From Clinical Practice Guideline to Clinical Pathway – Issues of Reference Model-Based Approach

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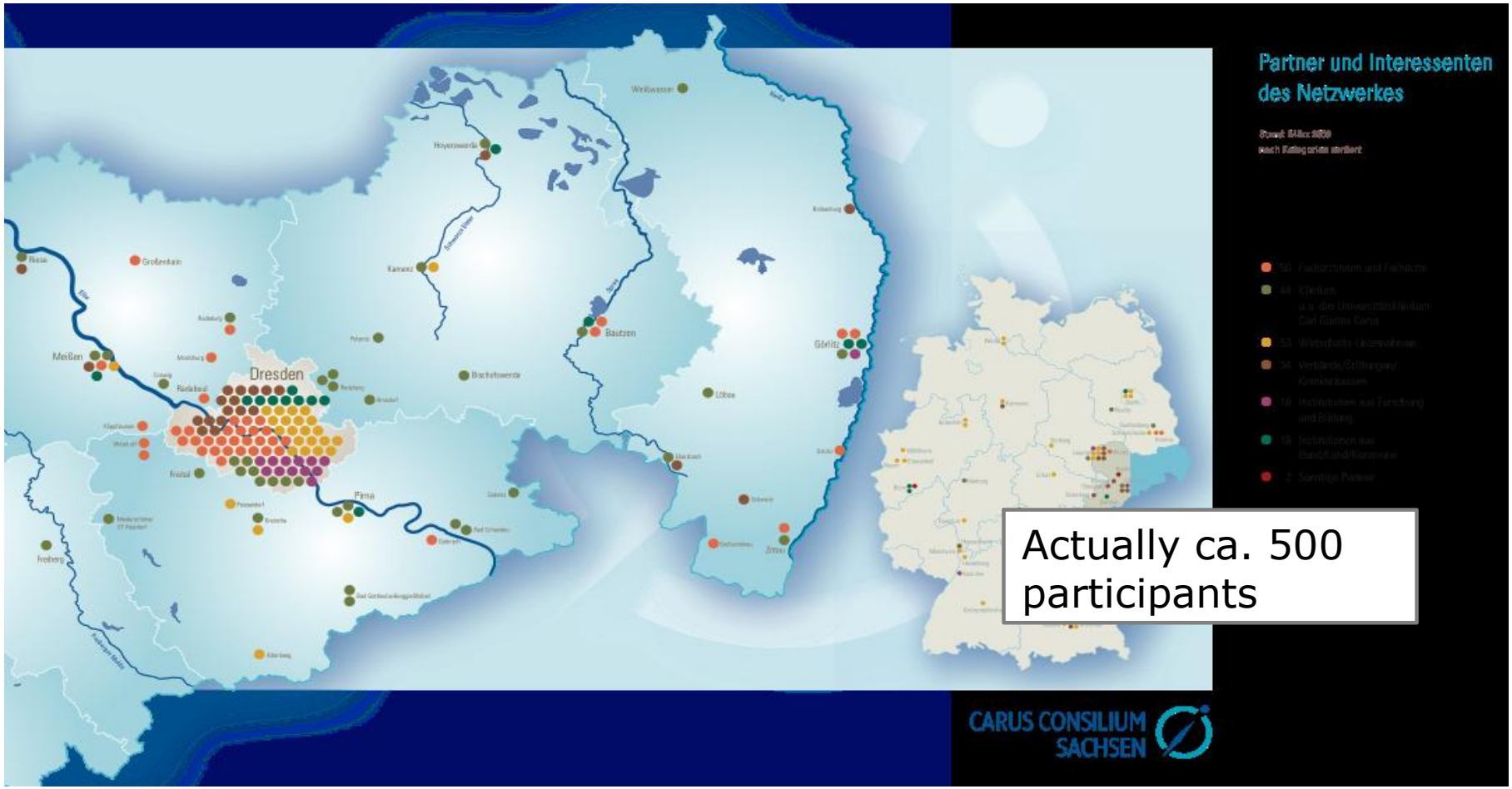
Agenda

- Project Background
- Theoretical Foundations
  - Clinical Pathway (CP) vs Clinical Practice Guideline
  - Fundamentals of Reference Modeling
  - Framework for Clinical Recommendations
- Motivation
  - Prior Research
- The Reference Model-Based Approach
- Analysis & Results
- Future Research

Project Background
The SOS-NET



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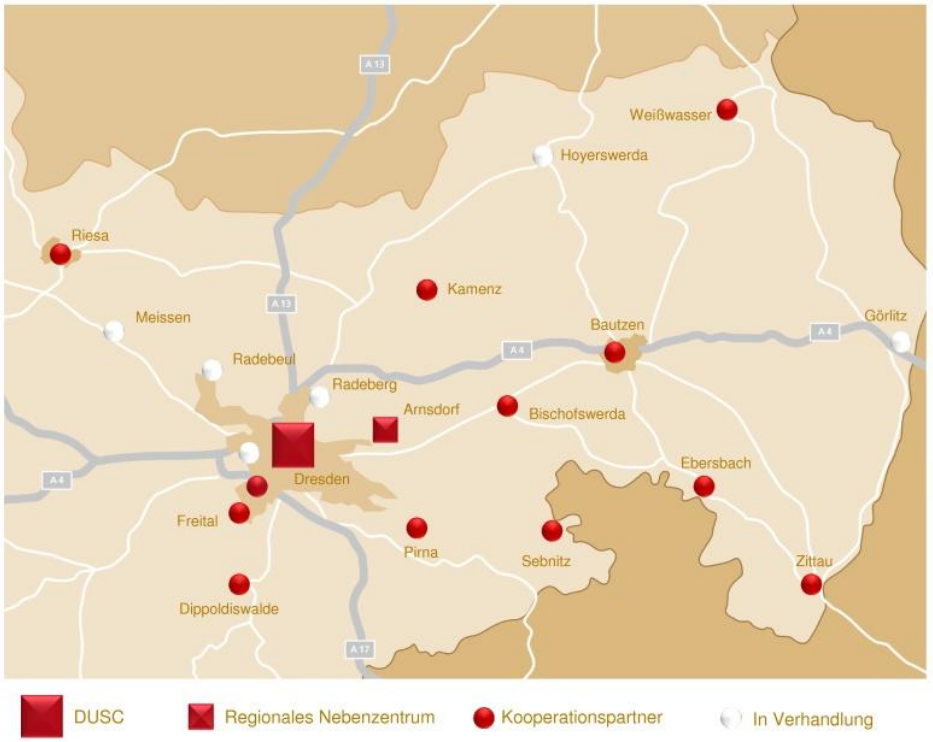
Project Background
The SOS-NET

