
- Decision about applications is delayed
- Action has to be taken



### 2.2.2 Case Study: Social Security Service

- Initial problem / opportunity formulation
 

“Because the applicable laws and regulations are so complex, it takes a long time for the staff involved to reach a decision. If we can assist these people with a knowledge system that stores the needed legal decision-making knowledge, the decision process can be speeded up, so that more clients can be served in the same time and the application backlog will be significantly reduced.”
- Clear idea existed about
  - The problem area
  - The direction of solution
  - Benefits for the organization
- Analysis could be used for filling in relevant parts of form OM-1

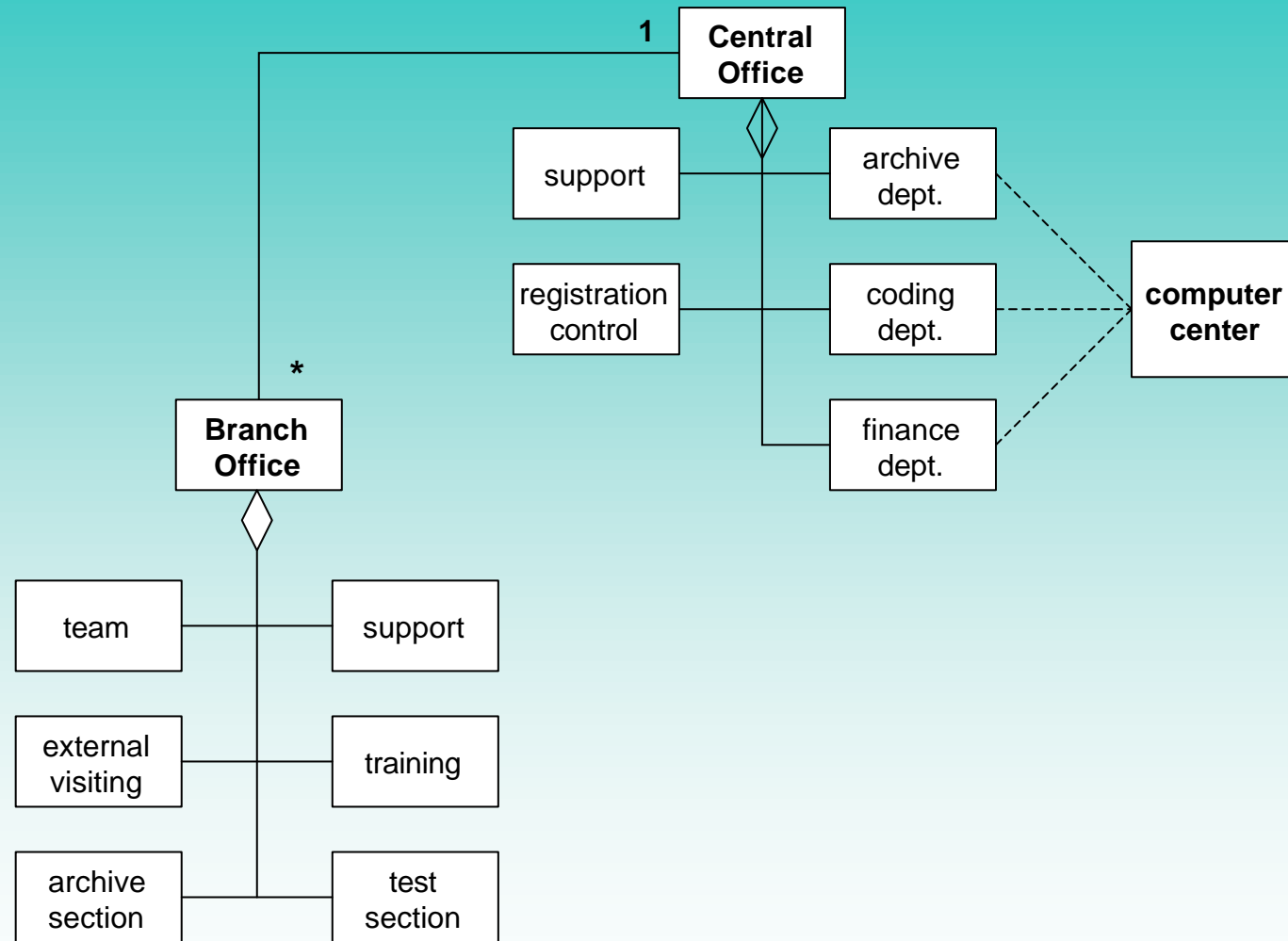
## 2.2.2 Case Study: Social Security Service

### Step 2: Focus Area in the organization (OM-2)

#### ■ Structure

- Description of the organizational structure
- One central office and a collection of branch offices
- Each branch office has the same structure
- Connection to the computer center is shown that handles a lot of activities for the central office

