

Andreas Schmidt¹
Christine Kunzmann²

A Methodological Framework for Building, Applying, and Updating Competency Ontologies



¹ FZI Research Center for Information Technologies
Karlsruhe, Germany
Andreas.Schmidt@fzi.de

² Christine Kunzmann
Kompetenzorientierte Personalentwicklung, Germany
contact@christine-kunzmann.de

- Competency-orientation
 - has emerged as an appropriate way of dealing with human potential and performance and their development
 - enables holistic approaches

- Current situation
 - usually based on a *somehow* hierarchic structured catalog
 - building of catalog usually one-time activity
 - often used only for a part of the company and for a single purpose, e.g. team staffing/composition
 - not shared among tools, not even within one application framework



- Fundamental Challenges of competency-oriented approaches:
 - well-defined **common understanding of each competency** across various departments or even organizations
 - various systems and services involved in HR, training, and knowledge management need to be **semantically coherent**
 - crucial **trade-off in competency modelling** needs to be solved:
 - the more accurate, realistic and fine-grained considered competencies are
 - the more complex management and controlling tasks become



Ontology-Based Competency Modeling

- Ontology as
 - formal shared conceptualization for a domain of interest
 - a „good ontology“ balances the aspects:
 - representation of **social agreement** („well-defined“, „common understanding“)
 - formalization for **enabling automating processes** („machine-readable“)
 - appropriateness for domain and purpose („useful“)

- Competency Ontologies
 - well-defined competencies
 - competency types, competency levels
 - and especially well-defined competency relationships
 - composition, generalization, subsumption
 - context-specific refinement of ontology frameworks



upper-level competence ontology

- specifying the notion of competency
- fundamental competency relationships
- e.g., our Professional Learning Ontology

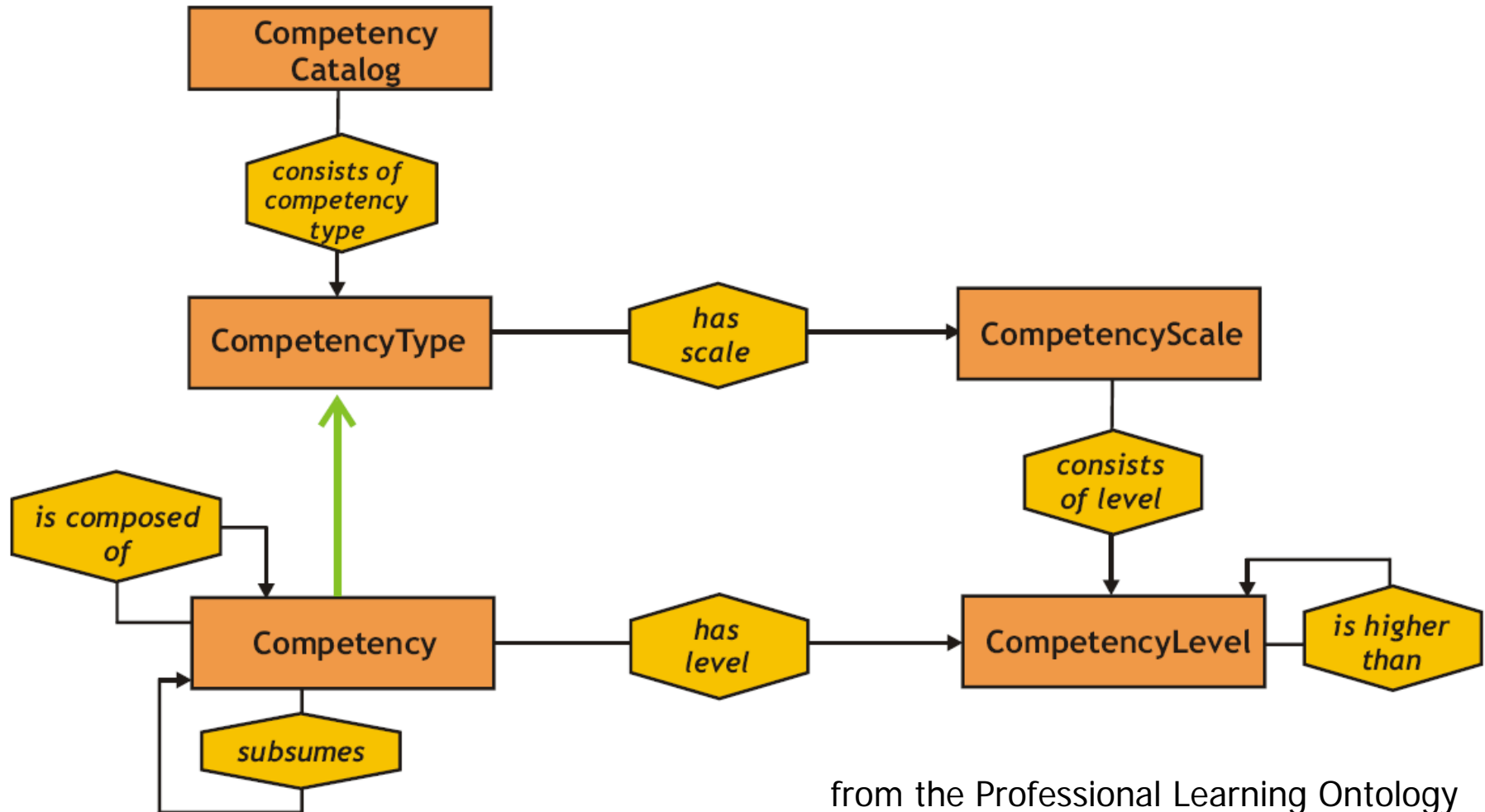
competence framework (ontology)