- Founded in 2007
- 13 hospitals within the network
- Healthcare network for regional stroke care (most important stroke
- structure in Saxony)
- Based on tele-medicial infrastructure
- Goal:
  - quality treatment of all stroke patients independent to the regional location
  - Lyse indication in small time slot

SOS-Net - Stroke Network of Saxony



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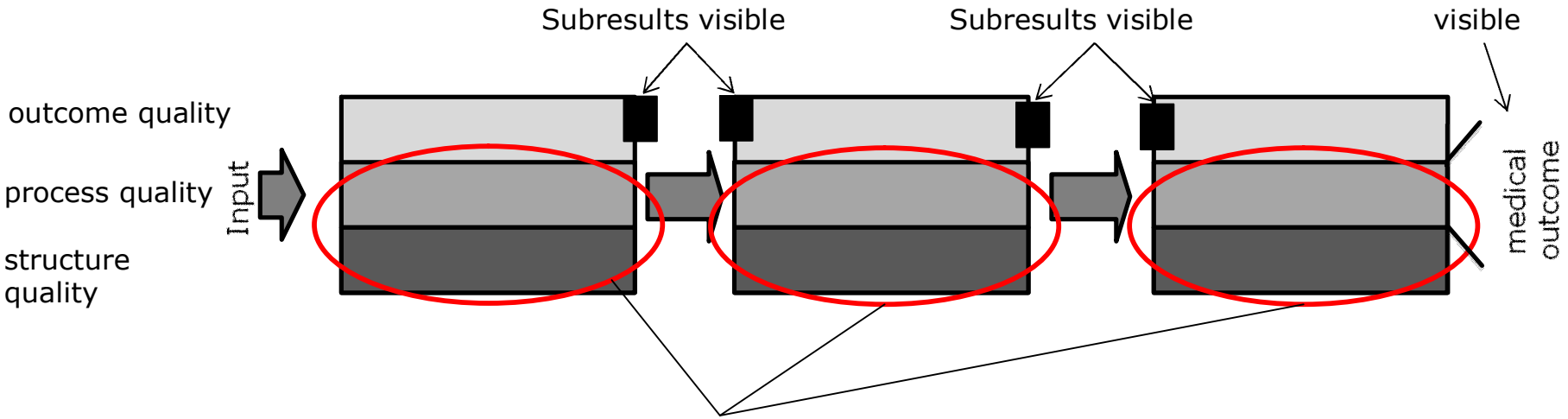
The Internal Quality as „Greybox“

Care process in a network



- The internal quality is not visible
- Fulfillment of requirements can be checked

Implication:

The processes in the network can not unified, however, a minimum standard of the processes, of coordination and communication of network members need to defined.

The Clinical Practice Guideline (CPG)

Characteristics:

- CPGs are recommendations for action (no binding instructions)
- Systematically developed recommendations to support clinical activities
- Classified into different development stages (Level 1 to 3)
- Aggregation of evidence-based medicine

Aim:

- Improvement of clinical care and cost
- Faster dissemination of evidence-base
- Patient information of the good clinic

Level 1:
-expert opinion
Level 2:
- consensus-based guideline
Level 3:
- evidence-based guideline

The Clinical Pathway (CP)

Characteristics:

- Instrument for clinical process management
- CPs are interdisciplinary and multi-professional aspects
- Creation at local level („From the hospital for the hospital")

Aim:

- Improvement of cost and process transparency
- Facilitate an active quality management (process quality improvement processes)
- Improvement of medical outcome
- Support of clinical documentation
- Definition of local standards

[Roed+2003], S.20 ff

Framework for Clinical Recommendations

Scenarion I:

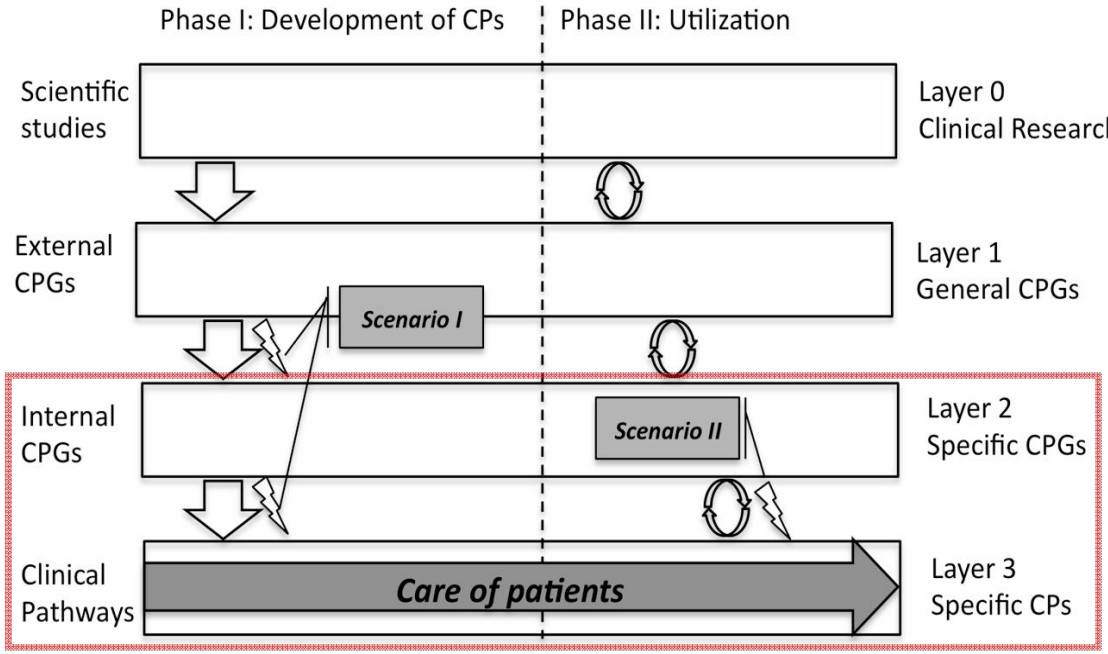
- Derivation of CPs based on CPGs

Goal:

- Reduction of manual work
- Methodological adaptation
- =>Improve Process quality

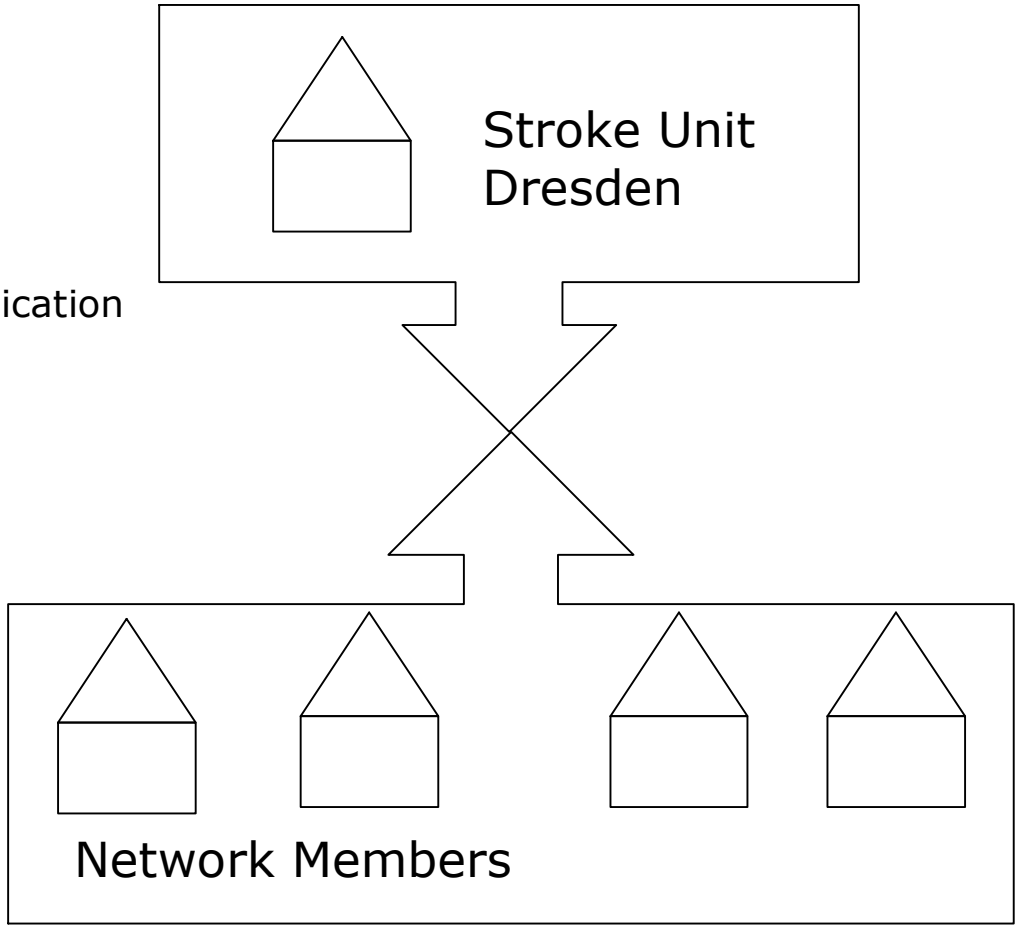
Scenario II:

- *Revision of CPGs*
- *Integrations and alignment of CPG and CP*



Advanced CPGs
and Method for application

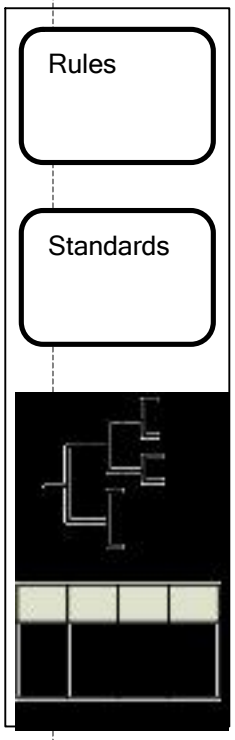
Guarantee of
quality level



Clinical Practice Guideline

Specific Models of CPs

Evidence Medicine



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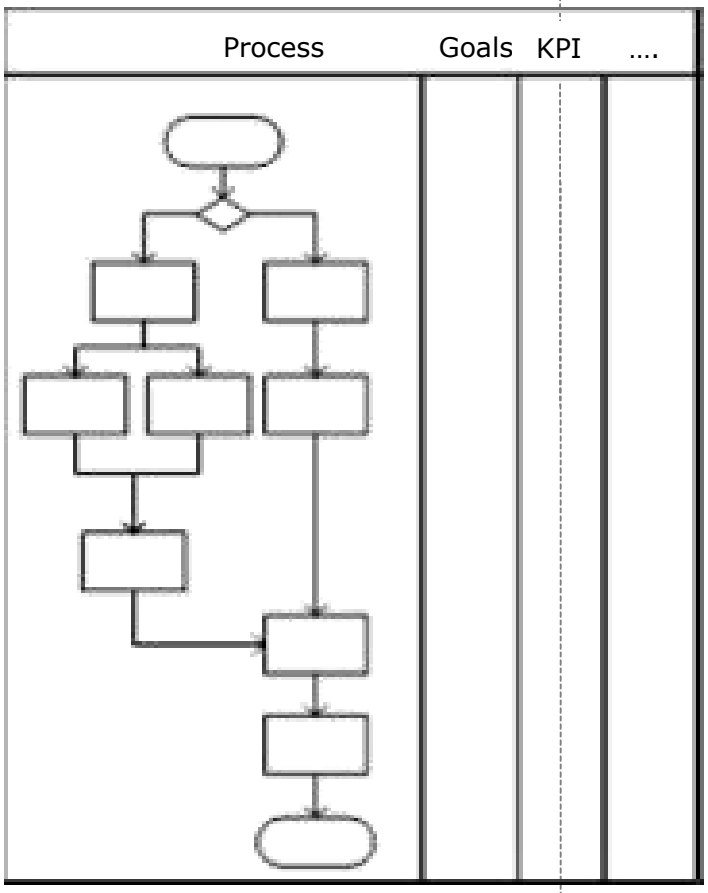
Gap



