Consideration of Dynamics in Knowledge Prioritization - Preparing an Efficient Company-Internal Knowledge Transfer

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Agenda

- Introduction in the Institute and its focus
- Background of the project
- Representing knowledge and its structure with knowledge maps
- How to prioritize knowledge preparing a successful transfer
- Future work

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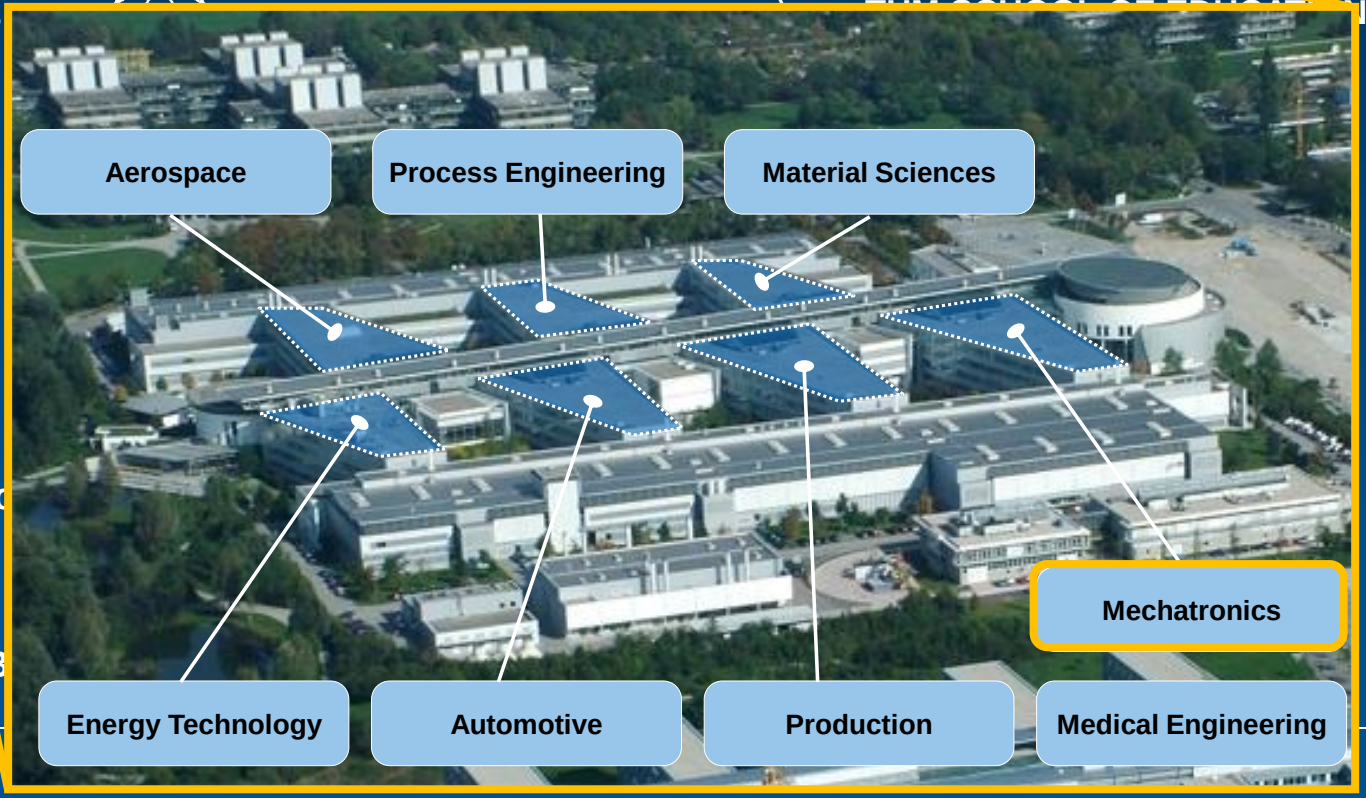
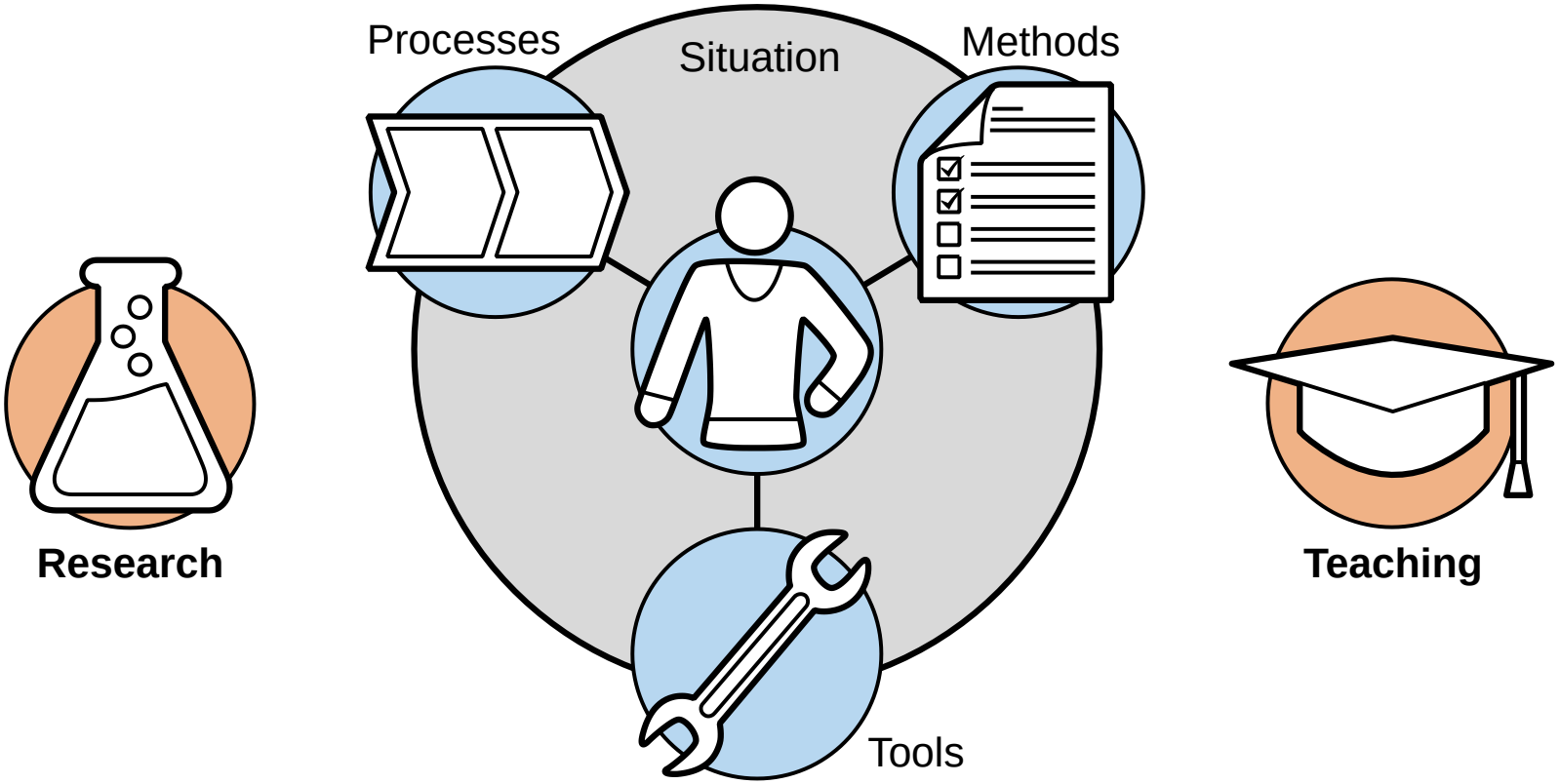
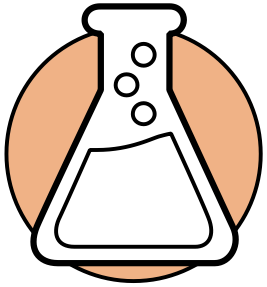