## 2.2.2 Case Study: Social Security Service

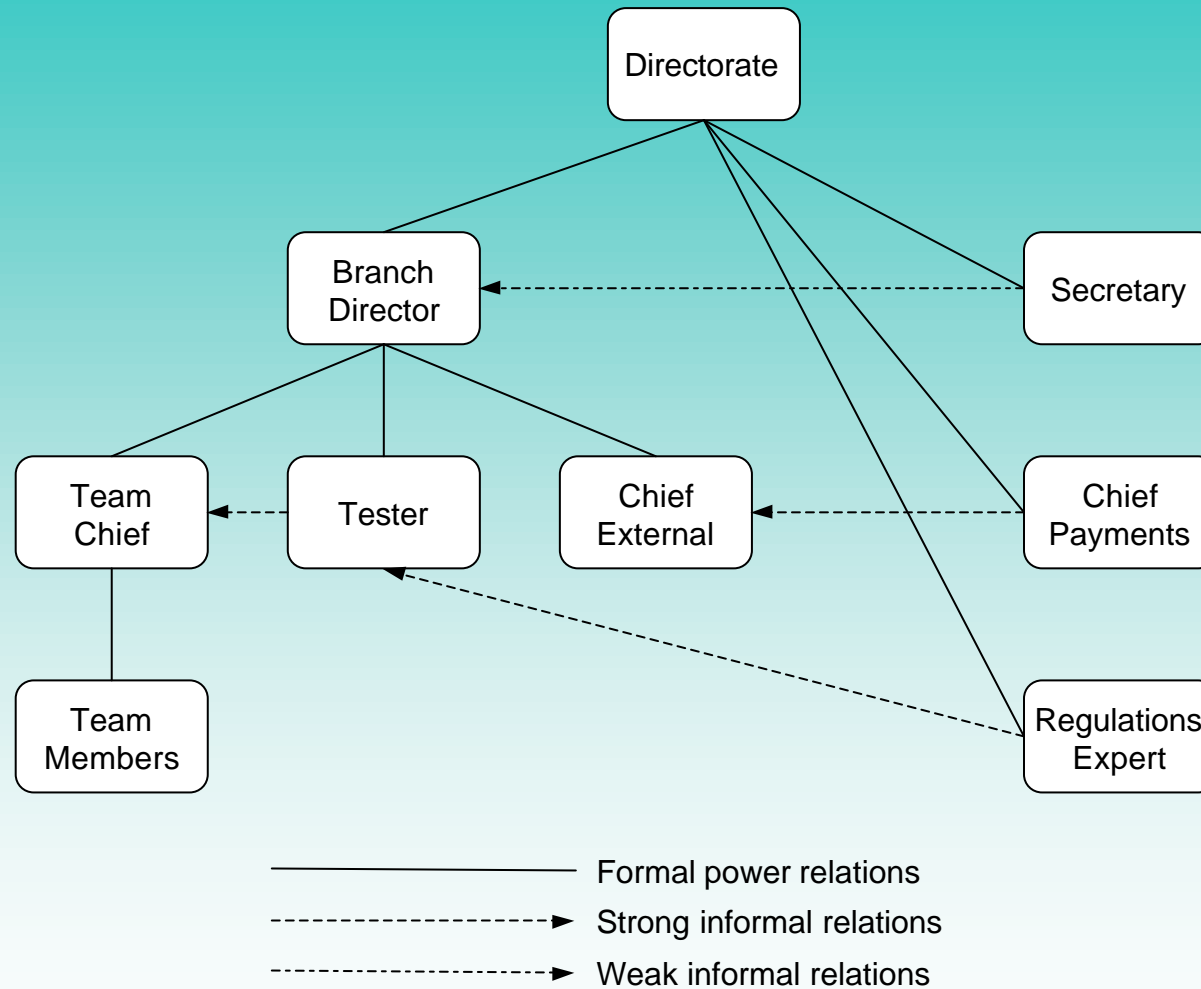


The structure component in the social security service case

### 2.2.2 Case Study: Social Security Service

- People
  - In general, a lot of different people are involved
  - Here, only a small fragment of persons is relevant, i.e. the staff members that are involved in the decision-making process
- Culture and Power
  - Identify and describe the power relations among the involved persons
  - Distinguish between
    - Official relations
    - Strong informal relations
    - Weak informal relations

## 2.2.2 Case Study: Social Security Service



Various power relationships in the social security service case.