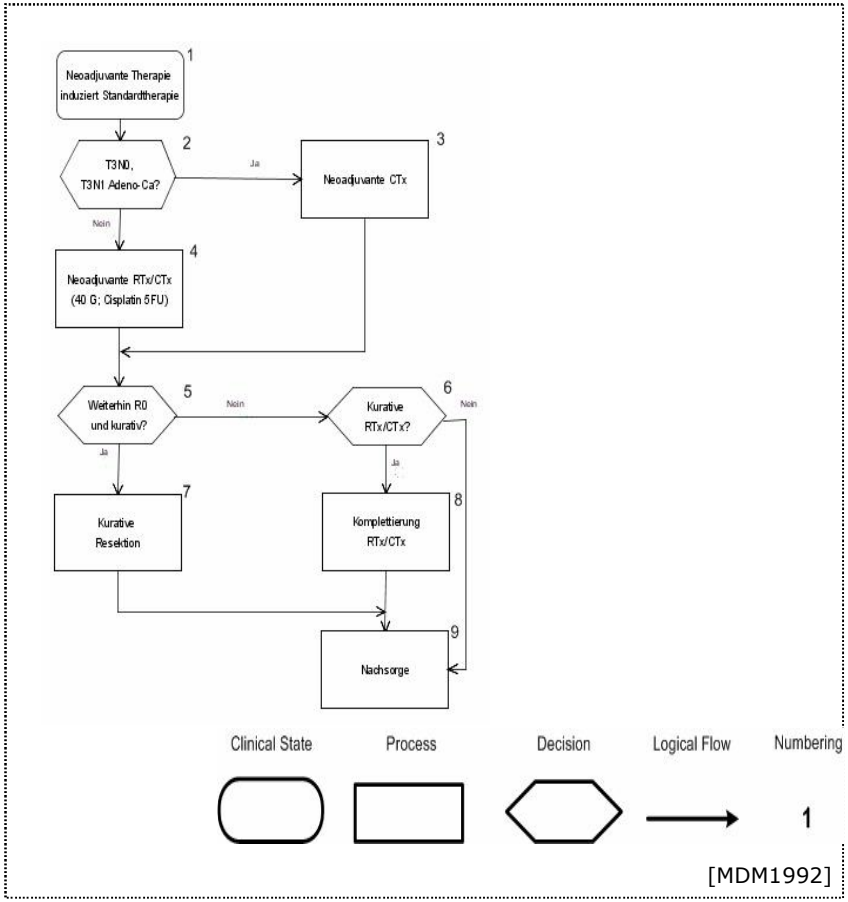
Clinical Practice

Nomenclatur of MDM:

- Published modeling language of Society of Medical Decision Making
- Goal: Comparison of CPGs

Critics:

- Insufficient adequacy of modelling language
- No Methodic for Adaption / No Construction Techniques [Broc2003]



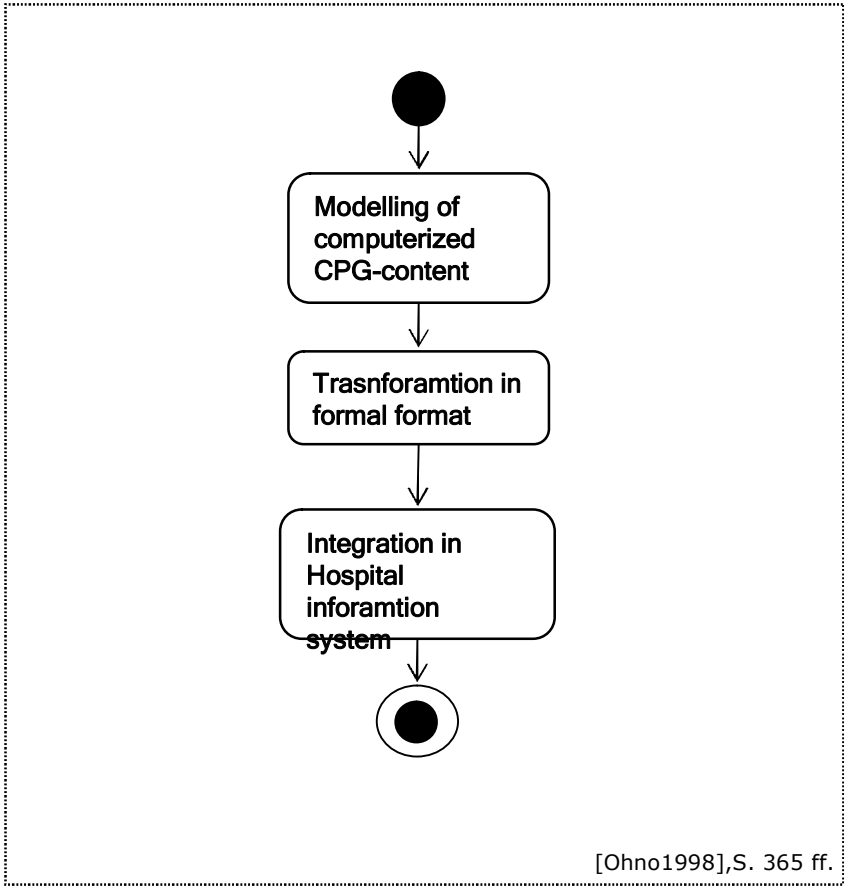
[MDM1992]