- uses the upper-level ontology
- defines reference competencies (->RCD)
- mostly branch-specific, but company-independent
- can extend the competence ontology

competence model/catalog

- company-specific
- refines and contextualizes the framework

Core part of an Upper-Level Ontology

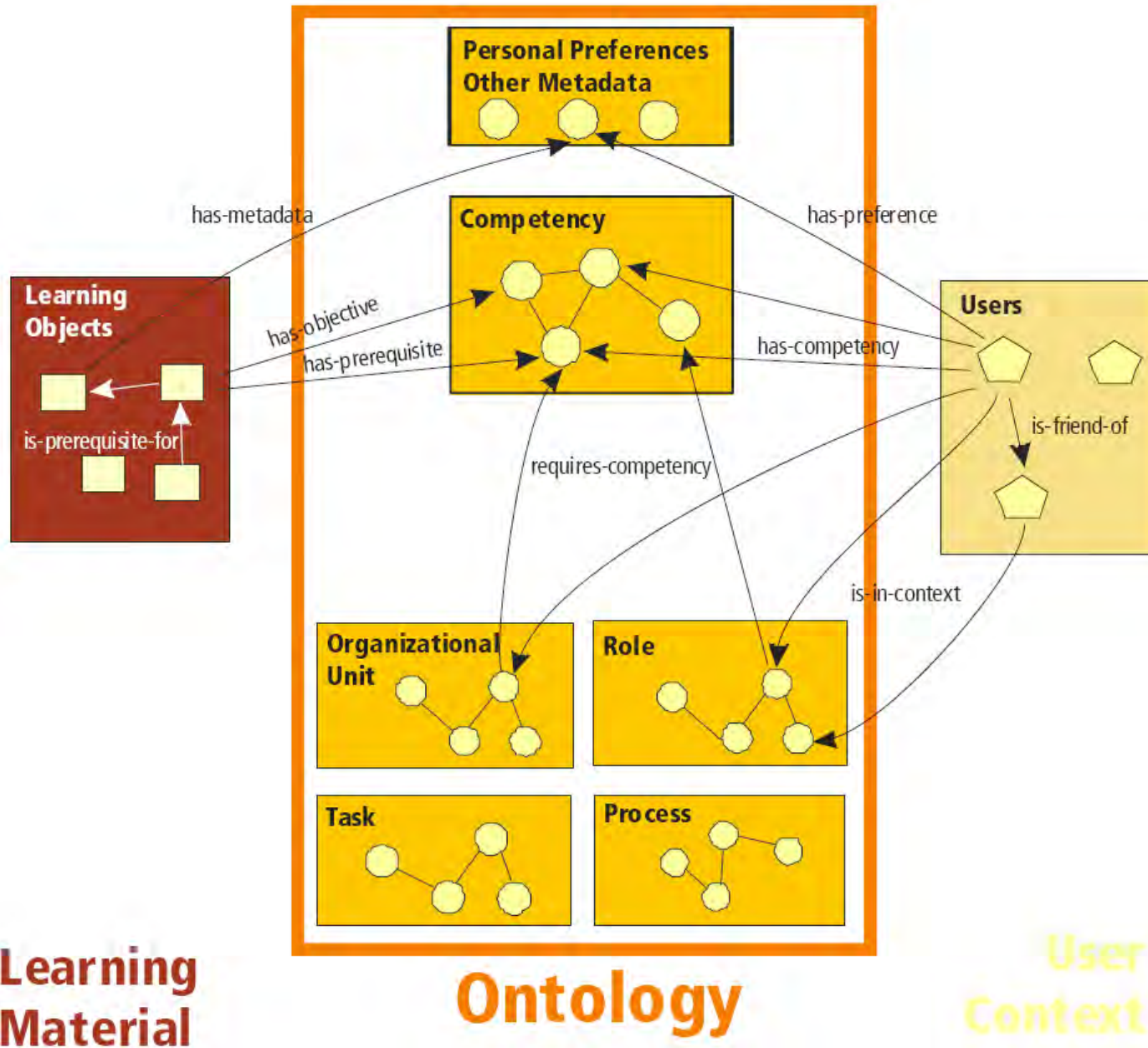


from the Professional Learning Ontology
<http://professional-learning.eu>

What can we do with it: Potentials of Automation

- Automation allows for fine-grained competency catalogs and thus more targeted actions
- **Profile matching** with similarity measures [Biesalski 05] for
 - selecting applicants
 - team staffing
- **Finding learning opportunities** with knowledge gap analysis and competency subsumption
 - learning on demand [Schmidt 05]
 - training planning [Kunzmann & Schmidt 06]
- **Aggregation** of individual competencies into organizational competencies