### 2.2.2 Case Study: Social Security Service

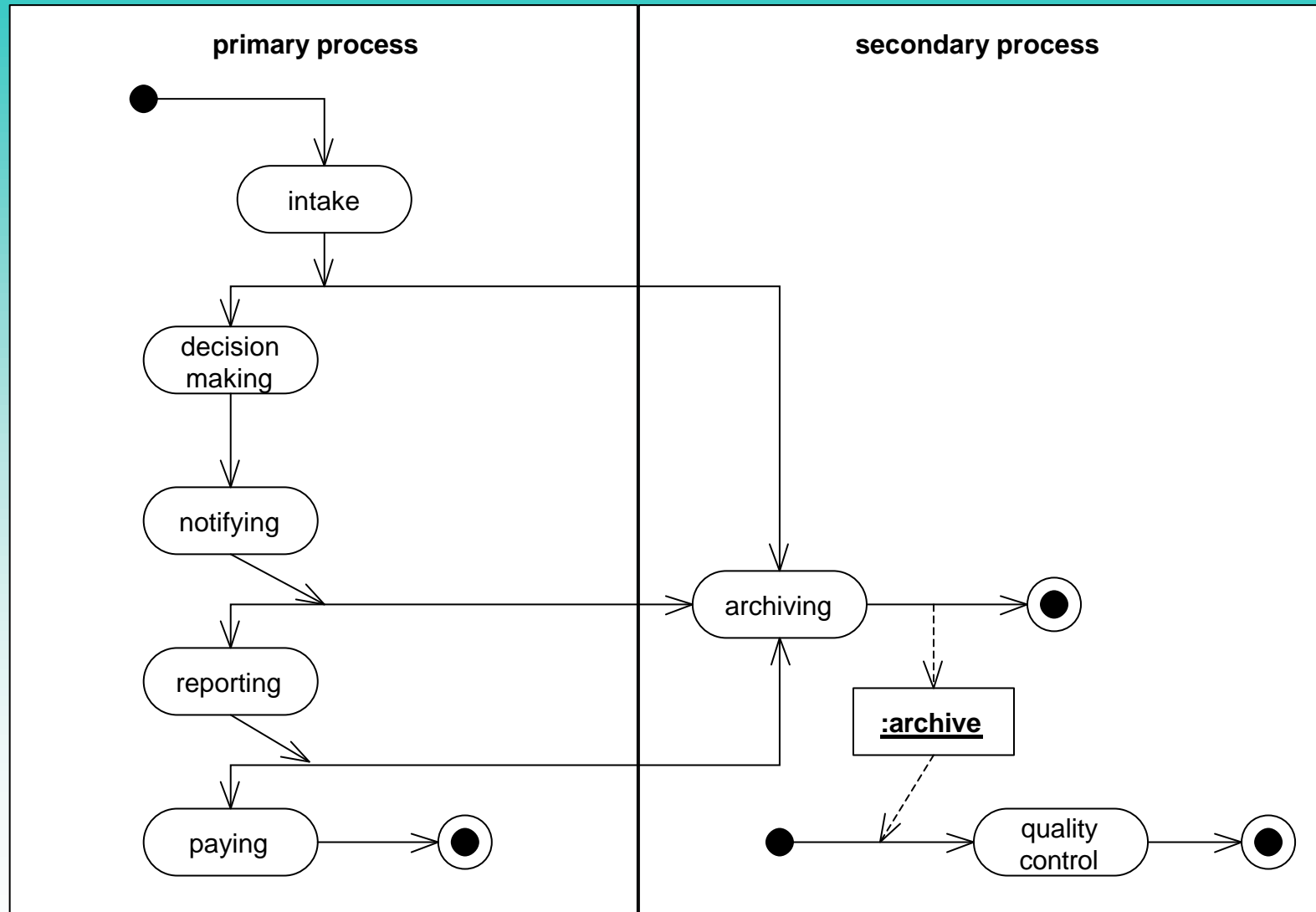
- Resources
  - Computing is done by central computer center
  - Some branch offices are inadequately housed
- Process and Knowledge
  - Required knowledge for the decision-making process
- Remark
  - Use worksheets in a flexible and selective way
  - Only fill in slots that are relevant for the given situation

## 2.2.2 Case Study: Social Security Service

### Step 3: Breakdown of Business Processes (OM-3) and Knowledge Assets (OM-4)

- Business process is decomposed into several tasks
  - Intake: collect all relevant information about the applicant
  - Archiving: handle files/documents for each client
  - Decision-Making: make the decision about the application; decide about amount of money
  - Notifying: send out written notification
  - Reporting: write internal report about the client
  - Paying: make actual payment to the client
  - Quality Control: check selected cases for correct handling