Computer-interpretable formalization:

- In discussion since 1980s
- Different language with (GLIF, GUIDE, Proforma, GEM...)
- Goal: Transformation in decision support system

Critics:

- Formal, not good human understandable
- Only parts of information system, which can formalized



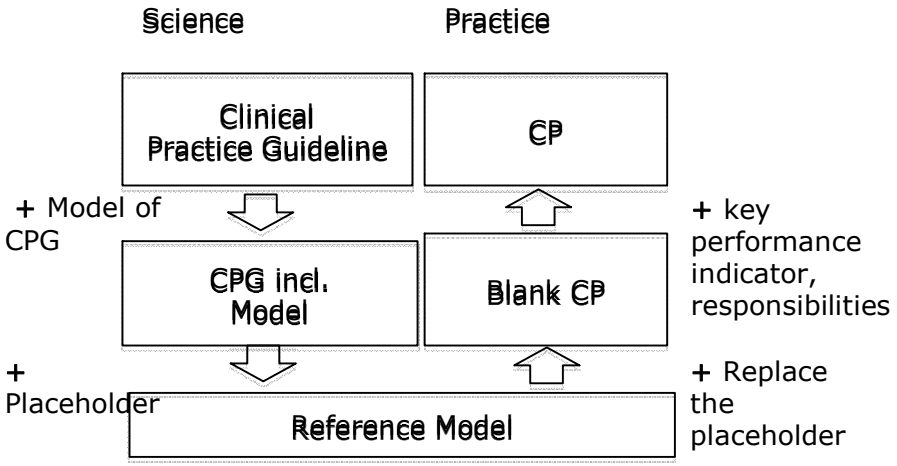
[Ohno1998],S. 365 ff.

Approach of Jacobs:

- First reference model based approach
- Applied for mamma carcinoma

Critics:

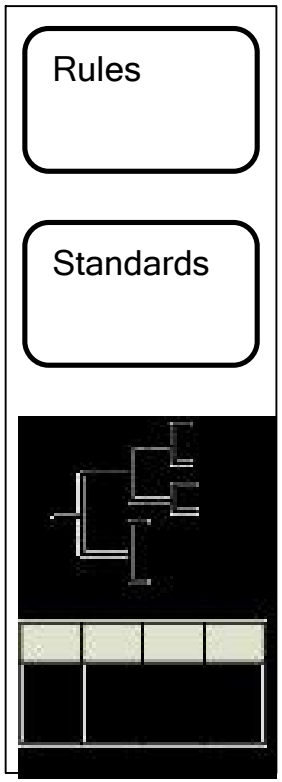
- Arbitrary design decision
  - No evaluation of modeling languages
  - Reduction on one construction technique
- Weak validity of results