The Professional Learning Ontology

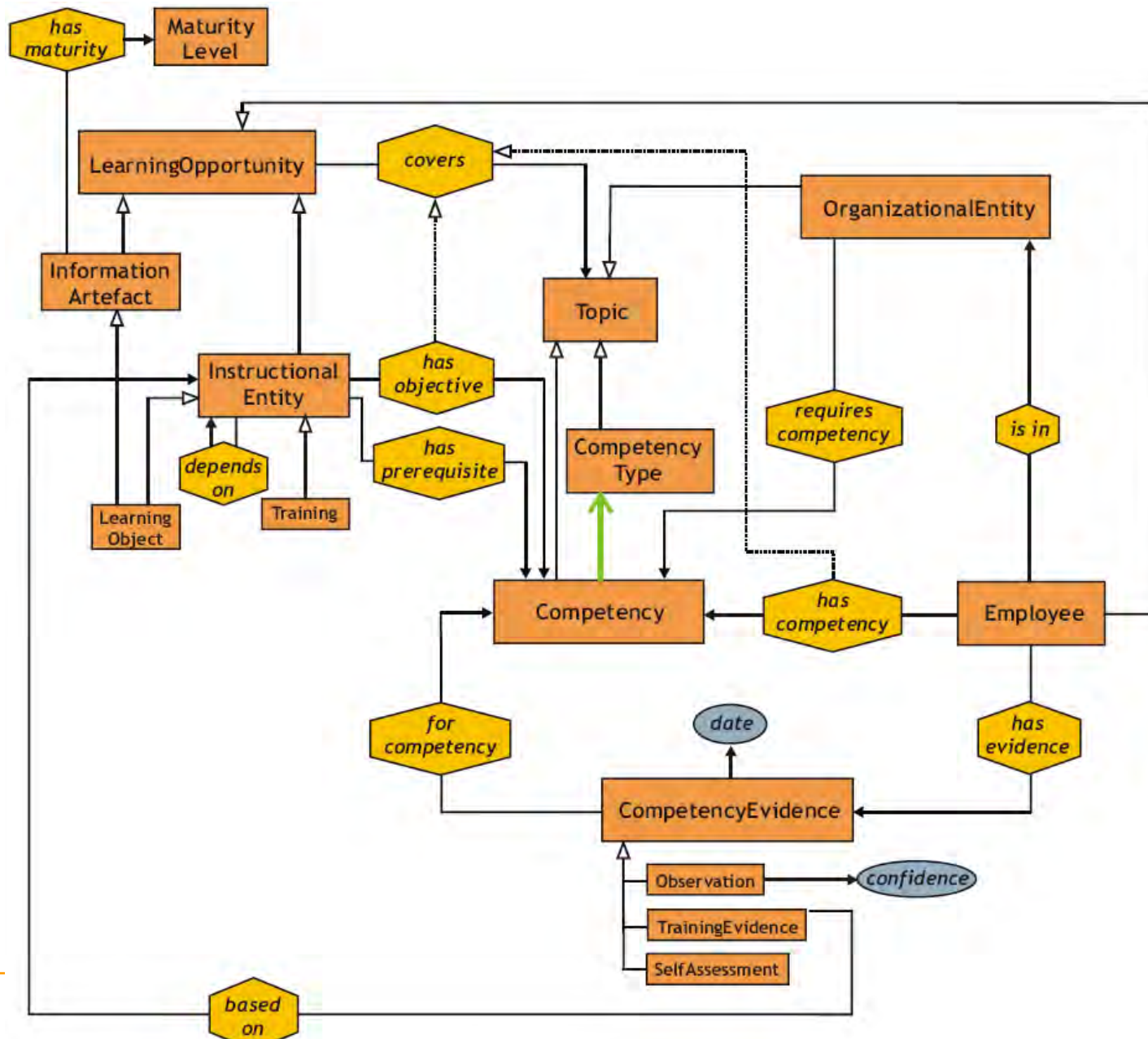