Activities of the Institute



Research Areas



Innovation & Creativity

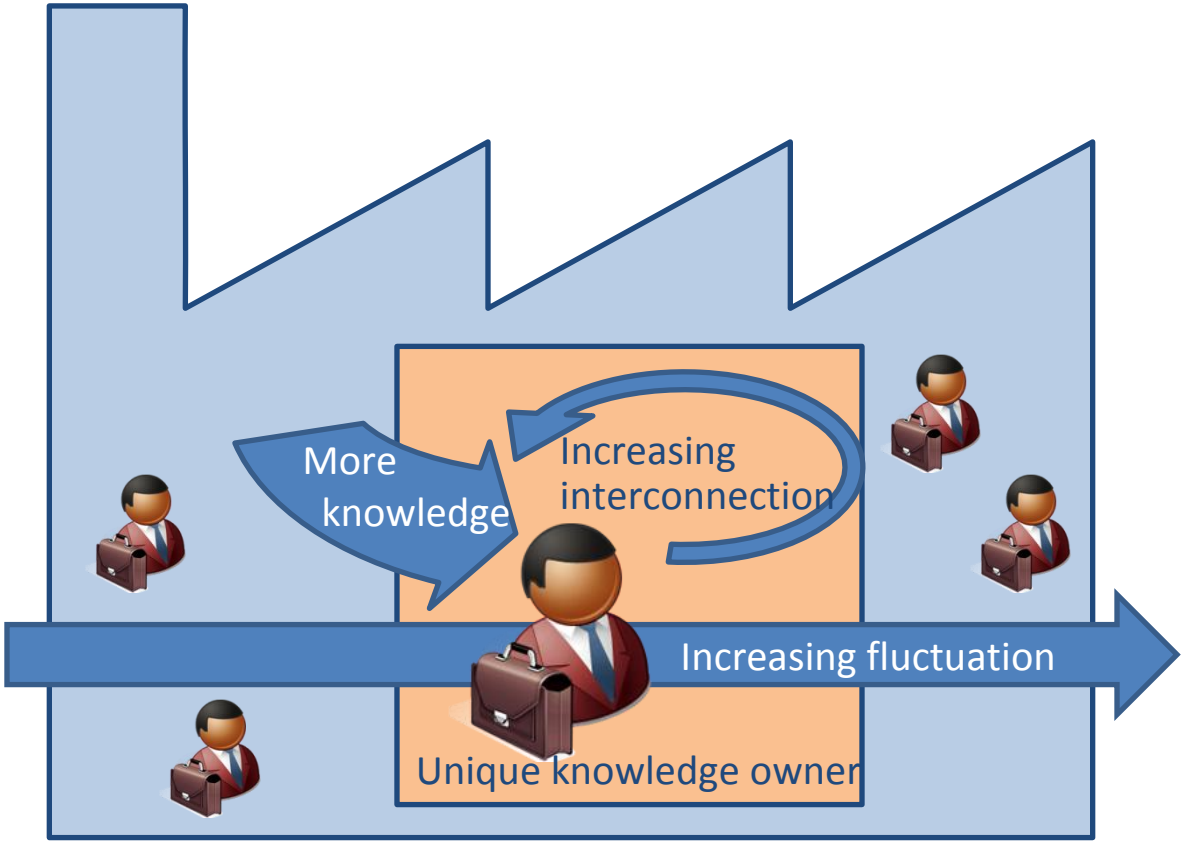
Systems Engineering

Engineering Processes

Knowledge Transfer & Knowledge Management

Cost Management

Background of the research project



➢ **Why an efficient knowledge transfer is necessary!?**

Industry partners

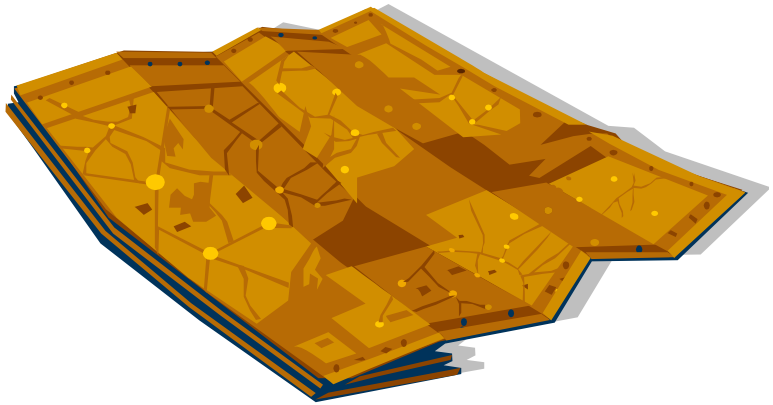
- **2 companies from Bavaria**
- **OEM for banknote counting and inspecting machines (Large company)**
- **Supplier for electric circuit protection devices (SME)**

Procedure and objectives of the project

- **Procedure**
  1. Institute advertised the governmental-funded knowledge transfer project and won the two industry companies for participating