[JACOBS2006], S. 74ff

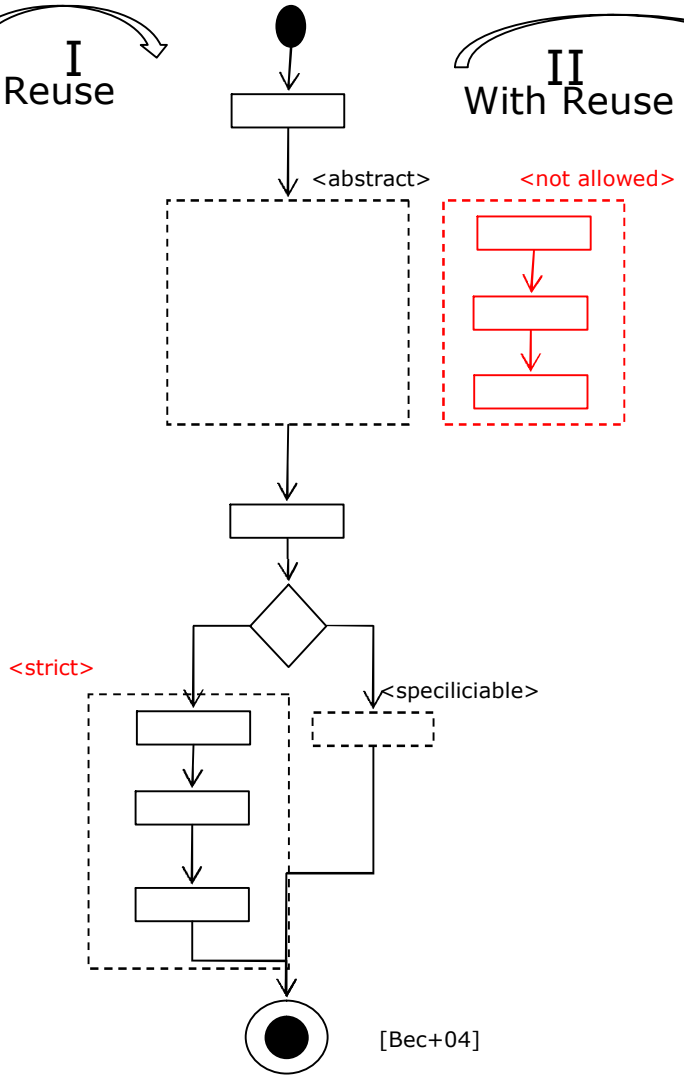
The Reference Model-based Approach

CPG



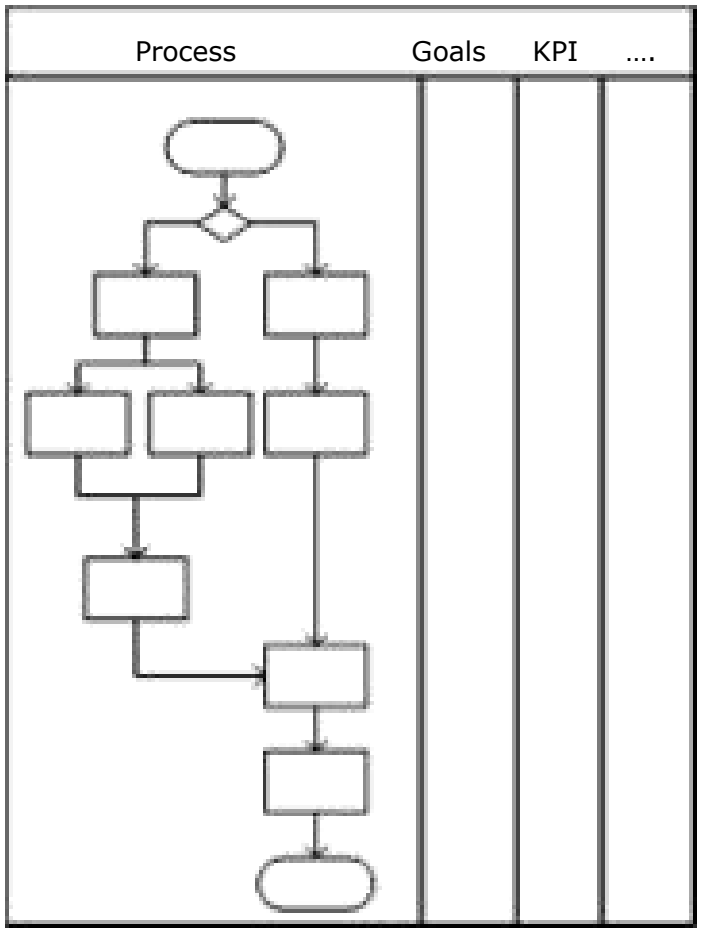
I
For Reuse

II
With Reuse



[Bec+04]

Specific Models of CPs



- In Information System (IS) research reference models are used to communicate best practice, common practice or normative rules
- They minimize the acceptance of model results or parts of models represe about effective and efficient so zational design [Hammel1999].
- The purpose of reference models usage is a reduction of development costs and of development time [Schuette1998]
- Reference models specify rules and standards that guarantee the compliance to adaptability of a standardized application system or the compliance to organizational rules.

Characteristics of Reference Models:
- Generality
- Adaptability
- Recommendatory character

- Configuration

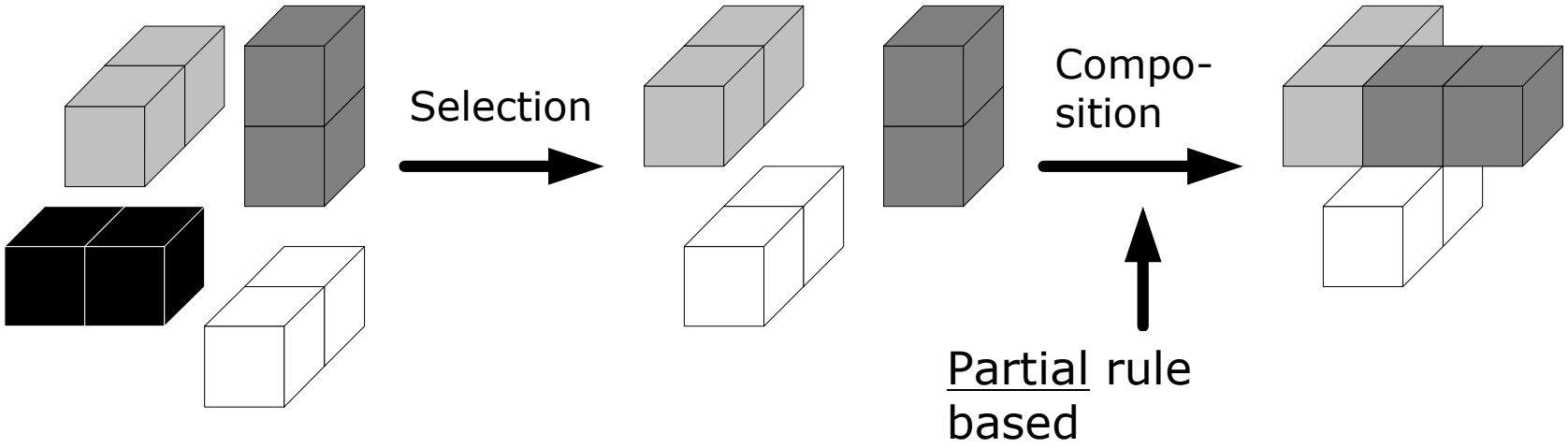
} Generating adaptation

- Specialization
- Aggregation
- Instantiation
- Analogy

} Not generating adaptation

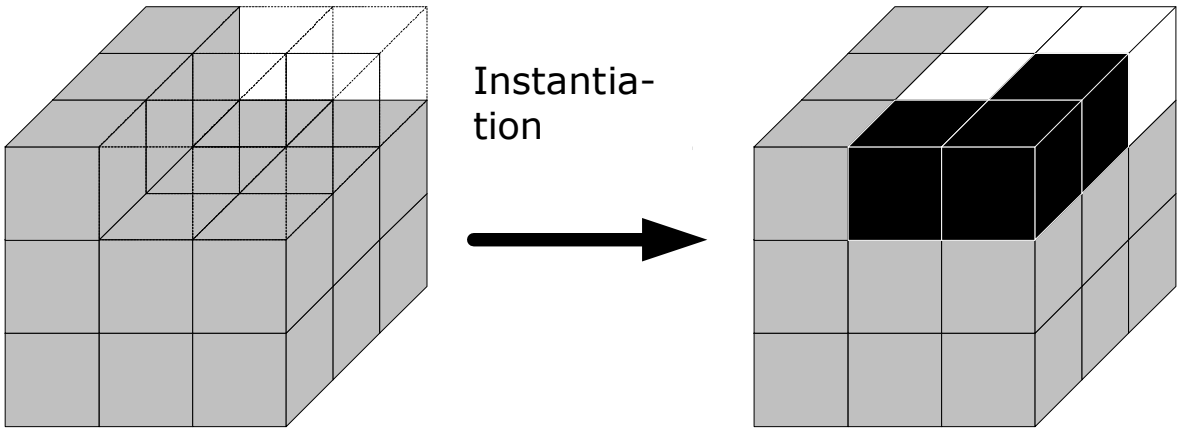
[Br03]