## 2.2.2 Case Study: Social Security Service

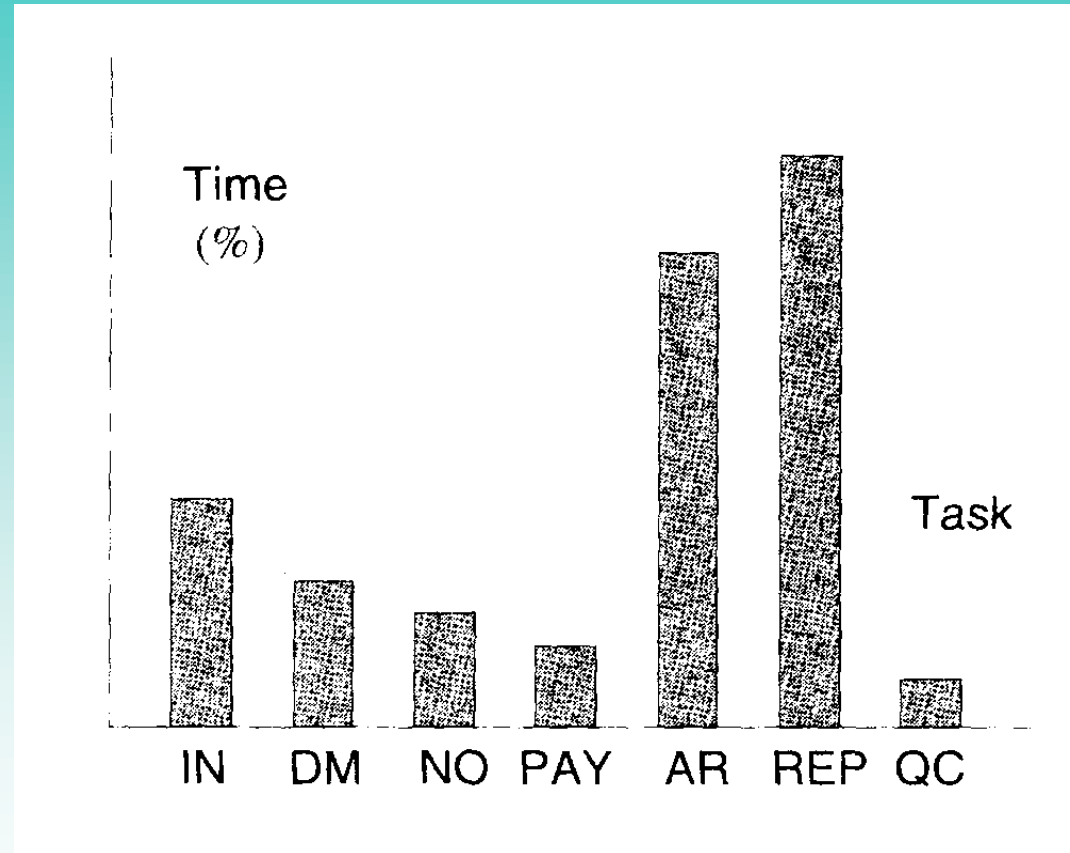




### 2.2.2 Case Study: Social Security Service

- Only some of the tasks are knowledge intensive, especially 'decision-making' and 'quality control'
- Decision-making:
  - Sometimes applicants are cheating
    - How to handle it?
  - Sometimes the office staff makes a positive decision based on some 'informal feeling'
- Analysis of the workload of each task showed that
  - Over 60% of the time is consumed by 'archiving' and 'reporting'
  - Decision-making is not the main bottleneck

## 2.2.2 Case Study: Social Security Service



Task significance: Workload in the social security service case, expressed in percentage of total time spent.

## 2.2.2 Case Study: Social Security Service

### Step 4: Scope and Feasibility Decision-Making (OM-5)

- Business Feasibility
  - Focus on improvement in archiving and reporting
  - Has impact on organization structure since these tasks involve several departments
  - Central computer center is affected as well
- Technical Feasibility
  - No problem for archiving/reporting; very difficult for decision making
- Project Feasibility
  - Ensure participation of the actors
- Proposed Action
  - Address 'archiving' in the first step

### 2.2.2 Case Study: Social Security Service

- Remark:
  - Organizational analysis is very important step
  - Be careful whether initial expectation is correct
  - Result of analysis may provide
    - New insights
    - that result in different actions when compared to the initial expectation

## 2.3 Impact and Improvement Analysis: Task and Agent Modeling

- This analysis is based on the results of 'organization modeling'
- Results are refined with respect to
  - Features of the relevant tasks
  - Involved agents
  - Used knowledge
- In the given context a task
  - Represents a goal-oriented activity adding value to the organization,
  - Handles inputs and delivers outputs in a structured and controlled way,
  - Requires (and provides) knowledge and other competencies,
  - Is carried out according to given quality and performance criteria,
  - Is performed by responsible and accountable agents