  2. Researchers developed the transfer methodology and adapted the contents of the work packages after periodic workshops with representatives from the companies
  3. Methodology is evaluated and documented currently (finishes 2-year project)

- **Objectives**
  - Improvement and enhancement the found knowledge domains
  - Development of a way to elicit knowledge and create knowledge maps without additional staff – by employees themselves
  - Development of the holistic knowledge transfer methodology
  - Consideration and integration of practically relevant circumstances

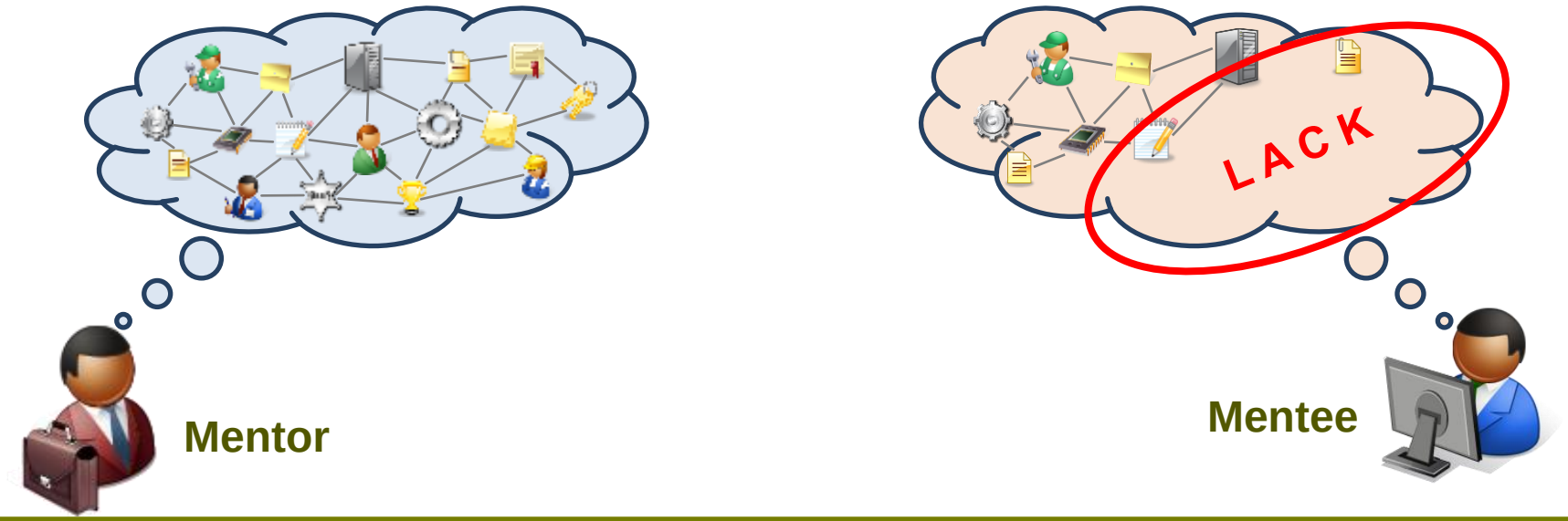
Improving the company-internal knowledge transfer with knowledge maps



Knowledge Map

- Graphical representation of knowledge (of an employee) in the form of a map
- Different types of knowledge elements
- Relations between knowledge elements

