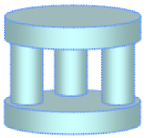
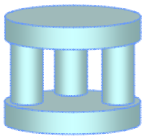


ECOLEAD

KNOWLEDGE TECHNOLOGIES FOR NETWORK ORGANISATIONS

Mitja Jermol
Jozef Stefan INstitute



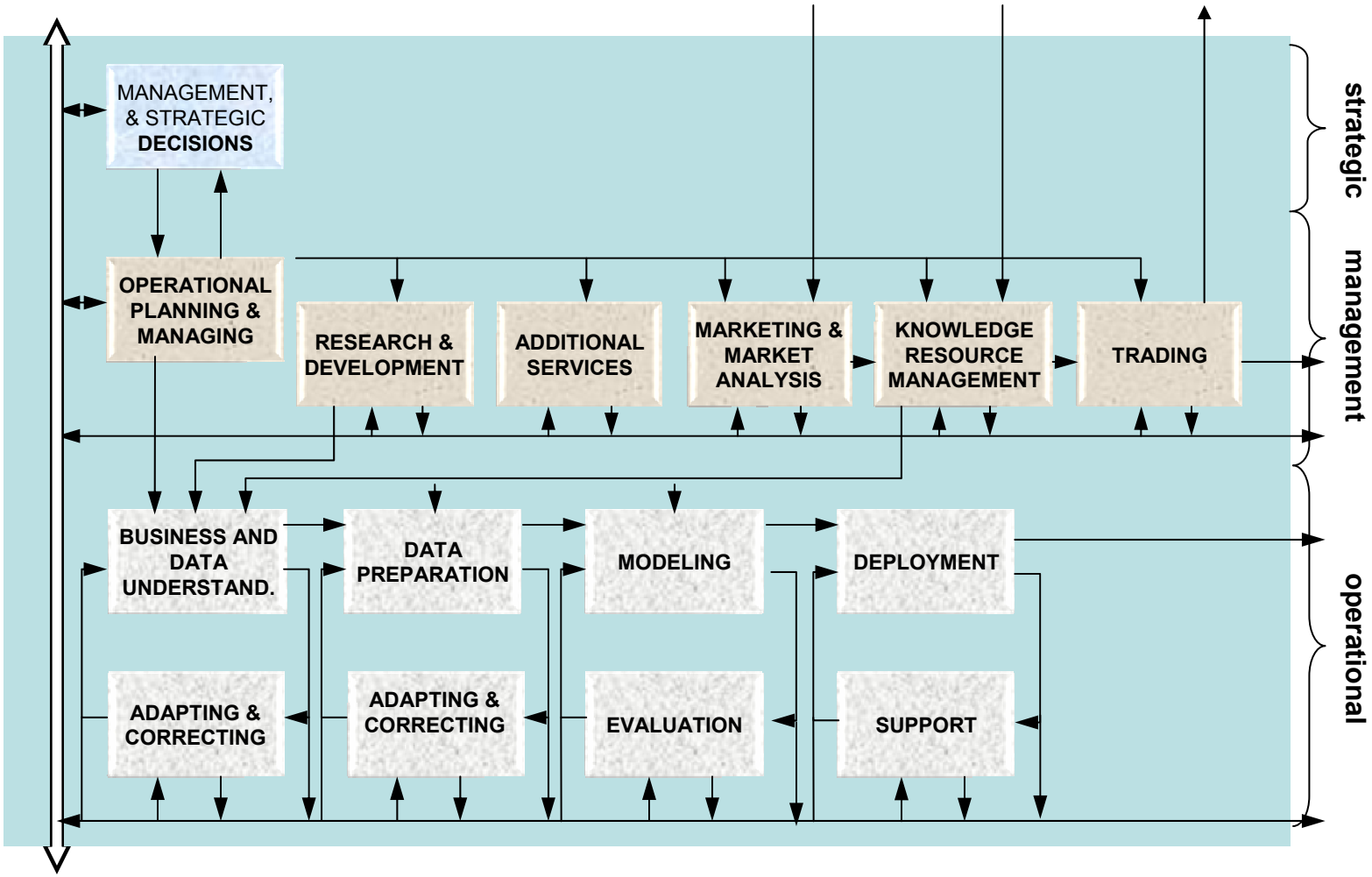
ECOLEAD

OUTLINE OF THE TALK

- **Basic concepts**
  - Networked organisations
  - Knowledge management
  - Knowledge technologies
- **KT for NO: theoretical background**
- **Examples of using KT in NOI**
  - Knowledge discovery
  - Knowledge mapping
  - Knowledge sharing: PKT
  - Knowledge formalisation: ontologies, Cyc
  - Knowledge use