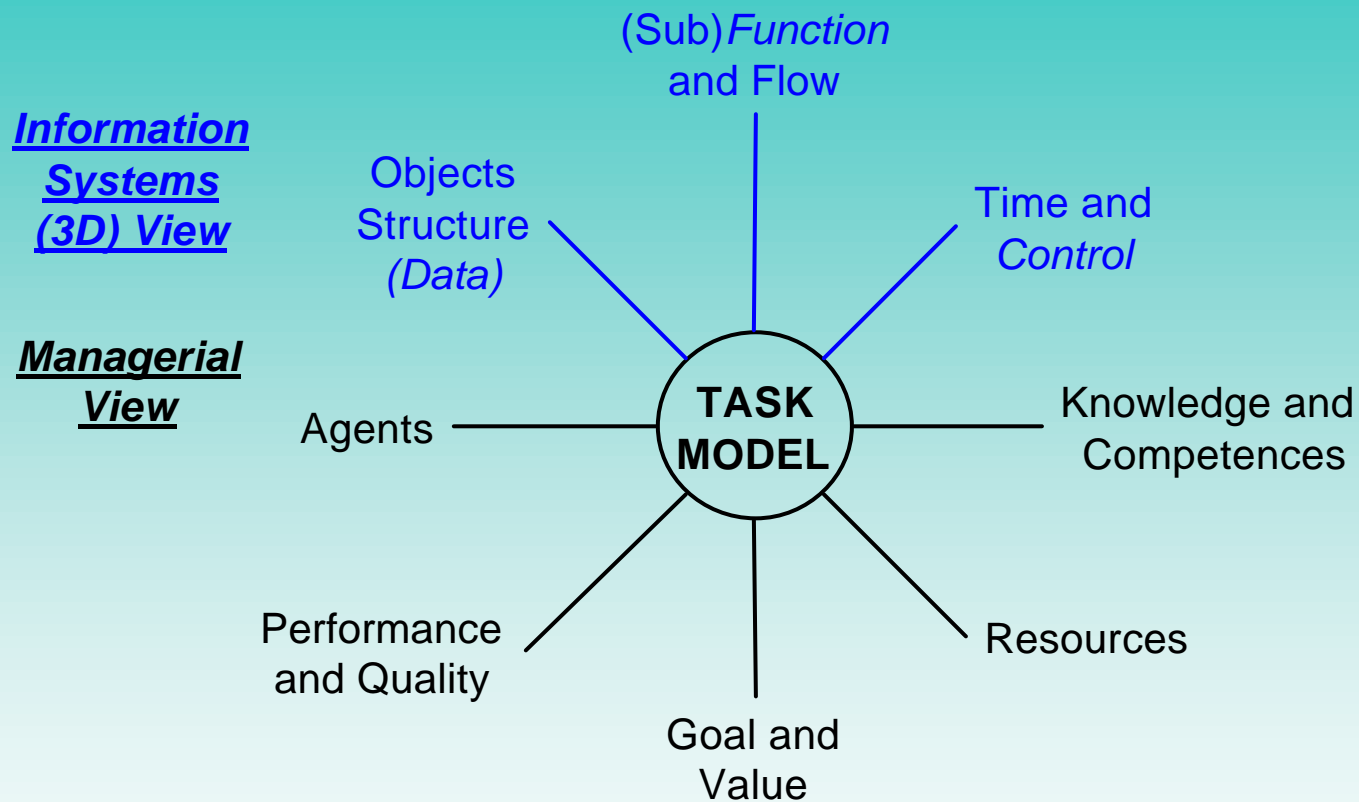
## 2.3.1 Task Analysis

### ■ Refinement of Tasks (TM-1)

#### ■ Tasks are analyzed from

- A managerial point of view, e.g. goal and value, quality and performance
- An information modeling view
  - Functional view:
    - Information flow network, e.g. specified as a UML activity diagram
  - Static information structure view:
    - Structure of objects and their relationships, e.g. specified as a UML class diagram
  - Control view:
    - Description of the temporal order of and control over the subtasks, e.g. specified as a UML state diagram

## 2.3.1 Task Analysis



Overview of the CommonKADS task model.

## 2.3.1 Task Analysis

| Task Model          | Task Analysis Worksheet TM-1   |
|---------------------|--|
| TASK                | Task identifier and task name  |
| ORGANIZATION        | Indicate the business process this task is a part of, and where in the organization (structure, people) it is carried out  |
| GOAL AND VALUE      | Describe the goal of the task and the value that its execution adds to the process this task is a part of  |
| DEPENDENCY AND FLOW | <i>Input tasks:</i> tasks delivering inputs to this task<br><i>Output tasks:</i> tasks that use (some of) the outputs of this task<br>You can use a data-flow diagram or an activity diagram here to describe this   |
| OBJECTS HANDLED     | <i>Input objects:</i> The objects, including information and knowledge items, that are input to the task<br><i>Output objects:</i> The objects, including information and knowledge items, that are delivered by the task as outputs<br><i>Internal objects:</i> Important objects (if any), including information and knowledge items, that are used internally within the task but are not input or output to other tasks<br>You may want to include a class diagram here to describe the information objects handled by the task. |

Worksheet TM-1: Refined description of the task within the target process.  
(Part I)