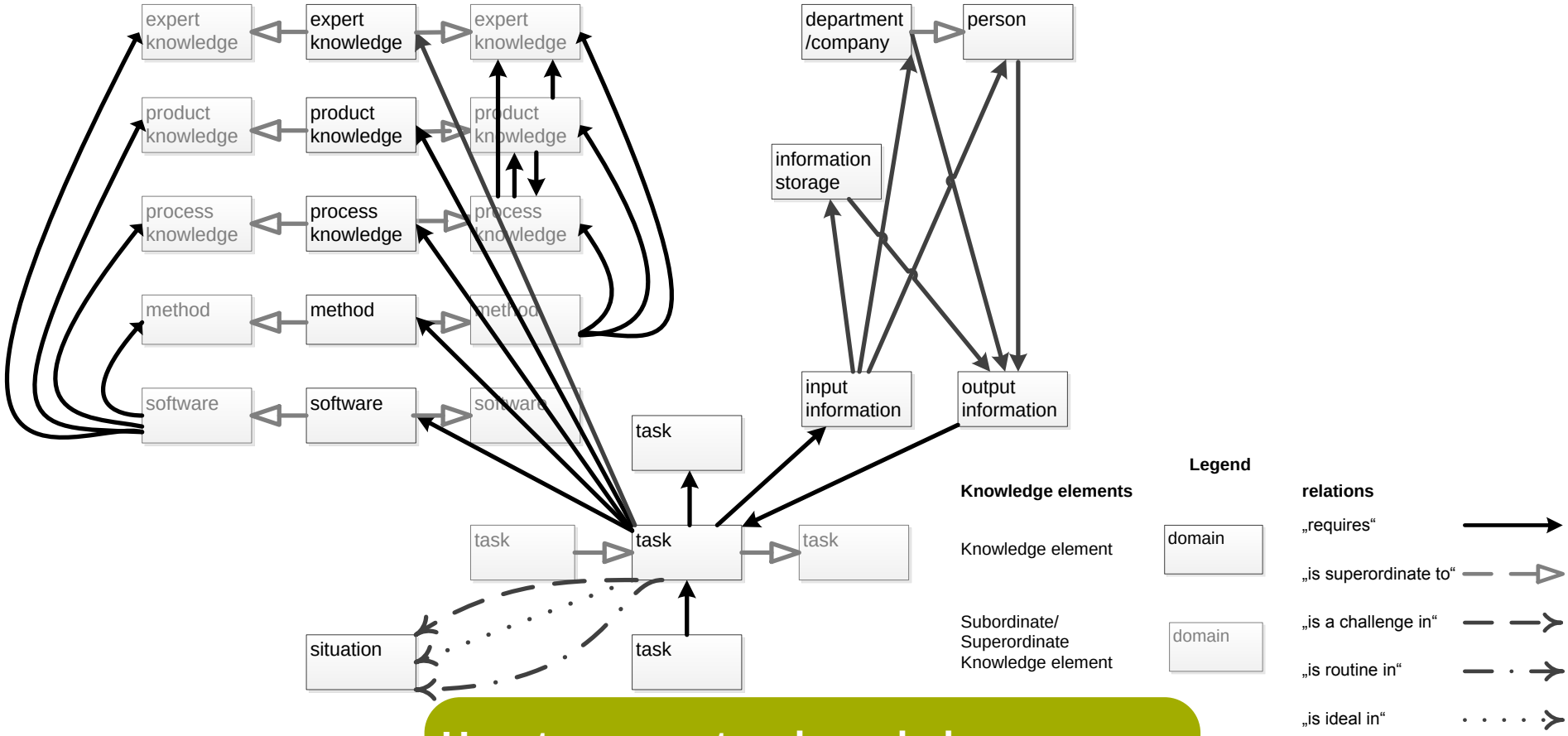
Improving the company-internal knowledge transfer with knowledge maps



Rough procedure of developed methodology for knowledge transfer:

1. Elicitation of knowledge and representing it with knowledge maps
2. Comparison of knowledge maps for identifying knowledge lacks
3. Prioritization of knowledge to be transferred due to scarce resources
4. Use of knowledge based company-internal systems where possible to reduce face-to-face effort
5. Personal knowledge transfer of remaining knowledge between mentor and mentee