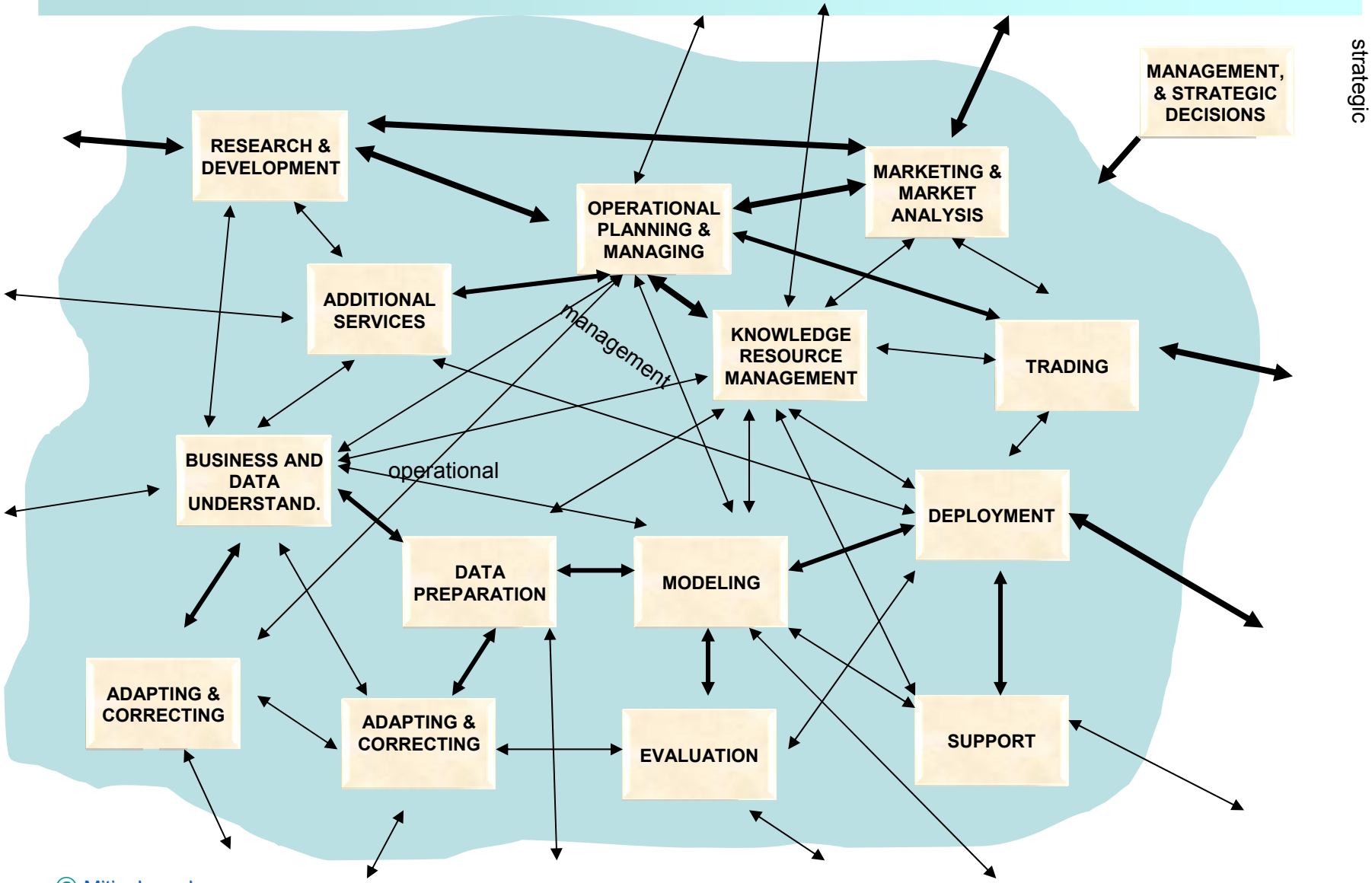
ECOLEAD

ORGANISATION – BUSINESS PROCESS VIEW



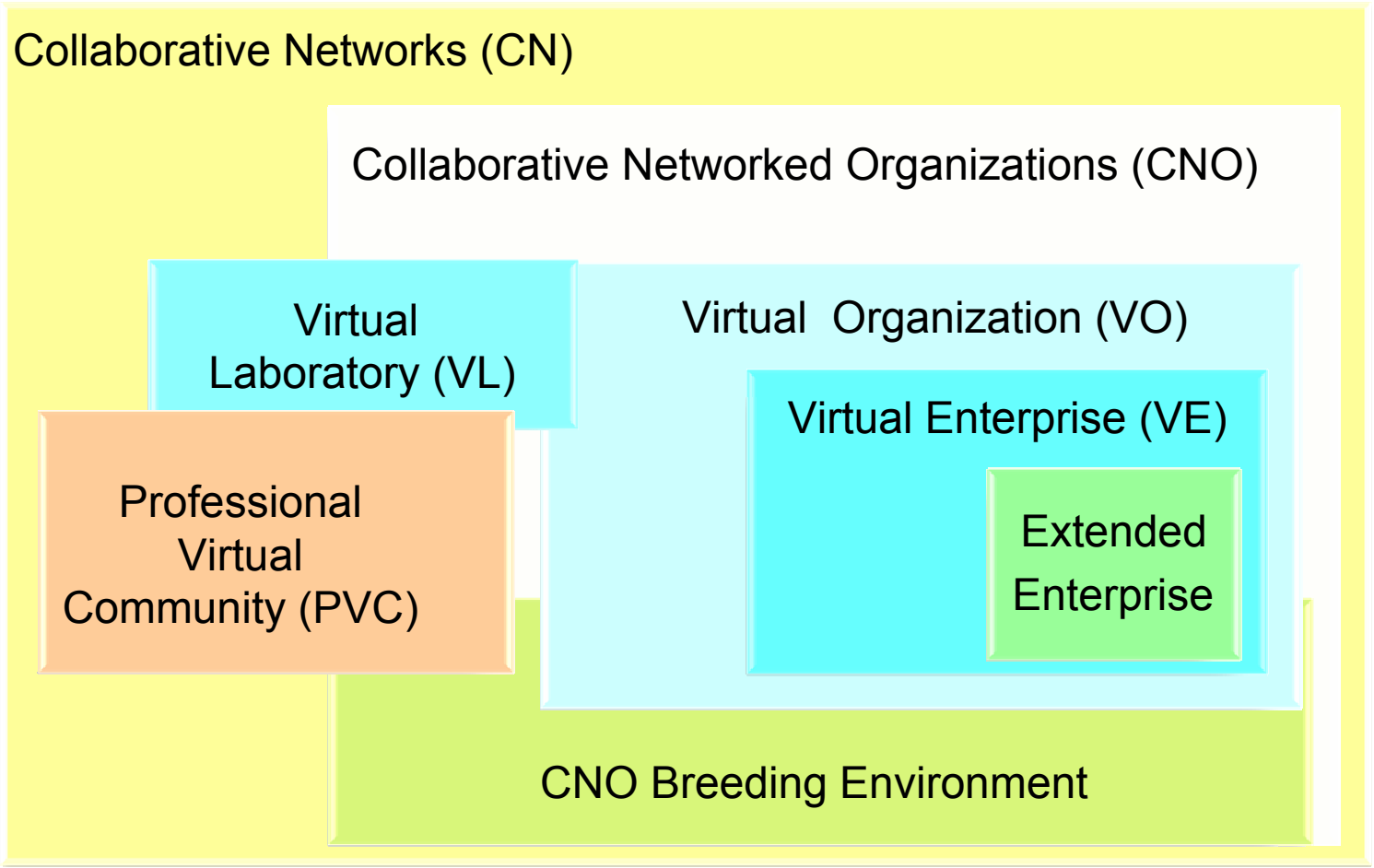
ORGANISATION – KNOWLEDGE VIEW

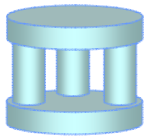
ECOLEAD



ECOLEAD

NETWORKED ORGANISATIONS





ECOLEAD

WHAT WE UNDERSTAND BY CNO?

Network ...

Constituted by a **variety of entities** (e.g. organizations and people) that are:

- largely **autonomous**
- geographically **distributed**
- **heterogeneous** in terms of their:
  operating environment, culture, social capital and goals