## 2.3.1 Task Analysis

| Task Model               | Task Analysis Worksheet TM-1 (continued)   |
|--------------------------|--|
| TIMING AND CONTROL       | Describe frequency and duration of the task.<br>Describe the control relation with other tasks. For this you may want to use a state diagram or an activity diagram.<br>Describe control constraints:<br>(i) <i>preconditions</i> that must hold before the task can be executed;<br>(ii) <i>postconditions</i> that must hold as result of execution of the task. |
| AGENTS                   | The staff members and/or the information systems (cf. OM-2 and OM-3) that are responsible for carrying out the task  |
| KNOWLEDGE AND COMPETENCE | Competences needed for successful task performance. For the knowledge items involved, there is a separate worksheet TM-2. List other relevant skills and competences here. Indicate which elements of the task are knowledge intensive. Note that tasks can also deliver competences to the organization, and it may be worthwhile to indicate that here.          |
| RESOURCES                | Describe and preferably quantify the various resources consumed by the task (staff time, systems and equipment, materials, financial budgets).<br>The description is typically a refinement of the resource descriptions in OM-2   |
| QUALITY AND PERFORMANCE  | List the quality and performance measures that are used by the organization to determine successful task execution   |

Worksheet TM-1: Refined description of the task within the target process.  
(Part II)

### 2.3.1 Task Analysis

- Knowledge Bottleneck Analysis (TM-2)
- Refinement of worksheet OM-4
- Very important part of overall analysis
- Oriented toward achieving superior use of knowledge by the organization

## 2.3.1 Task Analysis

| Task Model                                | Knowledge Item Worksheet TM-2  |                                     |
|---|--|-------------------------------------|
| NAME<br>POSSESSED BY<br>USED IN<br>DOMAIN | Knowledge item<br>Agent<br>Task identifier and name.<br>Wider domain the knowledge is embedded in (specialist field, discipline, branch of science or engineering, professional community) |                                     |
| <b>Nature of the knowledge</b>            |  | <b>Bottleneck / to be improved?</b> |
| Formal, rigorous                          |  |                                     |
| Empirical, quantitative                   |  |                                     |
| Heuristic, rules of thumb                 |  |                                     |
| Highly specialized, domain-specific       |  |                                     |
| Experience-based                          |  |                                     |
| Action-based                              |  |                                     |
| Incomplete                                |  |                                     |
| Uncertain, may be incorrect               |  |                                     |
| Quickly changing                          |  |                                     |
| Hard to verify                            |  |                                     |
| Tacit, hard to transfer                   |  |                                     |

Worksheet TM-2: Specification of the knowledge employed for a task, and possible bottlenecks and areas for improvement. (Part I)

## 2.3.1 Task Analysis

| Task Model                                | Knowledge Item Worksheet TM-2 (continued)  |                                     |
|---|--|-------------------------------------|
| NAME<br>POSSESSED BY<br>USED IN<br>DOMAIN | Knowledge item<br>Agent<br>Task identifier and name.<br>Wider domain the knowledge is embedded in (specialist field, discipline, branch of science or engineering, professional community) |                                     |
| <b>Form of the knowledge</b>              |  | <b>Bottleneck / to be improved?</b> |
| Mind                                      |  |                                     |
| Paper                                     |  |                                     |
| Electronic                                |  |                                     |
| Action skill                              |  |                                     |
| Other                                     |  |                                     |
| <b>Availability of knowledge</b>          |  |                                     |
| Limitations in time                       |  |                                     |
| Limitations in space                      |  |                                     |
| Limitations in access                     |  |                                     |
| Limitations in quality                    |  |                                     |
| Limitations in form                       |  |                                     |

Worksheet TM-2: Specification of the knowledge employed for a task, and possible bottlenecks and areas for improvement. (Part II)

### 2.3.1 Task Analysis

- Task analysis can be partially performed by asking simple and direct questions to the people involved:
  - How often do you carry out this task?
  - How much time does it take?
  - Who depends on your results?
  - What happens to the organization if it goes wrong?
  - ...
- Analysis is best done on a concrete example level
  - Use scenario techniques

## 2.3.2 Agent Descriptions

- Understand the various roles and competences of the various actors
- Provides a different viewpoint on information that is more or less already available in the other worksheets
- Oriented towards better understanding the impacts and required organizational changes
- A UML use-case diagram may be used to describe how agents participate in carrying out the different tasks

## 2.3.2 Agent Descriptions

| Agent Model                      | Agent Worksheet AM-1  |
|----------------------------------|---|
| NAME                             | Name of the agent   |
| ORGANIZATION                     | Indicate how the agent is positioned in the organization, as inherited from the organization-model worksheet descriptions, including the type (human, information system), position in the organization structure, ...    |
| INVOLVED IN                      | List of tasks (cf. TM-1)  |
| COMMUNICATES WITH                | List of agent names   |
| KNOWLEDGE                        | List of knowledge items possessed by the agent (cf. TM-2)   |
| OTHER COMPETENCES                | List of other required or present competences of the agent  |
| RESPONSIBILITIES AND CONSTRAINTS | List of responsibilities the agent has in task execution, and of restrictions in this respect. Constraints may refer to limitations in authority, but also to inside or outside legal or professional norms, or the like. |

Worksheet AM-1: Agent specification according to the CommonKADS agent model.