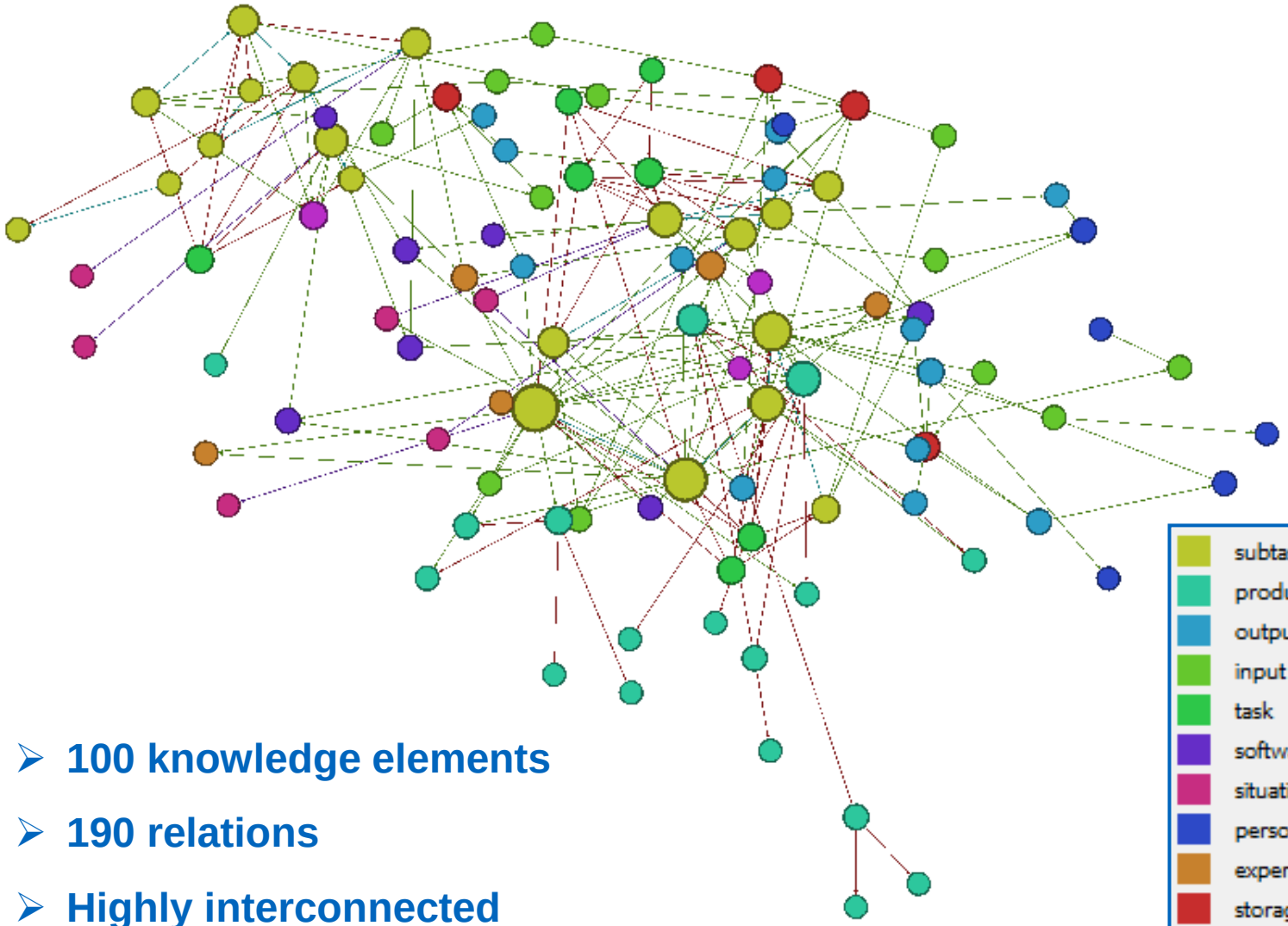
Meta-Knowledge Map



How to generate a knowledge map:

- Generating knowledge map with interview dialog running in open source software Gephi and Python
- No moderator needed (costs)

Exemplary knowledge map from case study



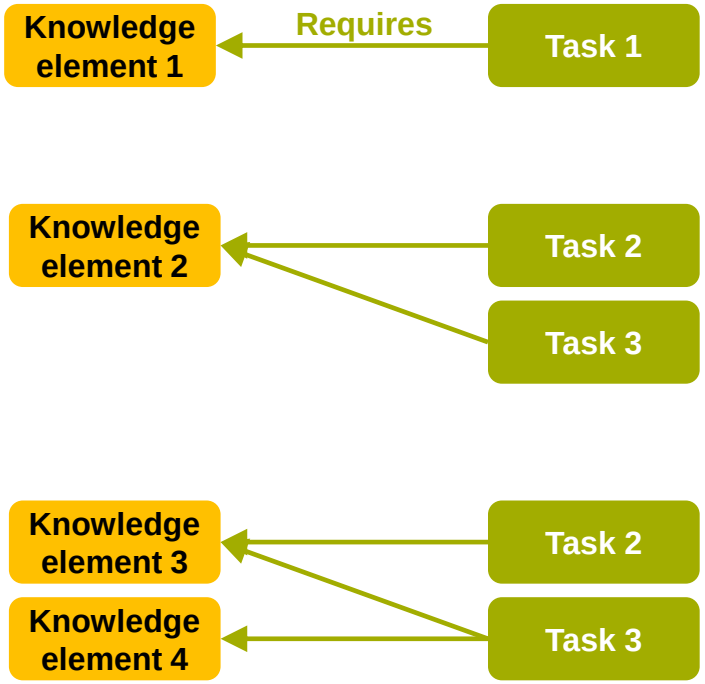
Legend

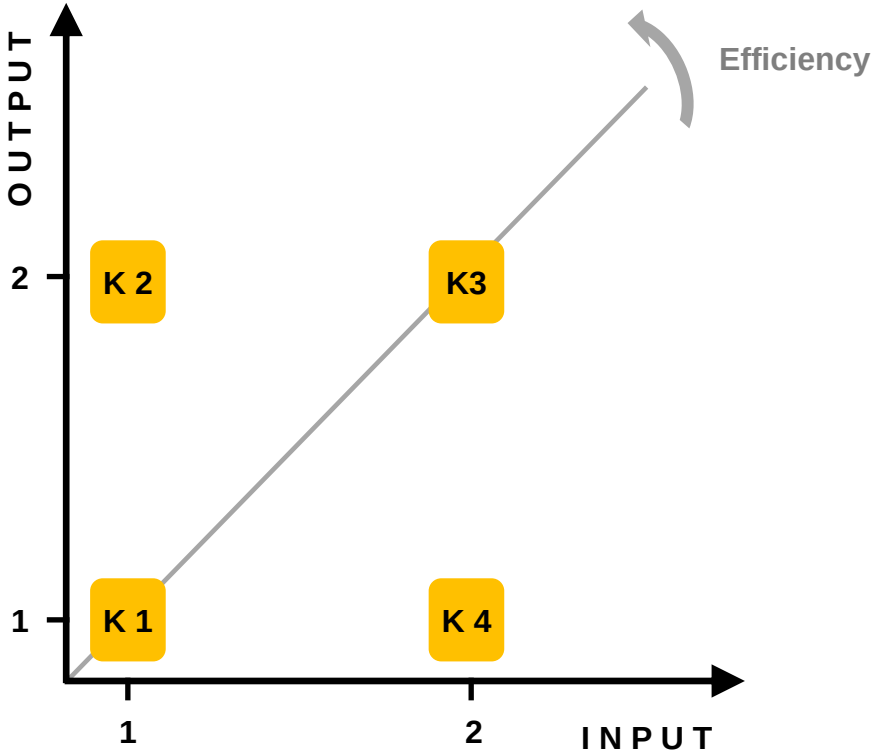
subtask	(20%)
product knowledge	(17%)
output	(13%)
input	(12%)
task	(7%)
software	(7%)
situation	(6%)
person	(6%)
expert knowledge	(5%)
storage	(4%)
method	(3%)