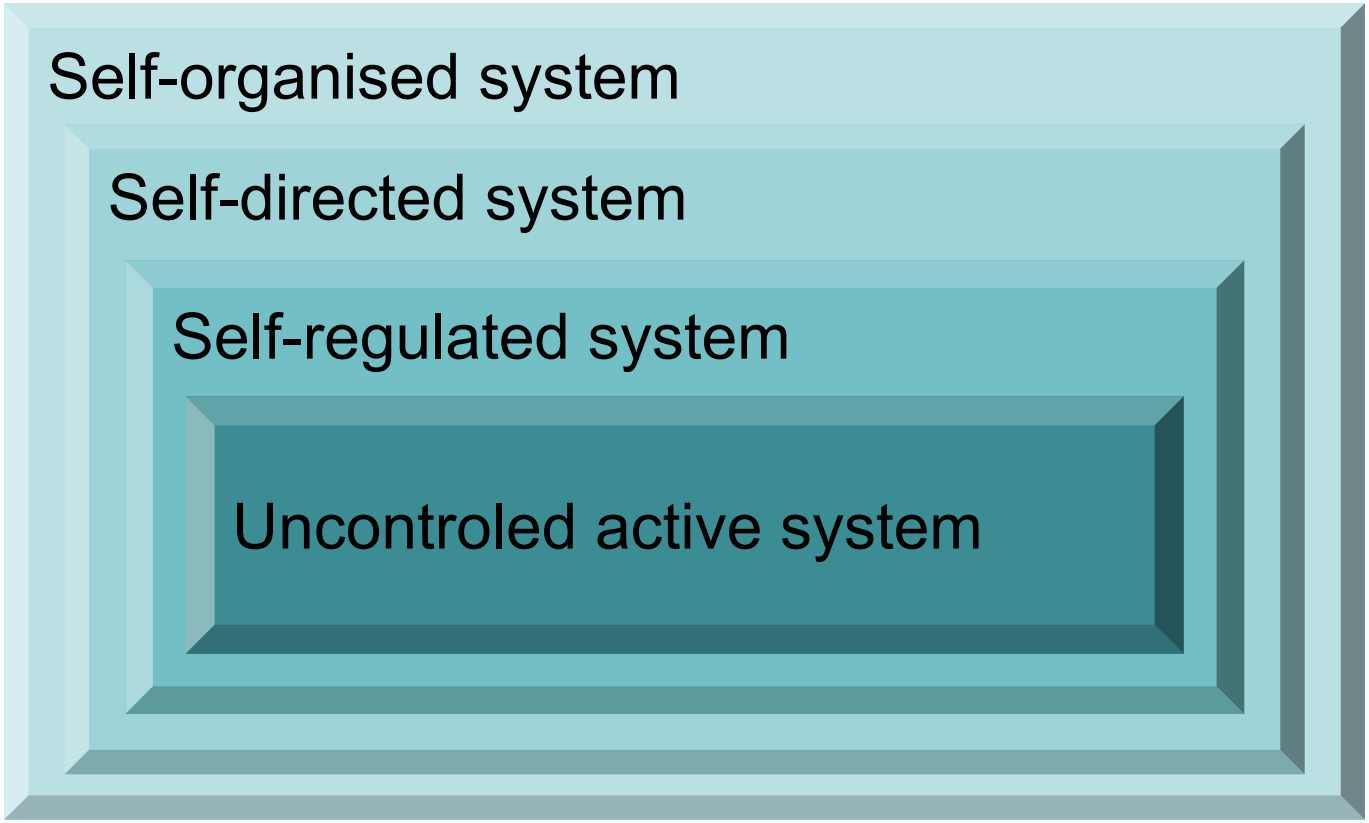
Nevertheless these entities collaborate to better achieve common or compatible goals

The collaborative interactions are supported by a **computer network**.

Unlike other networks, in CNO collaboration is an **intentional property** that derives from the **shared belief** that together the network members can achieve goals that would not be possible or would have a higher cost if attempted by them individually

ECOLEAD

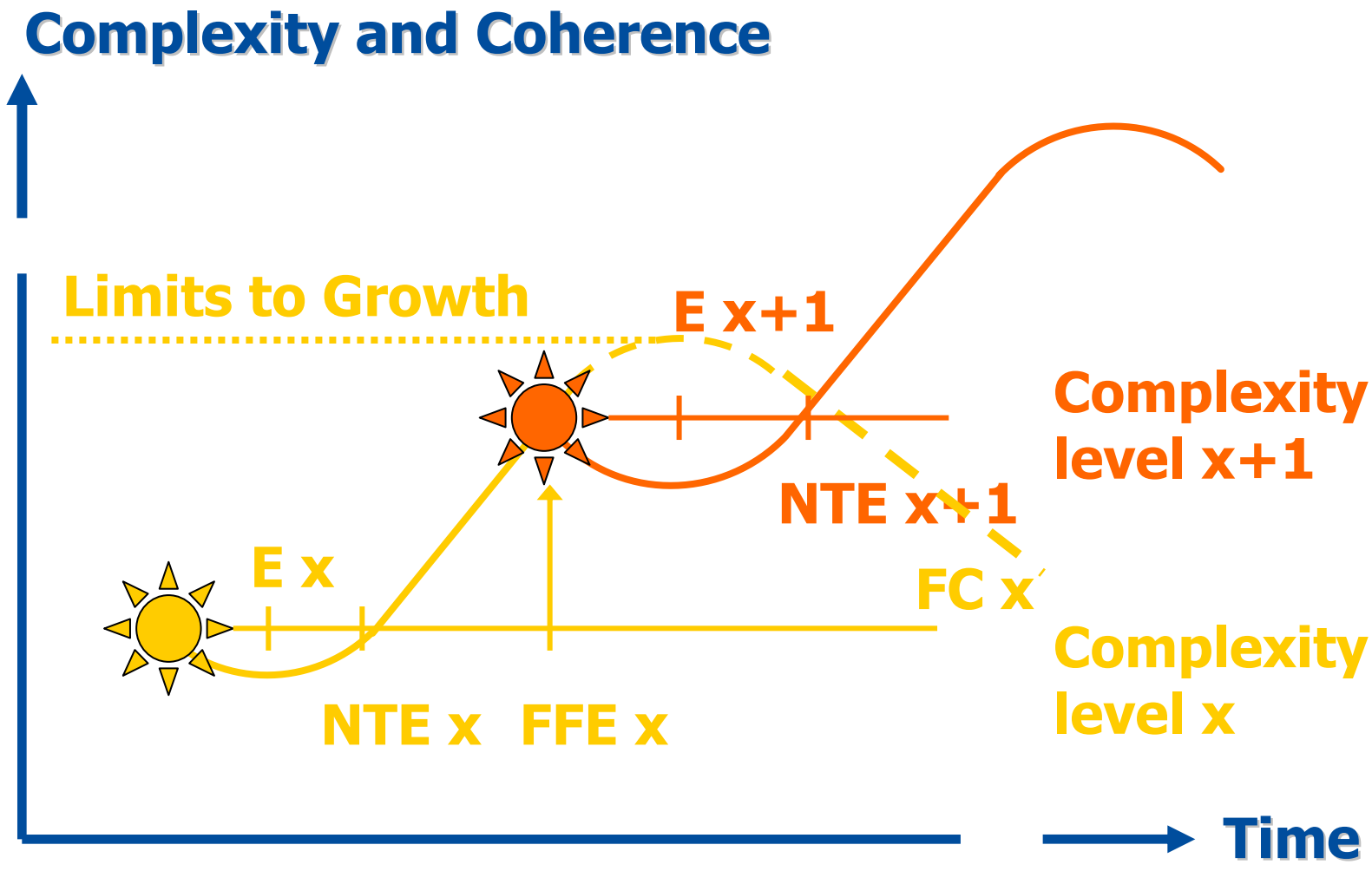
SELF - ORGANISATION

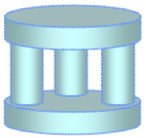


mitja.jermol@ijs.si

ECOLEAD

SELF–ORGANISATION – CHAORDIC SYSTEM





ECOLEAD

KNOWLEDGE TECHNOLOGIES

Knowledge technologies

- …are information technologies including **data mining**, **machine learning**, **decision support**, **language technologies**, **knowledge sharing tools** and other information technologies that support acquisition, retrieval, reuse, share, maintenance and modeling of knowledge.