## 2.3.3 Recommendations and Actions

- Condense analysis into document for managerial decision-making
- Major issues:
  - Which organizational changes are recommended?
  - What measures have to be implemented regarding specific tasks and workers involved? What improvements are possible regarding use and availability of knowledge?
  - Have these changes sufficient support from the people involved? Are further facilitating actions called for?
- Analysis may result in developing a knowledge(-based) system; however, that is only one possible action



### 2.3.3 Recommendations and Actions

| Organization Task, Agent Models         | Worksheet OTA-1: Checklist for Impact and Improvement Decision Document   |
|---|---|
| IMPACTS AND CHANGES IN ORGANIZATION     | <p>Describe which impacts and changes the considered knowledge system solution brings with respect to the organization, by comparing the differences between the organization model (worksheet OM-2) in the current situation, and how it will look in the future. This has to be done for all (variant) components in a global fashion (specific aspects for individual tasks or staff members are dealt with below).</p> <ol style="list-style-type: none"> <li>1. Structure</li> <li>2. Process</li> <li>3. Resources</li> <li>4. People</li> <li>5. Knowledge</li> <li>6. Culture &amp; power</li> </ol>  |
| TASK/AGENT-SPECIFIC IMPACTS AND CHANGES | <p>Describe which impacts and changes the considered knowledge system solution brings with respect to individual tasks and agents, by comparing the differences between the task and agent models (worksheets TA-1/2 and AM-1) in the current situation, and what they will look like in the future. It is important to look not only at the staff members directly involved in a task but also at other actors and stakeholders (decision-makers, users, clients).</p> <ol style="list-style-type: none"> <li>1. Changes in task layout (flow, dependencies, objects handled, timing, control)</li> <li>2. Changes in needed resources</li> <li>3. Performance and quality criteria</li> <li>4. Changes in staffing, involved agents</li> <li>5. Changes in individual positions, responsibilities, authority, constraints in task execution</li> <li>6. Changes required in knowledge and competences</li> <li>7. Changes in communication</li> </ol> |

Worksheet OTA-1: Checklist for the impacts and improvements decision document. (Part I)

### 2.3.3 Recommendations and Actions

| Organization Task,<br>Agent Models | Worksheet OTA-1: Checklist for Impact and Improvement Decision Document<br>(continued)   |
|------------------------------------|--|
| ATTITUDES AND<br>COMMITMENTS       | Consider how the individual actors and stakeholders involved will react to the suggested changes, and whether there will be a sufficient basis to successfully carry through these changes   |
| PROPOSED<br>ACTIONS                | <p>This is the part of the impacts and improvements decision document that is directly subject to managerial commitment and decision-making. It weights and integrates the previous analysis results into recommended concrete steps for action:</p> <ol style="list-style-type: none"> <li>1. Improvements: What are the recommended changes, with respect to the organization, as well as individual tasks, staff members, and systems?</li> <li>2. Accompanying measures: What supporting measures are to be taken to facilitate these changes (e.g., training, facilities)</li> <li>3. What further project action is recommended with respect to the undertaken knowledge system solution?</li> <li>4. Expected results, costs, benefits: reconsider items from the earlier feasibility decision document</li> <li>5. If circumstances inside or outside the organization change, under what conditions is it wise to reconsider the proposed decisions?</li> </ol> |

Worksheet OTA-1: Checklist for the impacts and improvements decision document. (Part II)