- **100 knowledge elements**
- **190 relations**
- **Highly interconnected**

The labels of knowledge elements are hidden due to secrecy!

Previous work in knowledge prioritization

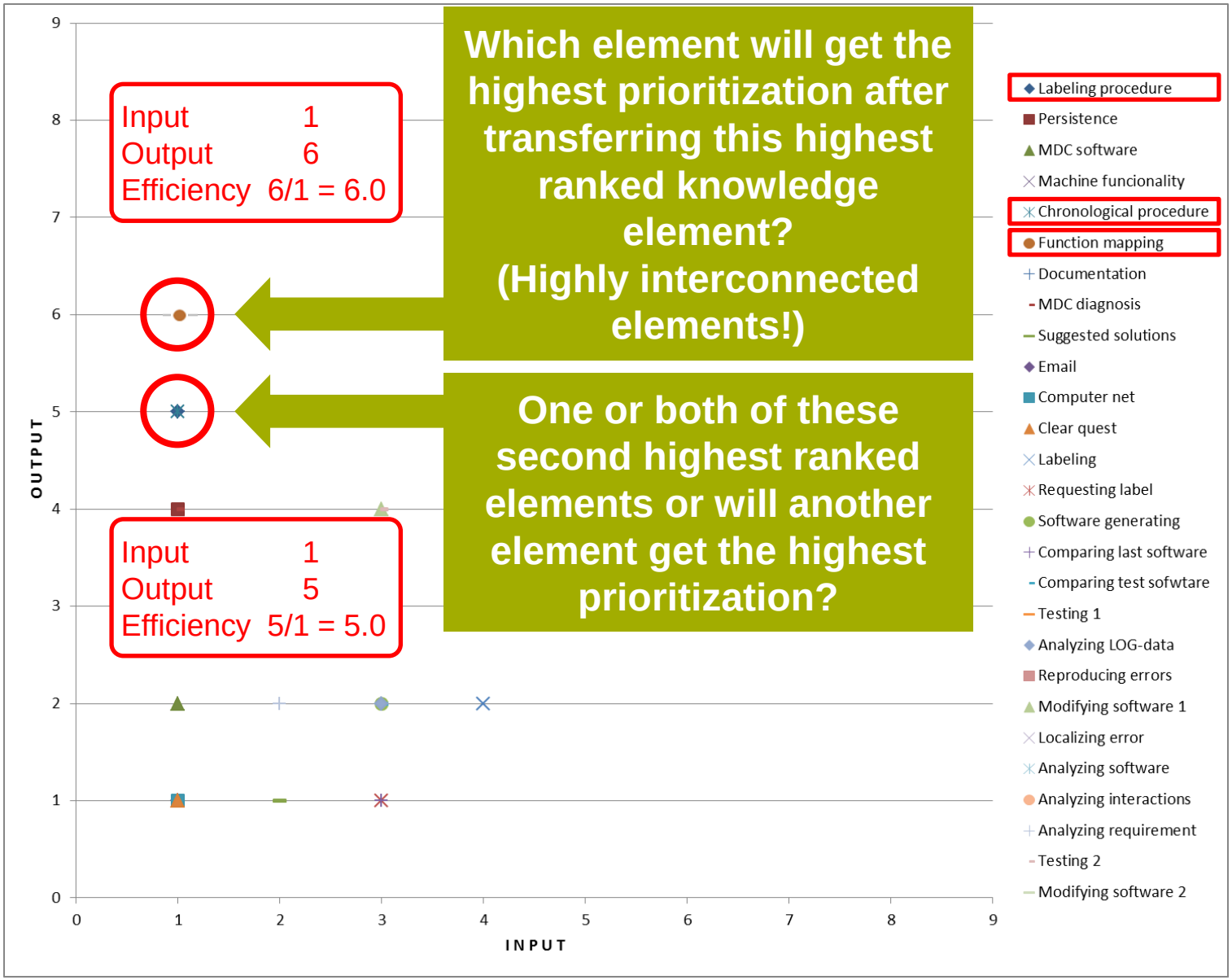




$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

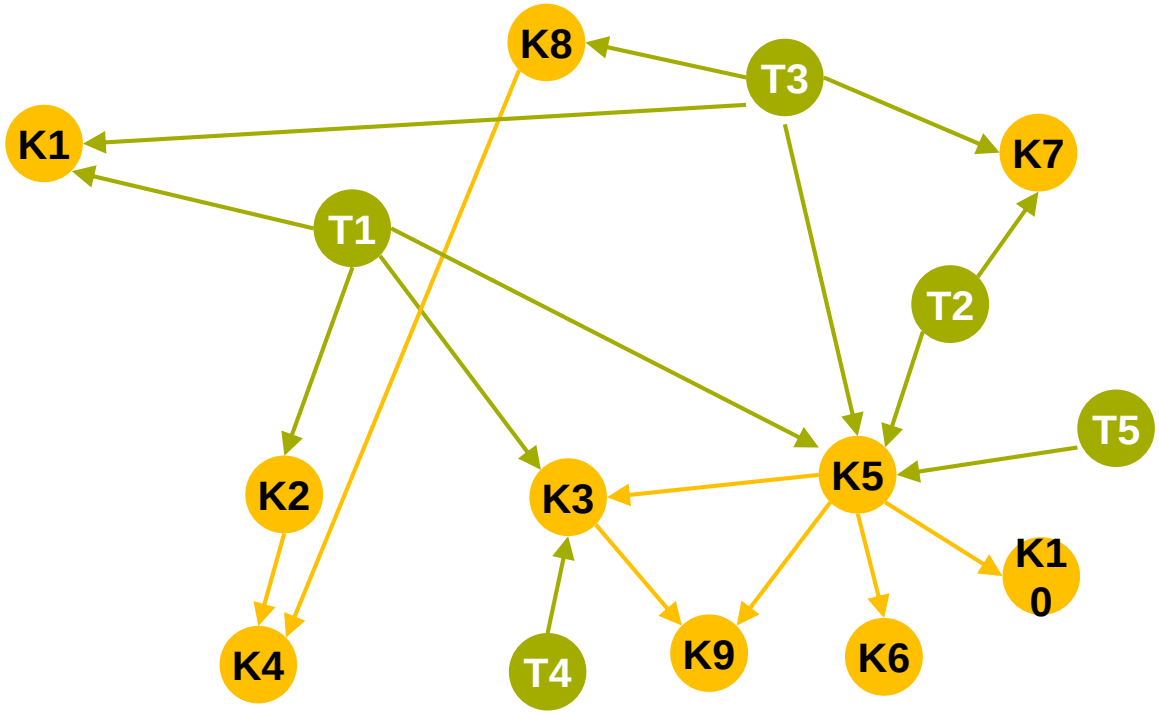