- …adds a layer of intelligence to information technology, to filter appropriate information and deliver it when it is needed.
- …provide a means for computers to understand the knowledge that is being presented by knowledge integrated into documents and services on the Internet (Semantic Web).

- Among knowledge technologies are knowledge extraction tools, ontologies, knowledge representation formalisms, intelligent topic maps, blogs, groupware, document management, expertise locators, latent semantic analysis, semantic networks, social networking engines, wikis,…

ECOLEAD

KNOWLEDGE MANAGEMENT – OLD DEFINITION

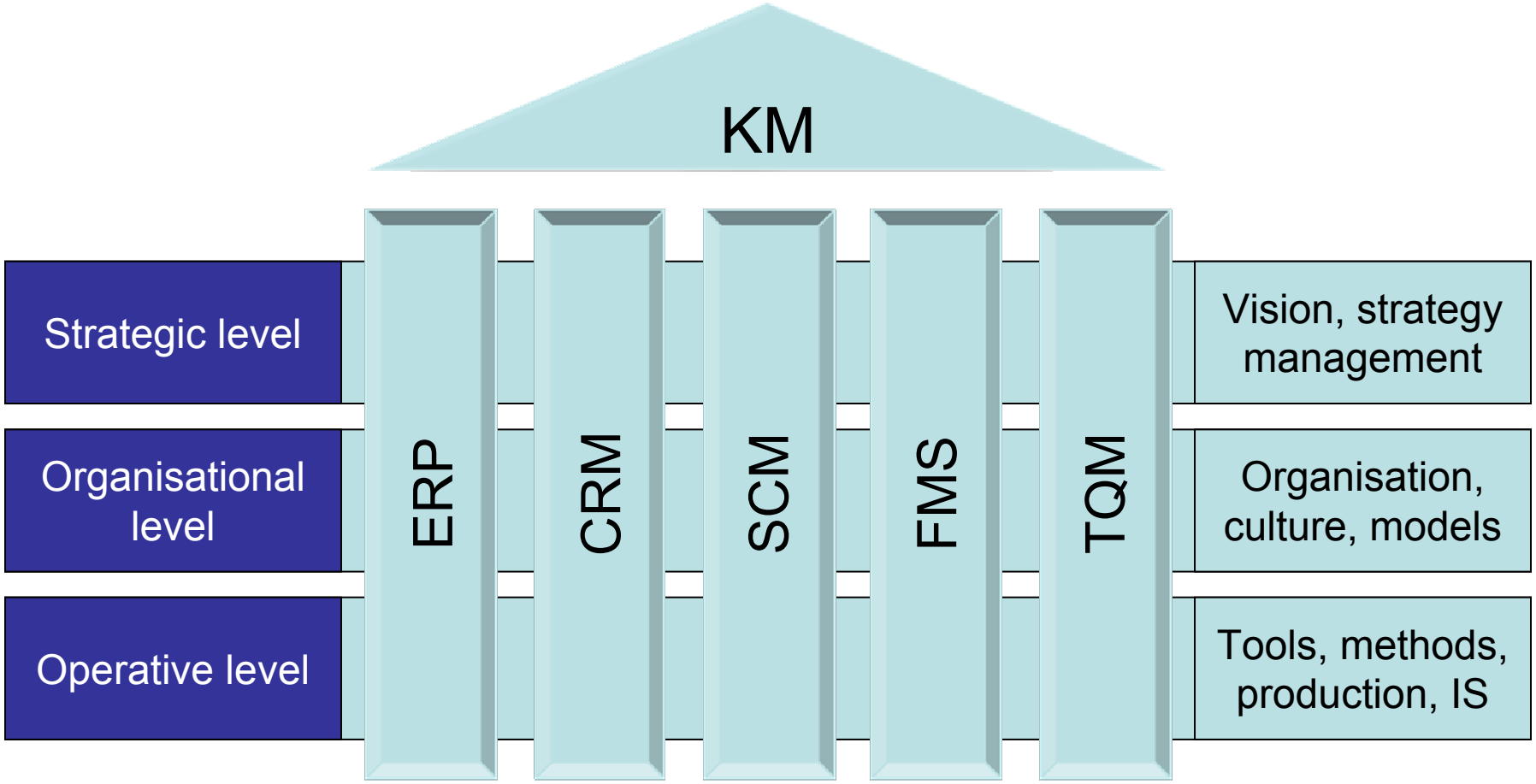
- **KM is an interdisciplinary business model dealing with all aspects of knowledge within the context of the firm, including knowledge creation, codification, sharing, and how these activities promote learning and innovation. In practice, KM encompasses both technological tools and organizational routines in overlapping parts.**