Learning
Material

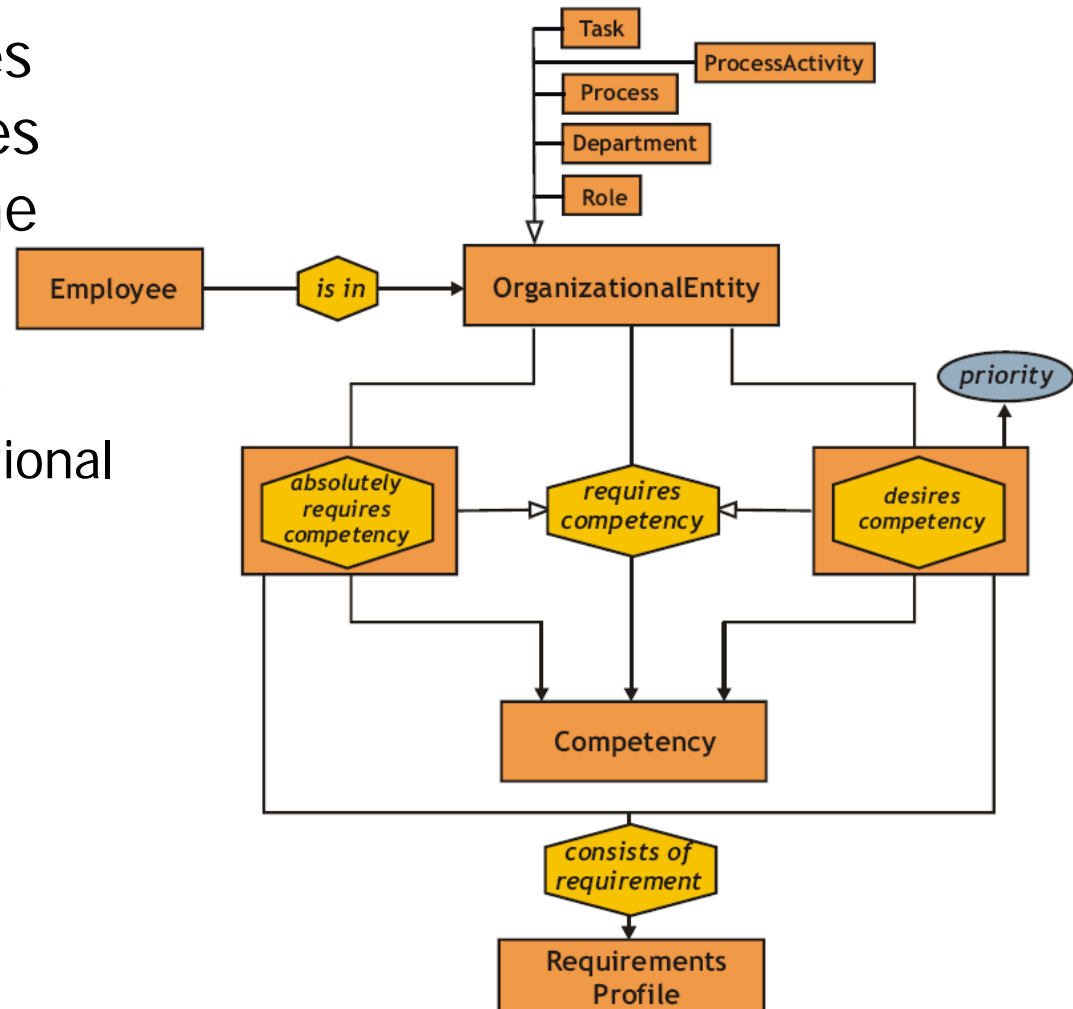
Ontology

User
Context