➢ **Criticism: static consideration of prioritization ranking**

Enhancement of the Approach and Dynamization



Enhancement of the approach and dynamization – ecxemple

t = 0

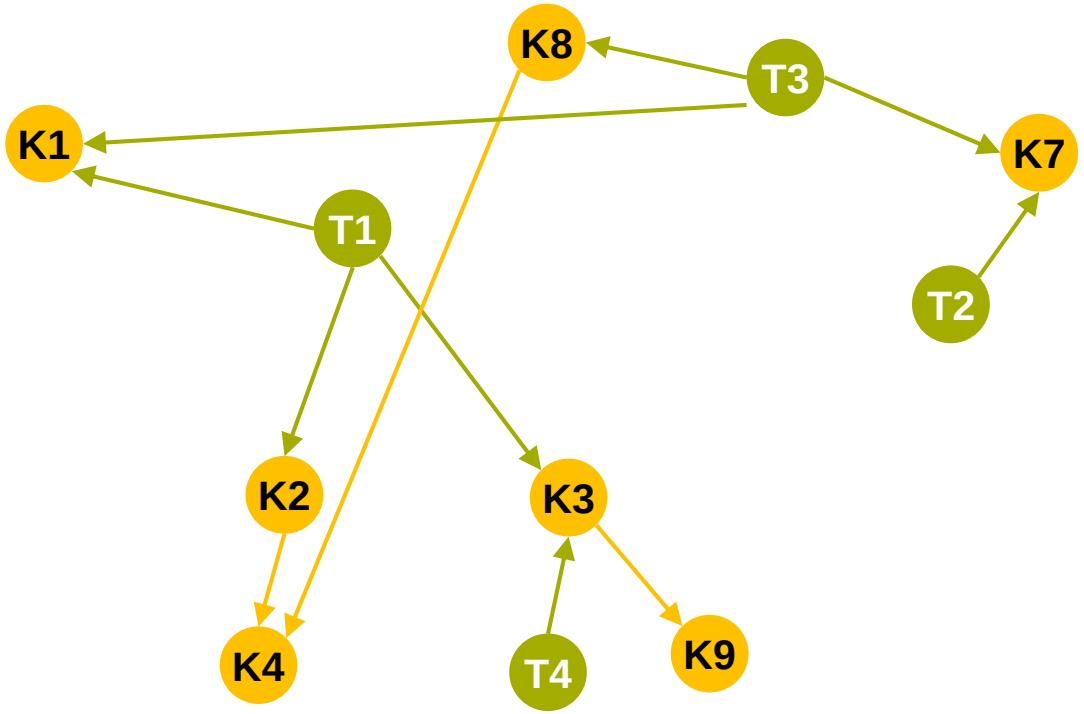


	INPUT	OUTPUT	Efficiency	Rank
K1	10	2	0,20	4
K2	8	1	0,13	5
K3	8	2	0,25	2
K4	0	0	0,00	7
K5	10	4	0,40	1
K6	0	0	0	7
K7	9	2	0,22	3
K8	9	1	0,11	6
K9	0	0	0	7
K10	0	0	0	7