http://sims.berkeley.edu

mitja.jermol@ijs.si

ECOLEAD

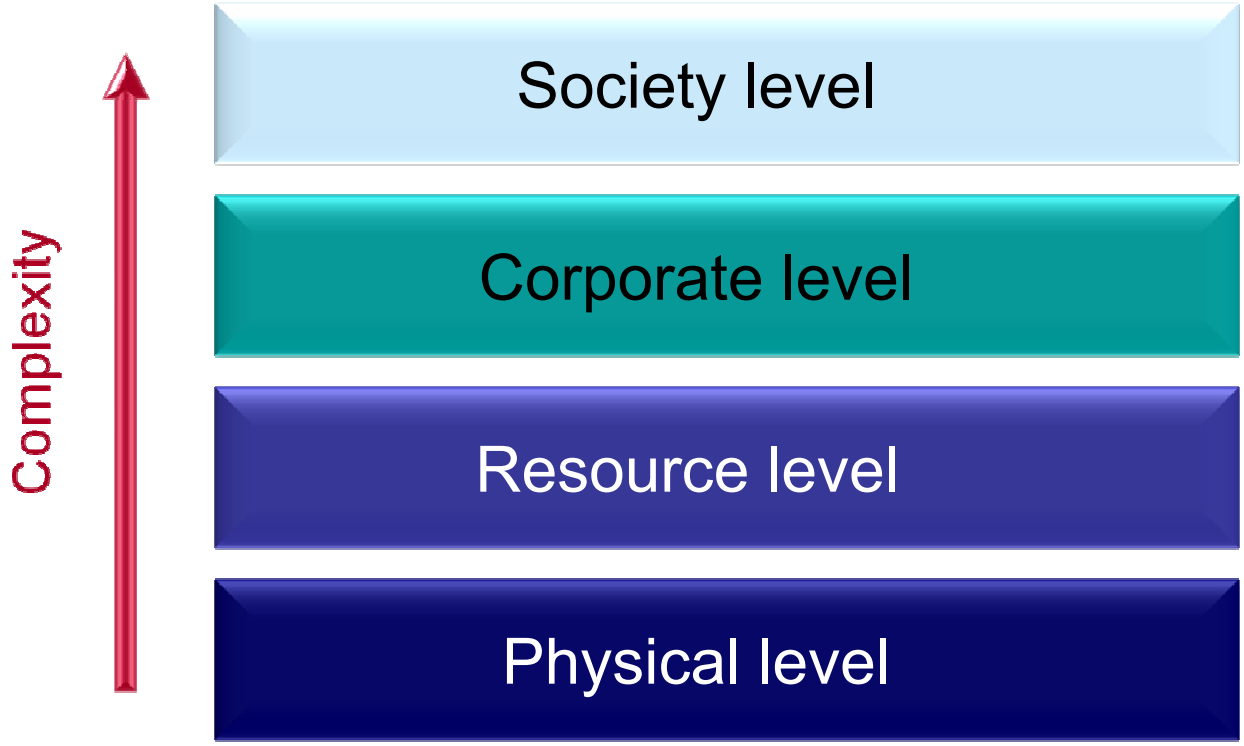
KM IN RELATION TO OTHER SYSTEMS



ECOLEAD

HOLISTIC VIEW ON KM

Self-organisational

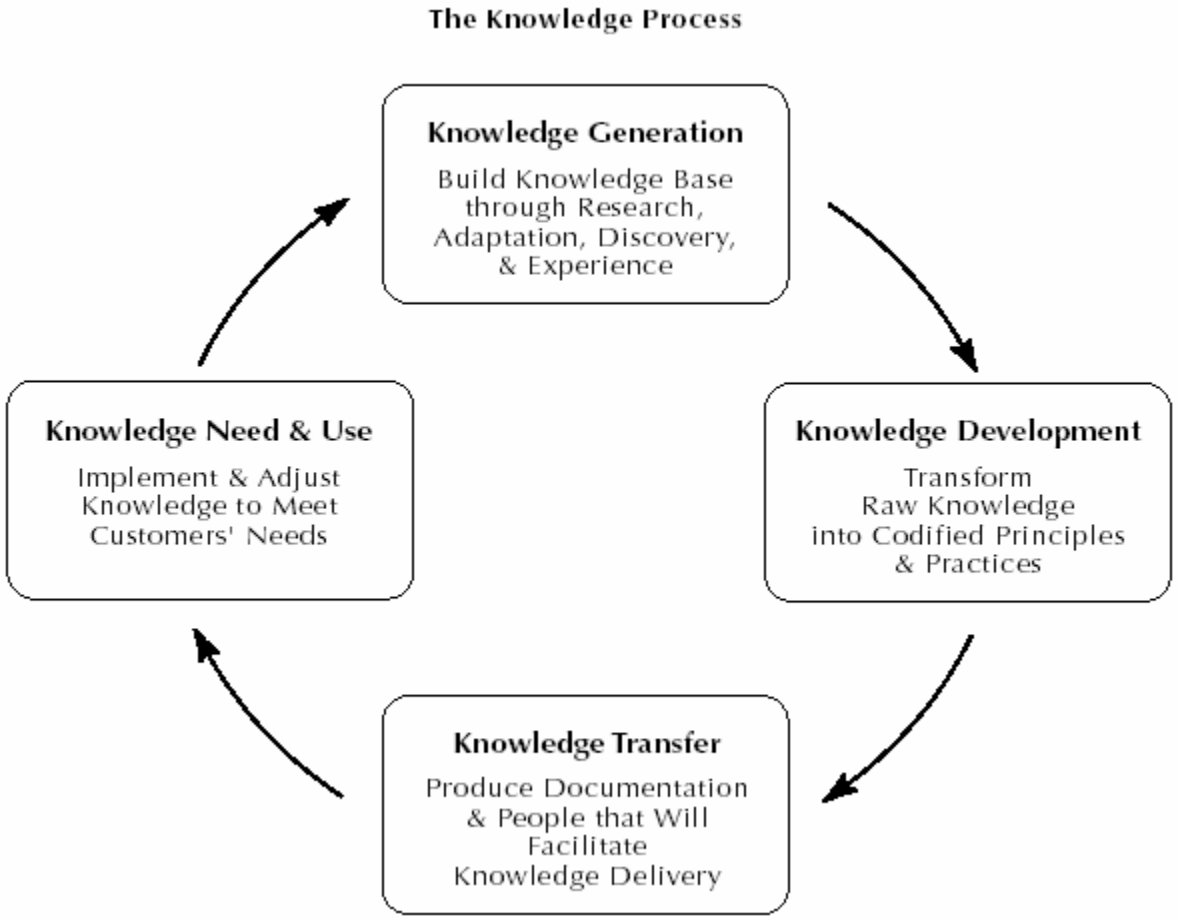


Predetermined

mitja.jermol@ijs.si

KNOWLEDGE MANAGEMENT – PROCESS MODEL

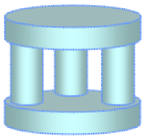
ECOLEAD



ECOLEAD

KM SCOPE

- **Knowledge management in a real business environment**
  - Analysing, modeling, managing distributed networked organisations
    - Industry clusters, virtual organisations, virtual communities, living labs
  - Knowledge discovery and knowledge storage
    - Competence directories, Knowledge mapping, K-bases, media and methods repositories
  - Training and knowledge transfer
    - ICT supported training, virtual communities, distance learning, personalisation