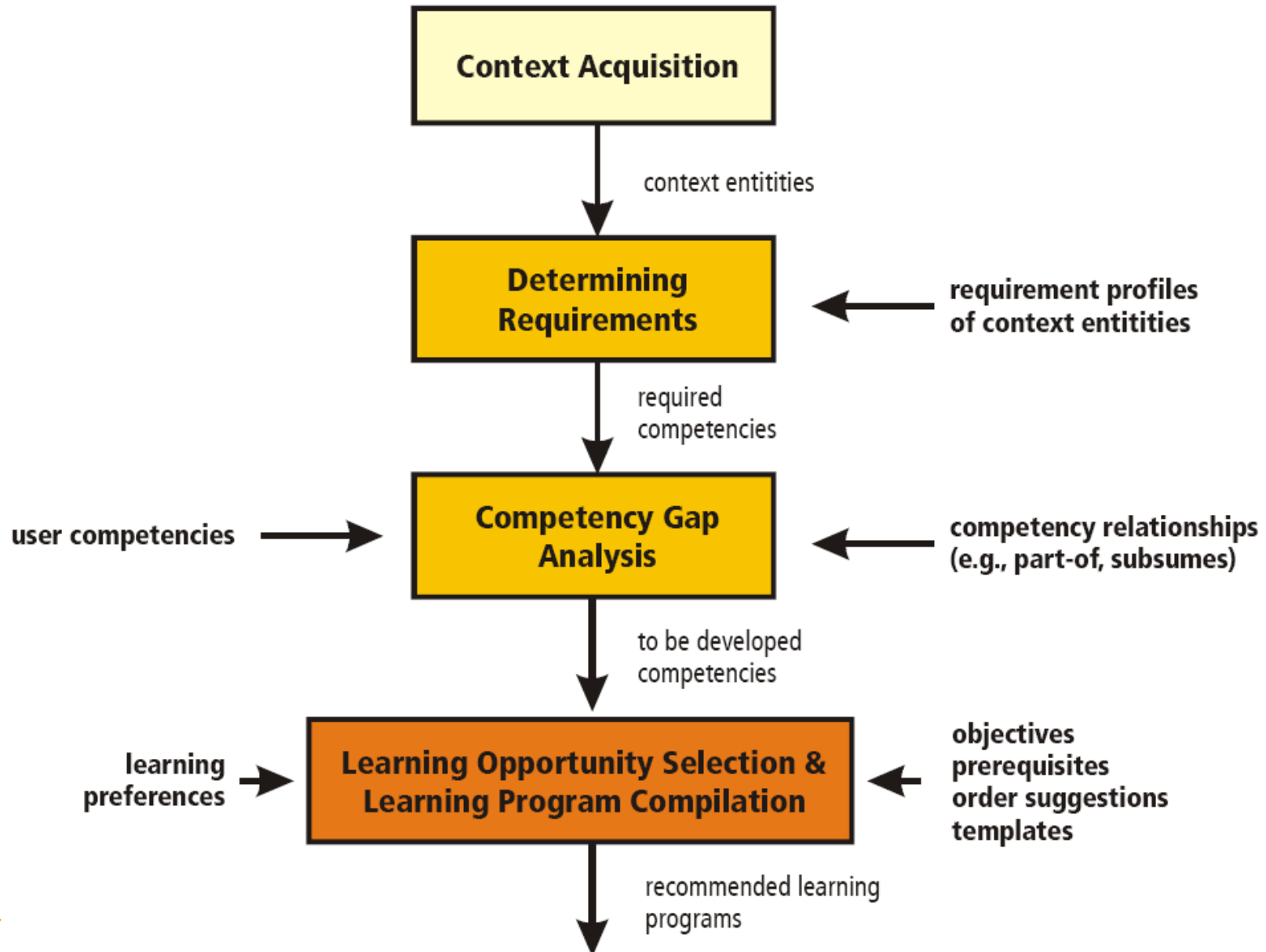
The Professional Learning Ontology (2)