K Knowledge element
T Task

Enhancement of the approach and dynamization – ecxemple

t = 1

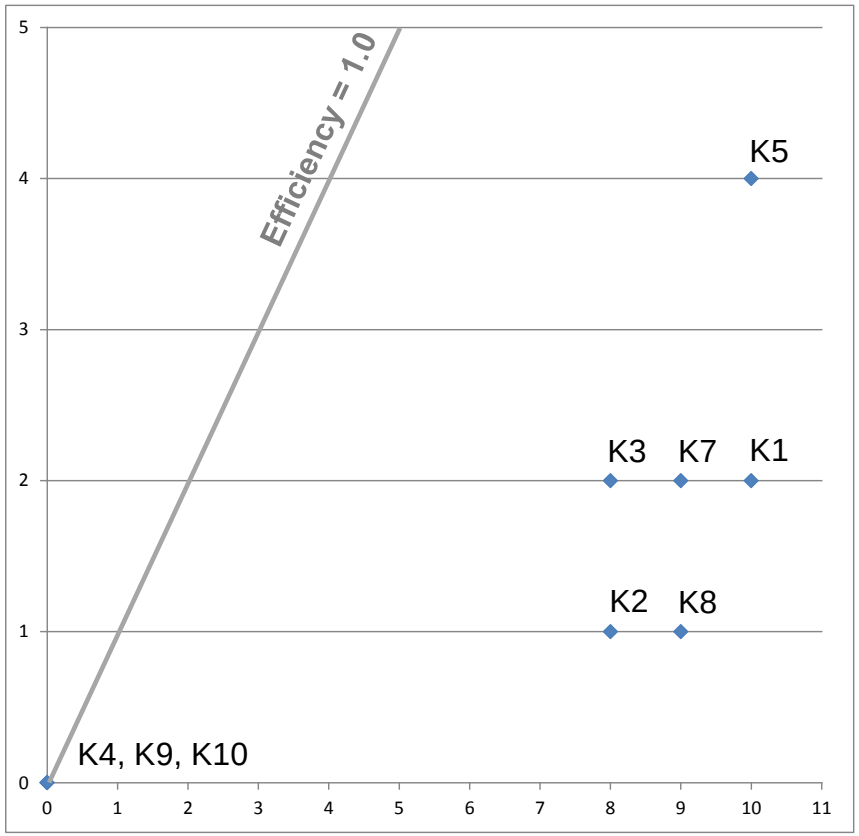


	INPUT	OUTPUT	Efficiency	Rank
K1	7	2	0,29	3
K2	5	1	0,20	5
K3	5	2	0,40	2
K4	0	0	0,00	6
K5				
K6				
K7	4	2	0,50	1
K8	4	1	0,25	4
K9	0	0	0	6
K10				

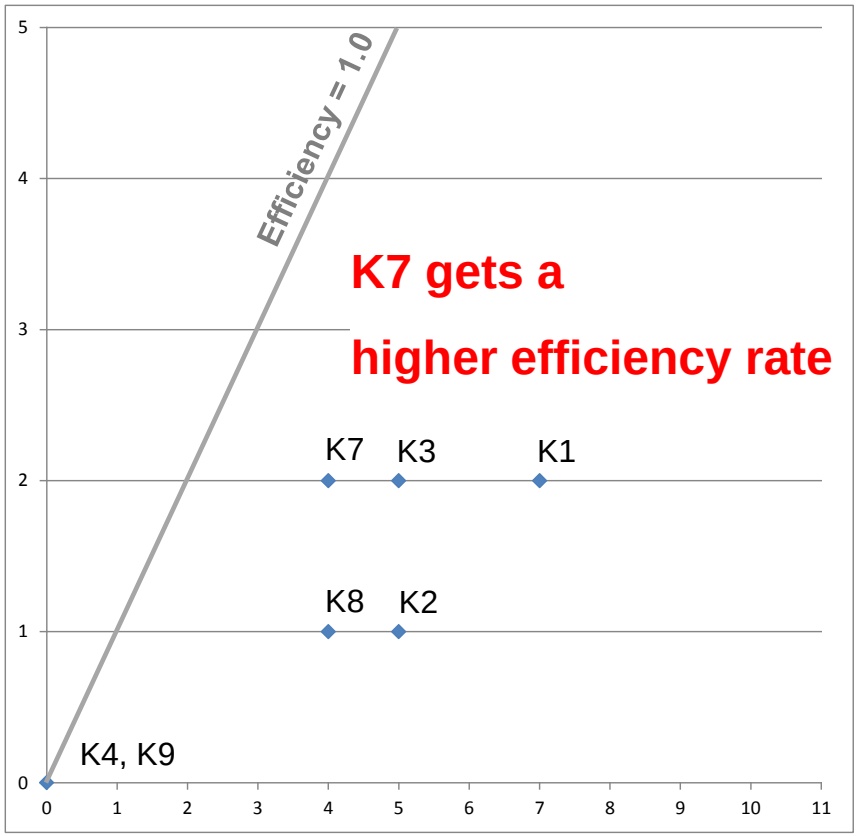
K Knowledge element
T Task

Depiction in the input-output-portfolio

t = 0



t = 1



- **Note: Elements don't have to but they can change their positions due to their interrelations after transferring a certain other one!**

Future Work

- **Weighting of added output depending on enabling “only” another knowledge element or a task**
  K ← K => 0.5
  K ← T => 1.0

- **Enhancing the totally numerical approach through integrating the effort for learning specific knowledge elements estimated by mentors**

Thank you for your attention!

Acknowledgment
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