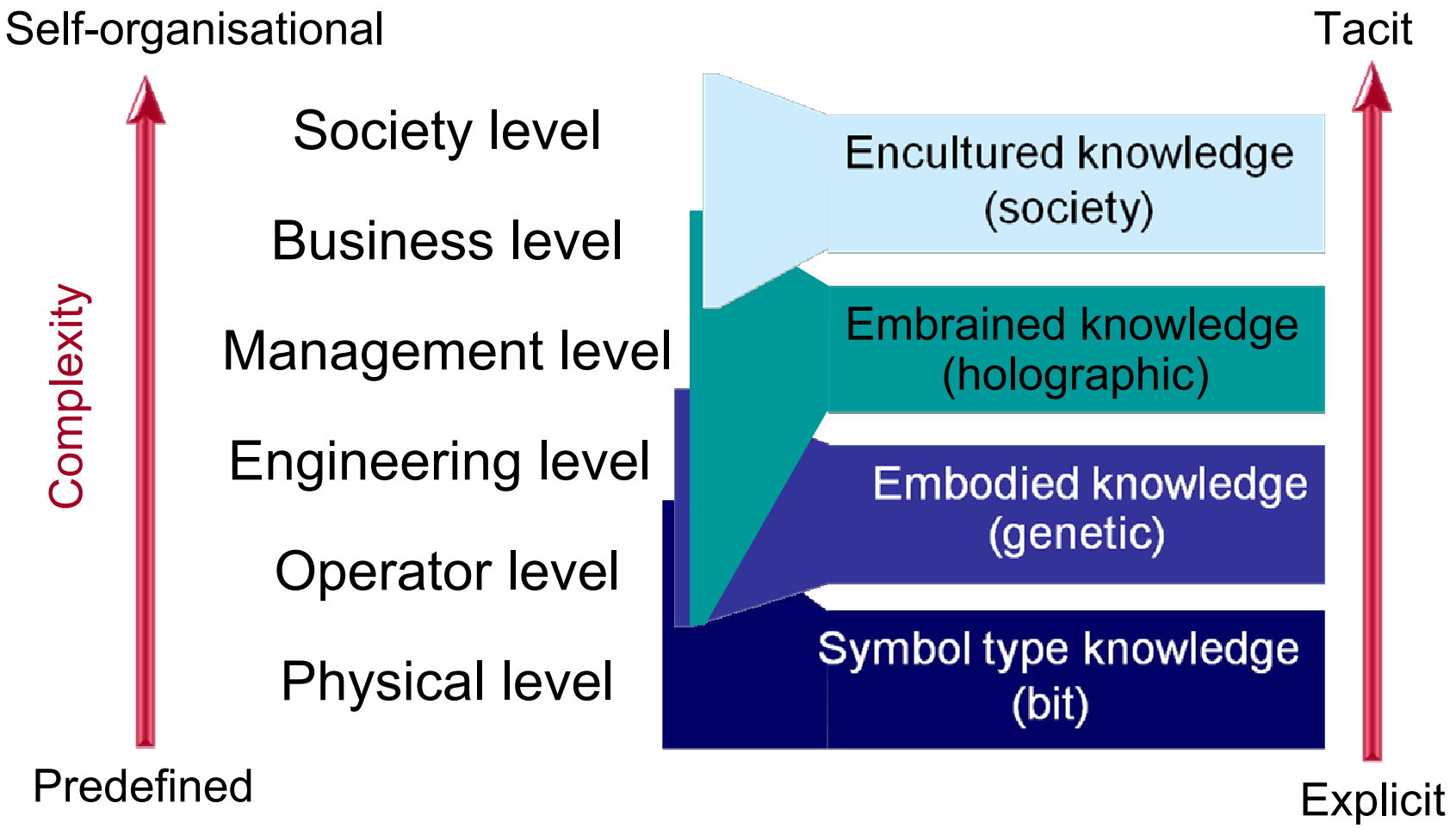
ECOLEAD

SEVEN SCHOOLS ON KM

- Systems school – codifying knowledge in databases
- Cartographic school – mapping knowledge
- Engineering school – process oriented
- Commercial school – intellectual assets, IPR
- Organizational school – knowledge sharing across communities
- Spatial school – work and relaxation spaces
- Strategic school – companies as a knowledge businesses