- Specialization of a gerneral model

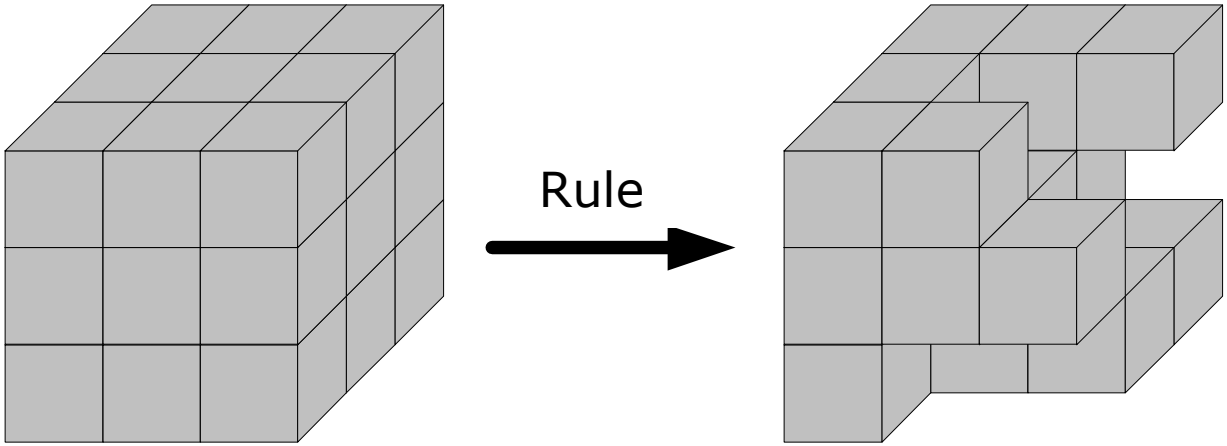


- Selection of reference model components in respect of criteria
- The way of composition is in general rule independent

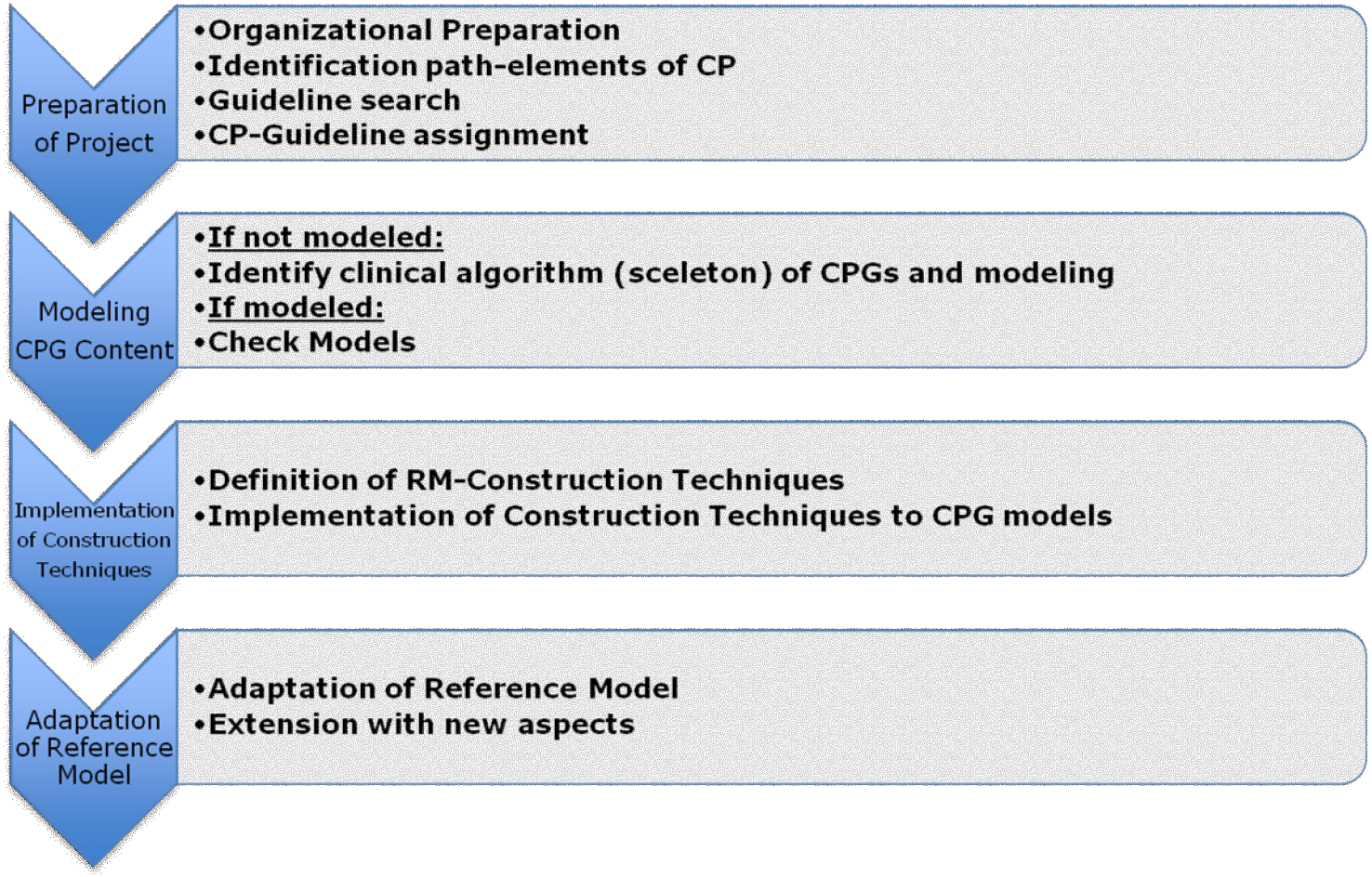
- RM pre-defines model elements, which are needed to be concretize
- Concretion without limitation or with limitation of range