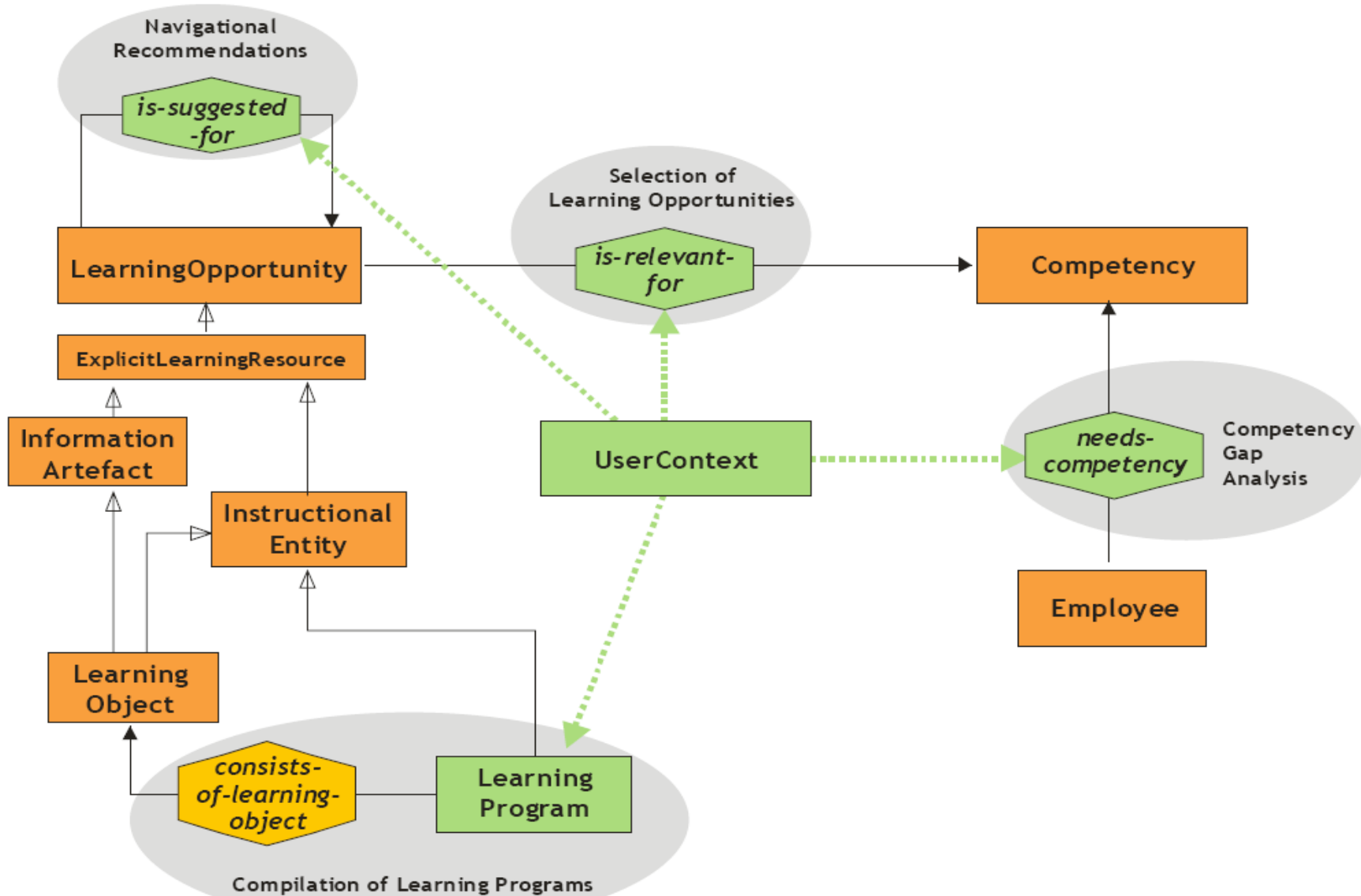
- For recommending learning opportunities within work processes we need to determine what is relevant
- Requirement profiles
 - attached to organizational entities