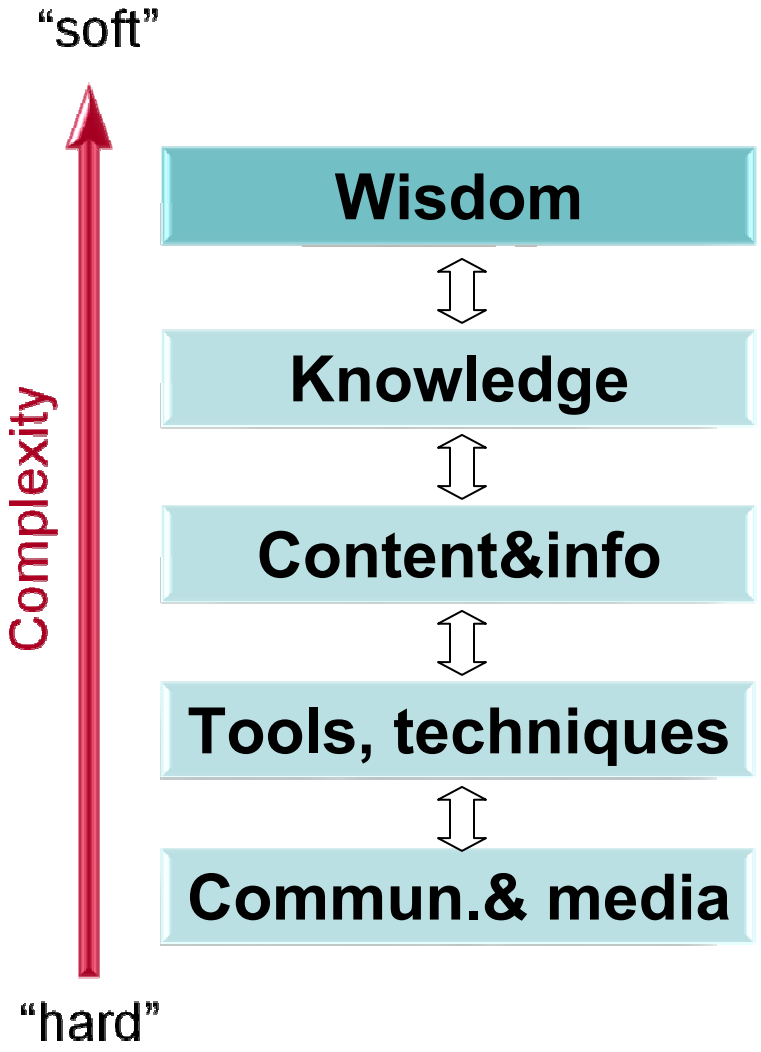
ECOLEAD

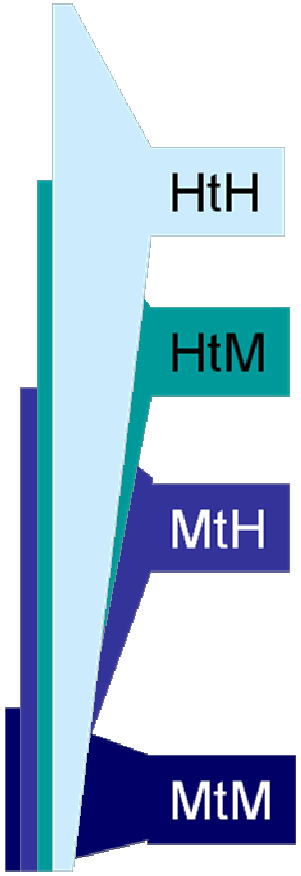
KNOWLEDGE



ECOLEAD

RESOURCE LEVEL





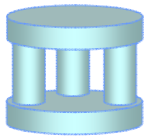
Embodied

Actional

Situational

Relational

mitja.jermol@ijs.si



ECOLEAD

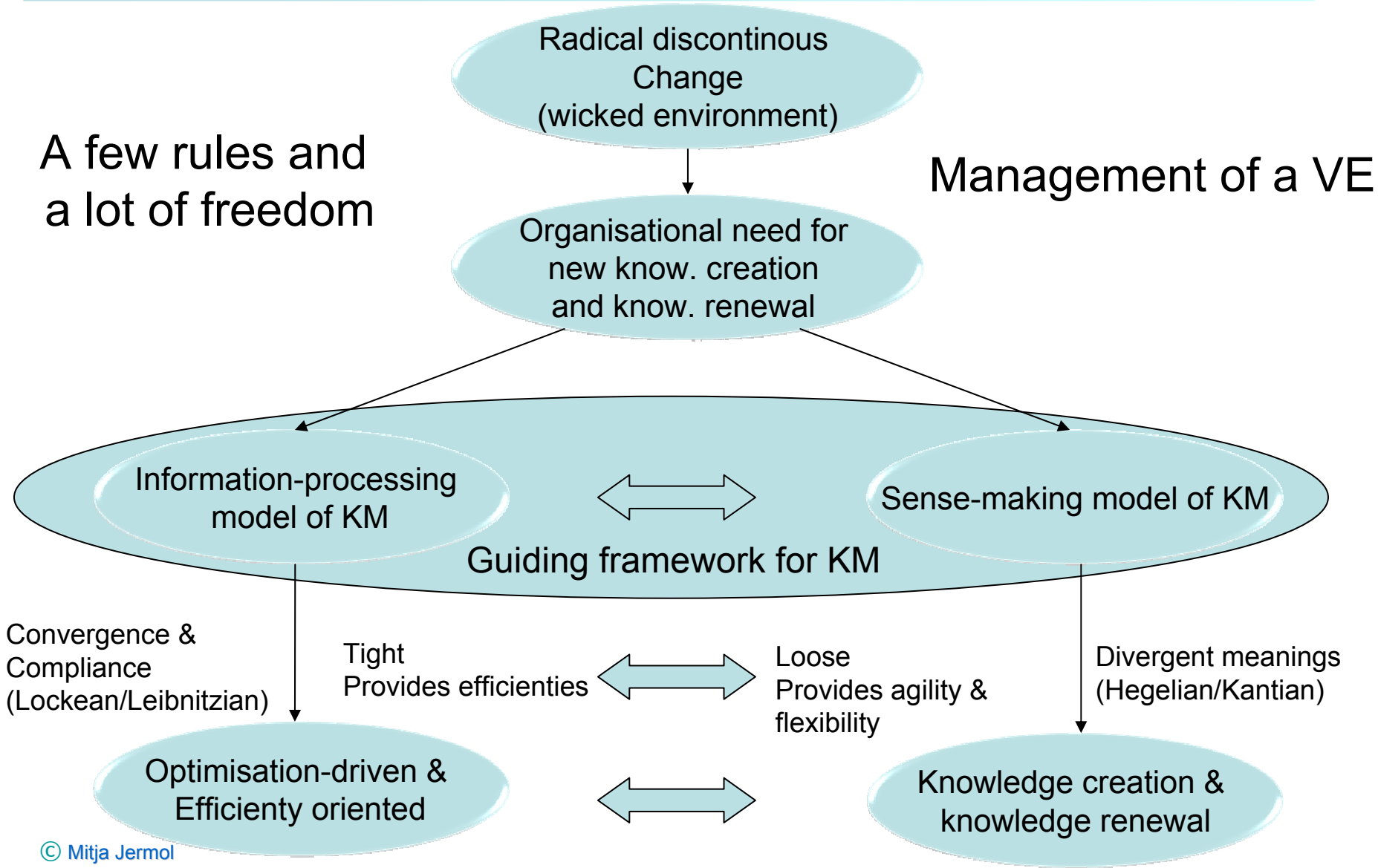
KM – NEW WORLD DEFINITION

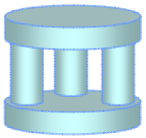
- **"Knowledge Management caters to the critical issues of organizational adaptation, survival and competence in face of increasingly discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings."**

  Y. Malhotra at http://www.brint.com/km/whatis.htm

BUSINESS PROCESS INNOVATION

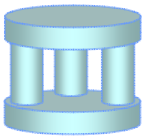
ECOLEAD





NEW PARADIGMS IN KM

- **From K-resource to K-process**
- **From deterministic to complex – "A few rules and a lot of freedom"**
- **From cognitive factors to social factors – knowledge networks and social networks**
- **From know-how to creativity and innovation**
  - Creativity: the crazy things that work
  - Innovation is the conversion of knowledge and ideas into a benefit.