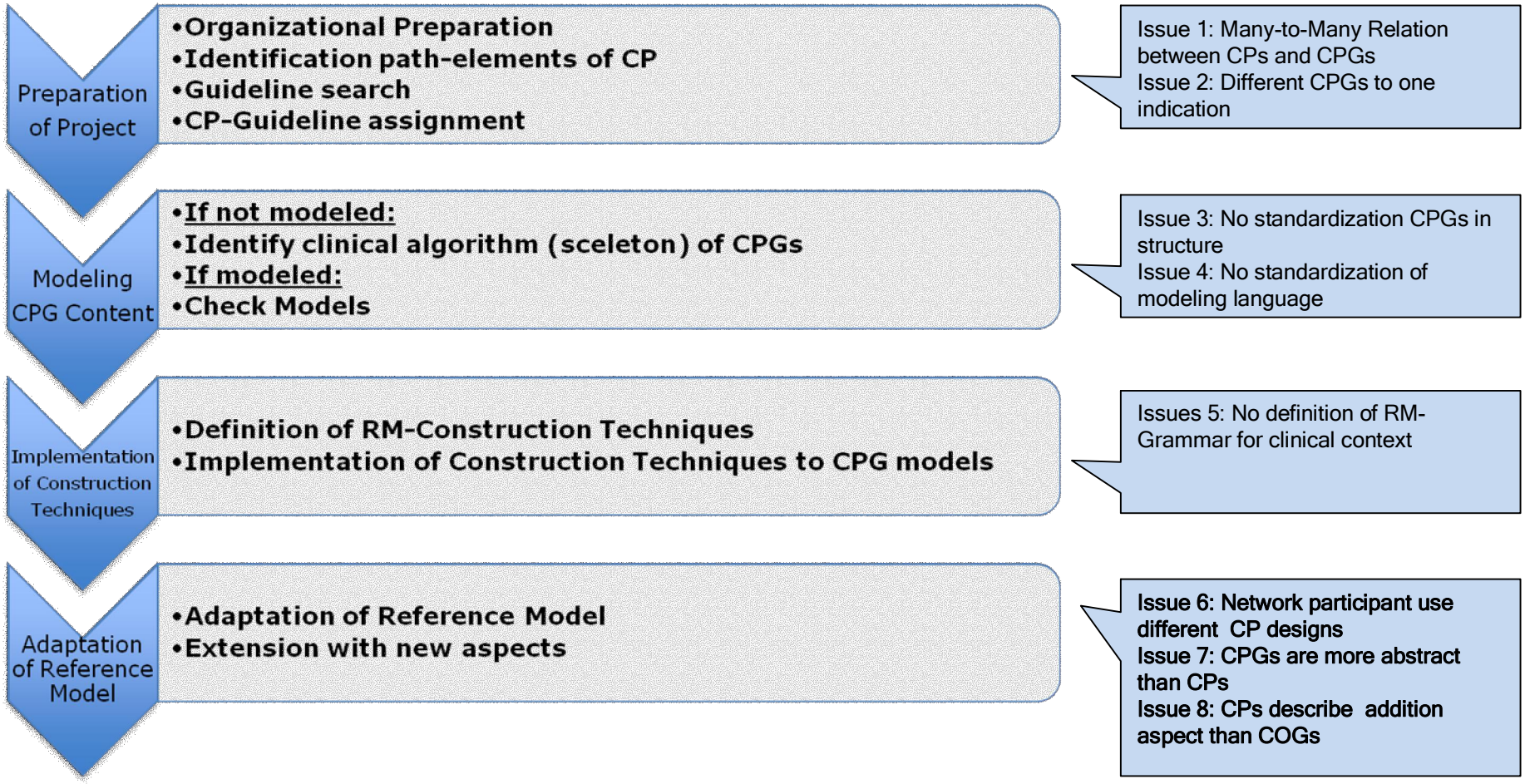
- Rule based adaptation
- Selection of forethought models
- Result: Projection of variant of the model



- All variants of modification are defined ex ante


Preparation of Project
•Organizational Preparation
•Identification path-elements of CP
•Guideline search
•CP-Guideline assignment
Modeling CPG Content
•If not modeled:
•Identify clinical algorithm (sceleton) of CPGs and modeling
•If modeled:
•Check Models
Implementation of Construction Techniques
•Definition of RM-Construction Techniques
•Implementation of Construction Techniques to CPG models
Adaptation of Reference Model
•Adaptation of Reference Model
•Extension with new aspects

Analysis & Results



Further Research

- Tool support for reference model construction and application
- Definition of standards for conceptual modeling of clinical practice guidelines including the RM techniques
- Extension of reference model-language to a reference model-based method

Thank you for your attention!

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Consequences

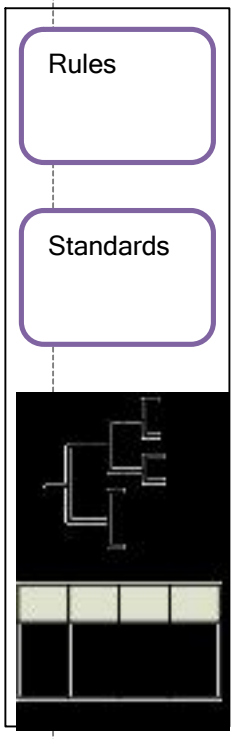
Issue 1: Many-to-Many Relation between CPs and CPGs
Issue 2: Different CPGs to one indication

Issue 3: No standardization CPGs in structure
Issue 4: No standadization

Issue Network participant use different CP designs

Method, which guarantees a comparable result

Reference Model



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Issues:

- level of abstraction
- different aspects
- representation

Similarities:

- Clinical Algorithm

Specific Models of CPs