Learning on Demand



Competency-driven learning services

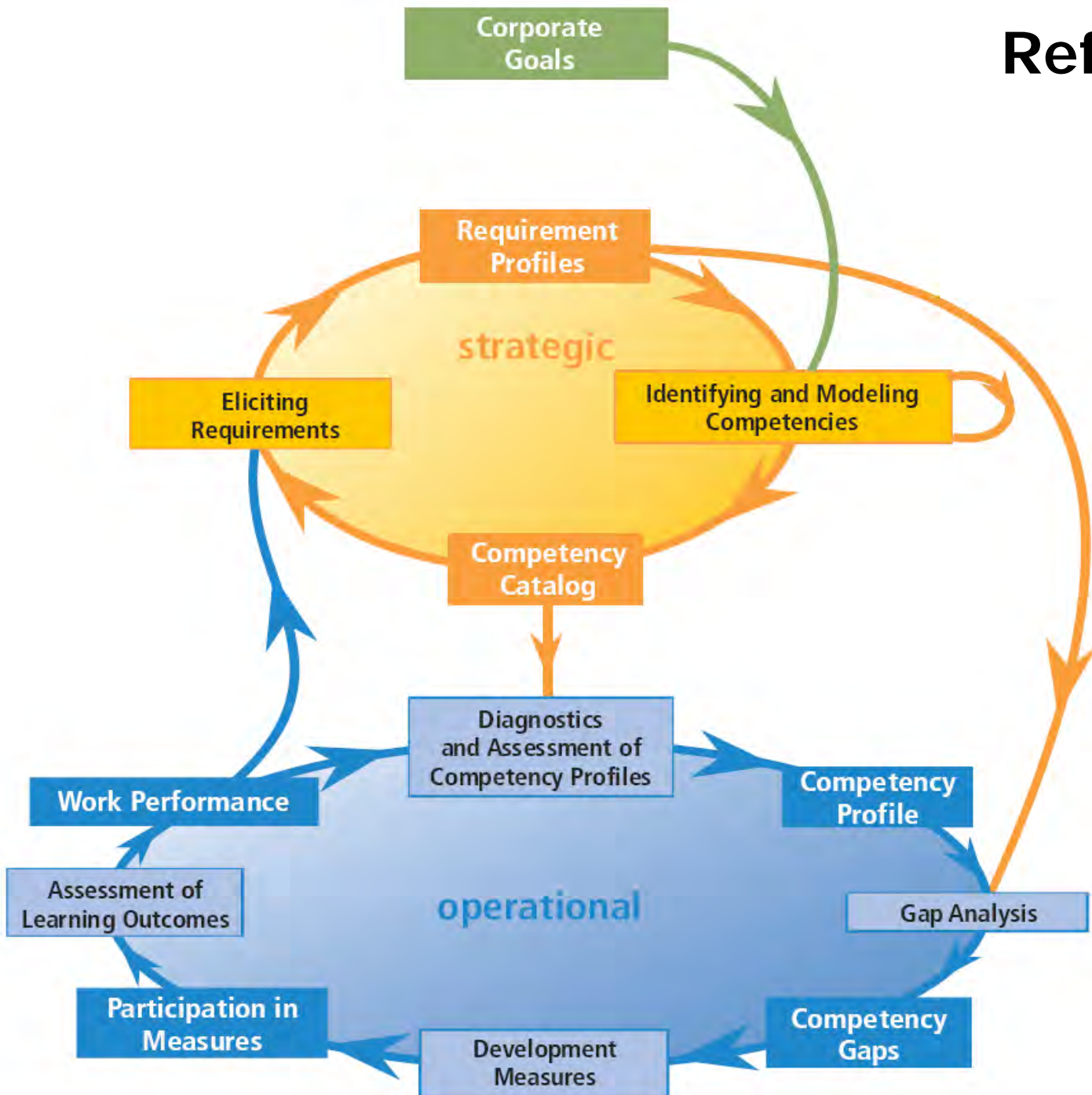


- What is missing: How to make use of and maintain competency models in a real enterprise environment
 - => sustainability
 - avoid outdated competency models
 - avoid over-formalization of top-down approaches
 - built-in continuous improvement

- Three layers of responsibility
 - normative layer => top management
 - strategic layer => medium and lower management
 - operational layer => employees and lower management

- Closed Loop Approach

Reference Process



Professional Learning Ontology

is available under <http://professional-learning.eu>



FP7 IP MATURE – <http://mature-ip.eu>

will investigate the harvesting of bottom-up approaches to support the maturing of competency models



Andreas Schmidt

Department Manager
FZI Research Center for Information Technologies, Karlsruhe,
GERMANY

andreas.schmidt@fzi.de, <http://andreas.schmidt.name>



Christine Kunzmann

Kompetenzorientierte Personalentwicklung
GERMANY, <http://kompetenzen-gestalten.de>
contact@christine-kunzmann.de