## 2.4 Guidelines for Organization and Task / Agent Study

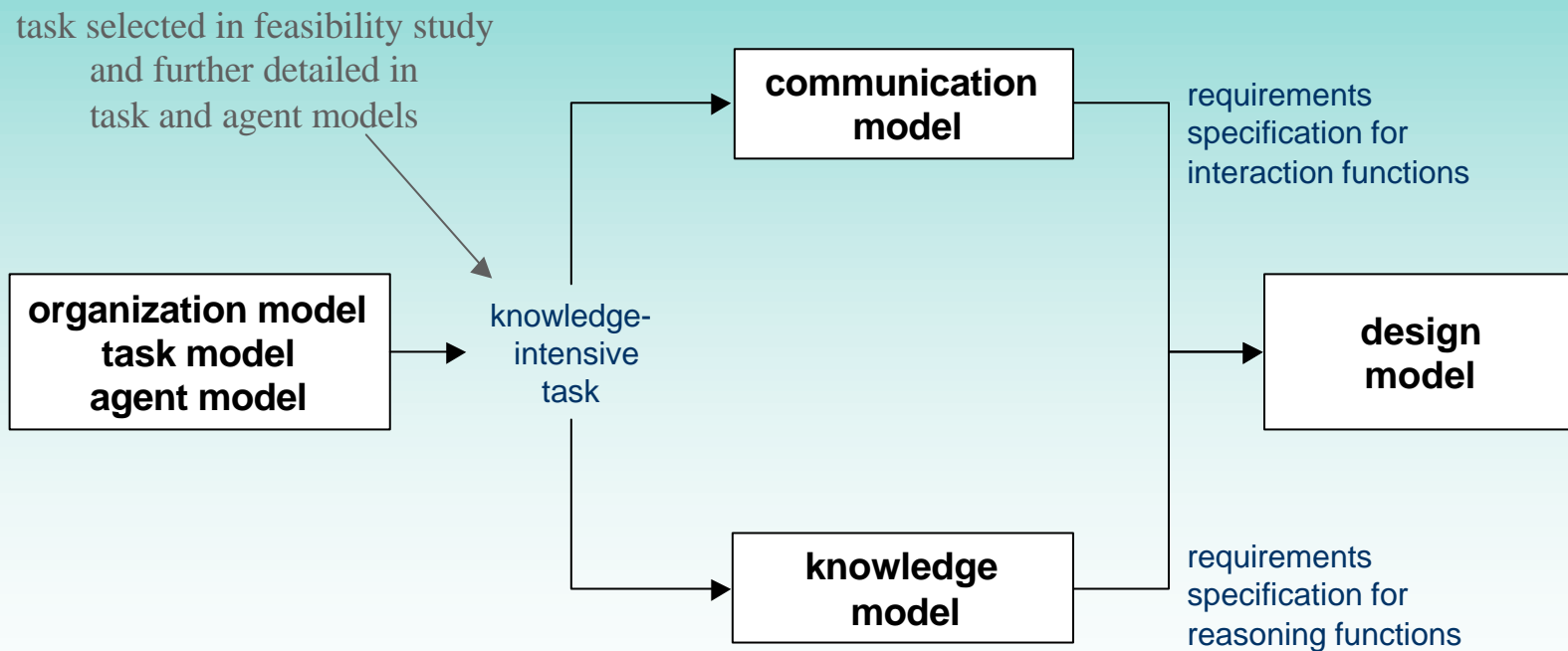
- Identify the stakeholders
  - Understand perspectives and interests of the various stakeholders
  - Gain explicit, strong support from (top-level) management
  - Identify a champion for the KM initiative
- Analyze the support that is provided by the different stakeholder groups
  - Take into account the “unwritten rules”
- Try to clearly understand the business process
  - Use concrete examples (scenarios)
- Business process may be described using UML activity diagrams
  - Distinguish between primary process and secondary processes
  - Identify involved departments / groups

## 2.4 Guidelines for Organization an Task / Agent Study

- Assess different alternative solutions
  - How big is the support within the organization?
- Identify added value of each proposed solution
- Keep analysis simple

## 2.5 Further Aspects of the CommonKADS Methodology

- Result of organization and agent / task analysis provides important inputs to the development of an IT solution
  - CommonKADS offers additional models for supporting these subsequent system development steps



The CommonKADS Model Suite

## 2.5 Further Aspects of the CommonKADS Methodology

### ■ Knowledge Model

- Describe the types and structures of the knowledge used in performing a task
- Describe the role knowledge plays in solving a task
- Description is given in an understandable way
- Provides a communication basis with experts and users

## 2.5 Further Aspects of the CommonKADS Methodology

- Knowledge Model has three parts:
  - Domain knowledge
    - Domain specific knowledge relevant for the application
    - e.g. the ingredients of ice-cream or production machines
    - similar to object models from Software Engineering or ontologies
  - Inference knowledge
    - Basic reasoning knowledge
    - e.g. the results of processing a mix of ingredients with a certain procedure
  - Task knowledge
    - describes the goal of the application and its decomposition into sub-goals/sub-tasks

## 2.5 Further Aspects of the CommonKADS Methodology

- Within the knowledge model, knowledge structures are specified by ontologies
  - CommonKADS provides a semi-formal description of ontologies (compare class diagrams in UML, or ER-diagrams)
  - Ontobroker system (see Chapter 3) provides a formal specification of an ontology
    - Ontology is the basis for inferencing
    - Ontology may be visualized in a similar way to class diagrams



## 2.5 Further Aspects of the CommonKADS Methodology

### ■ Communication Model:

- Describe communication between the different agents
- Description is given in an implementation independent way

### ■ Design Model:

- Previous models constitute the (detailed) requirements specification for the knowledge(-based) system
- based on theses requirements, the design model gives the technical system specification, such as
  - system architecture
  - implementation platform
  - software modules