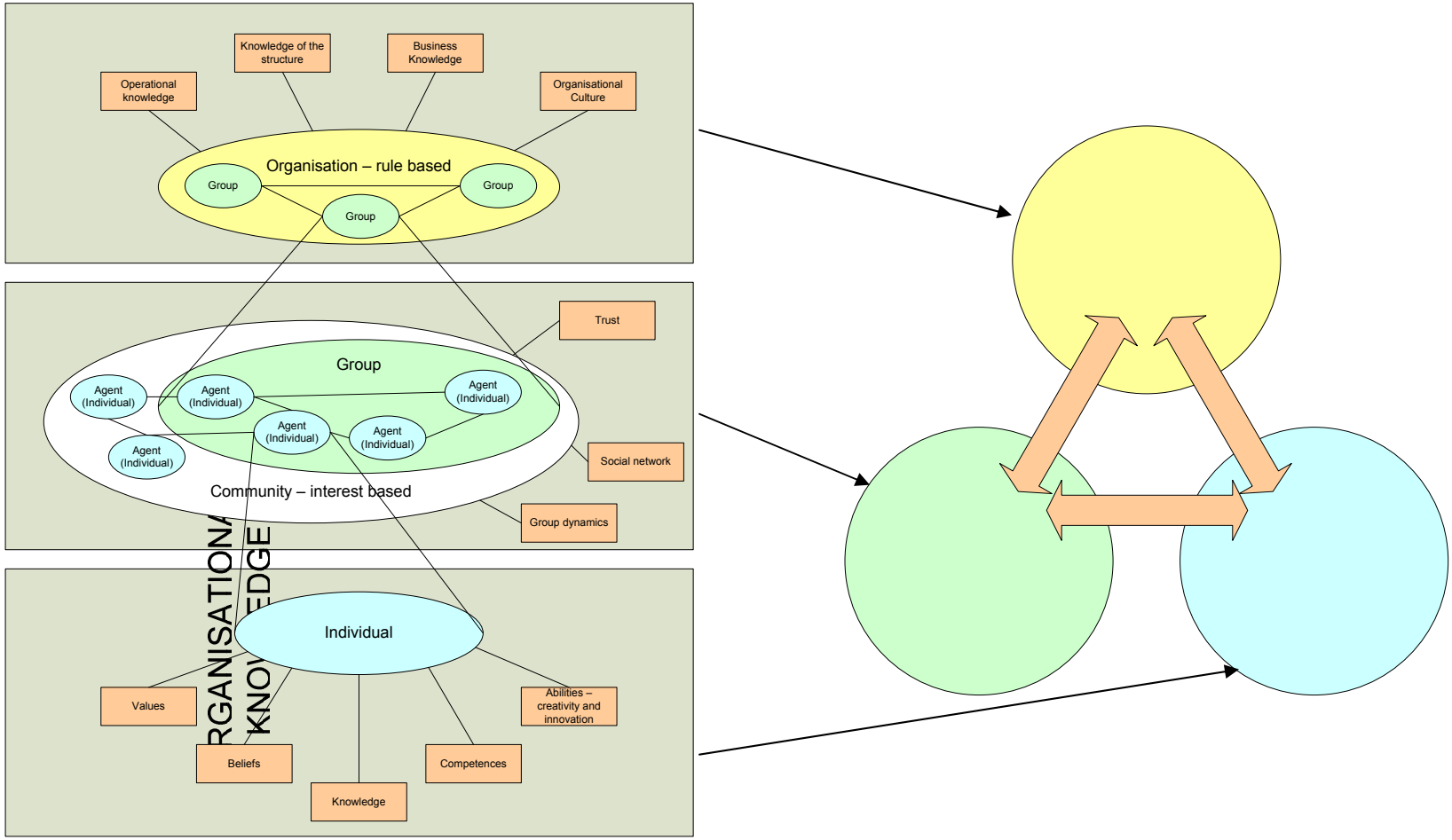


ECOLEAD

KT FOR NO:
THEORETICAL BACKGROUND

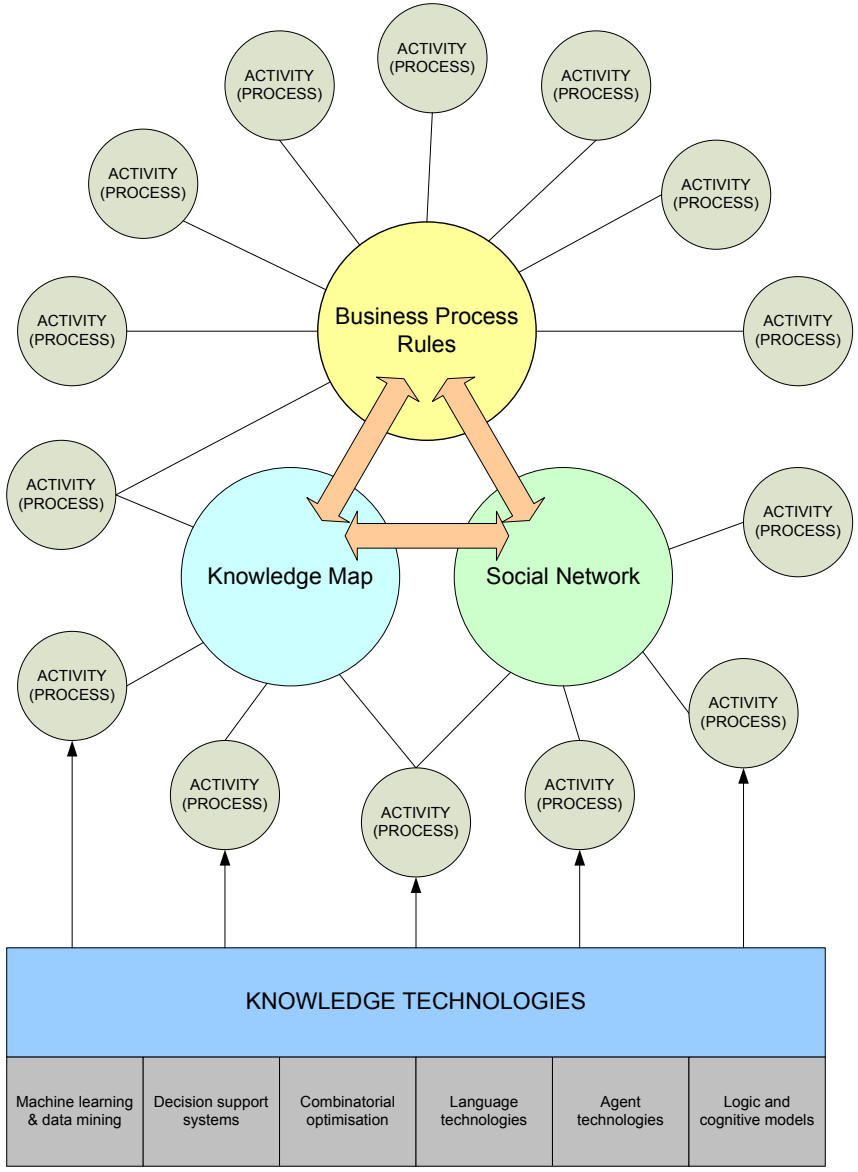
ECOLEAD

KM IN NO



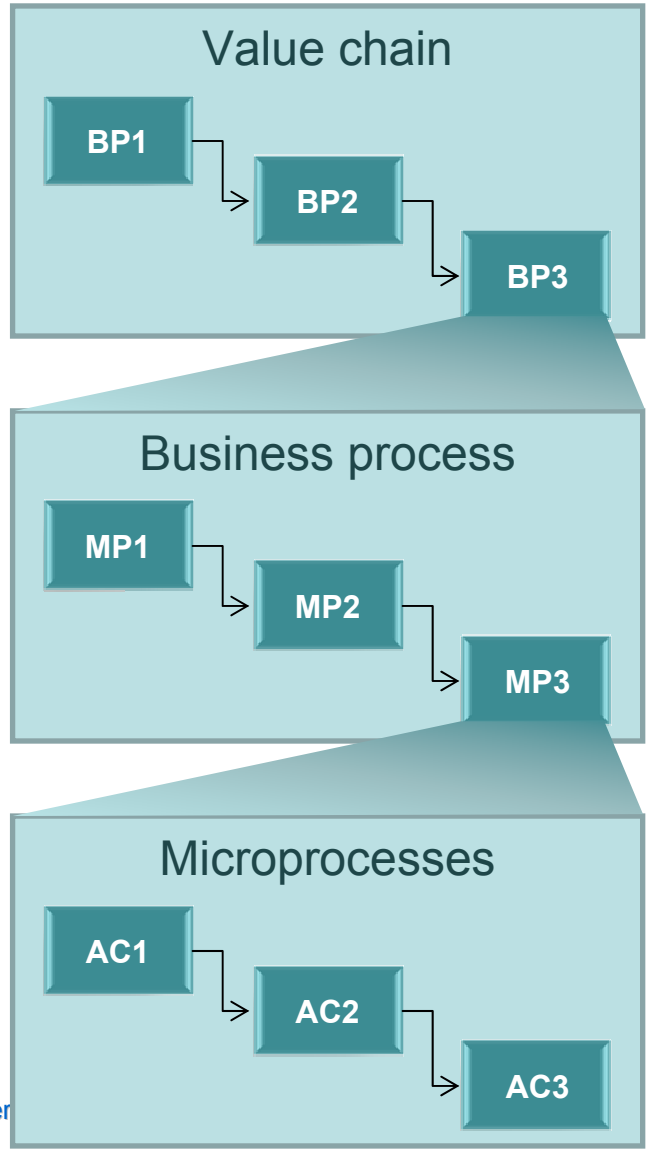
ECOLEAD

KT APROACH TO KM



HIERARCHY OF BUSINESS PROCESSES

ECOLEAD



Business process level

Microprocess process level

Activity level

experts

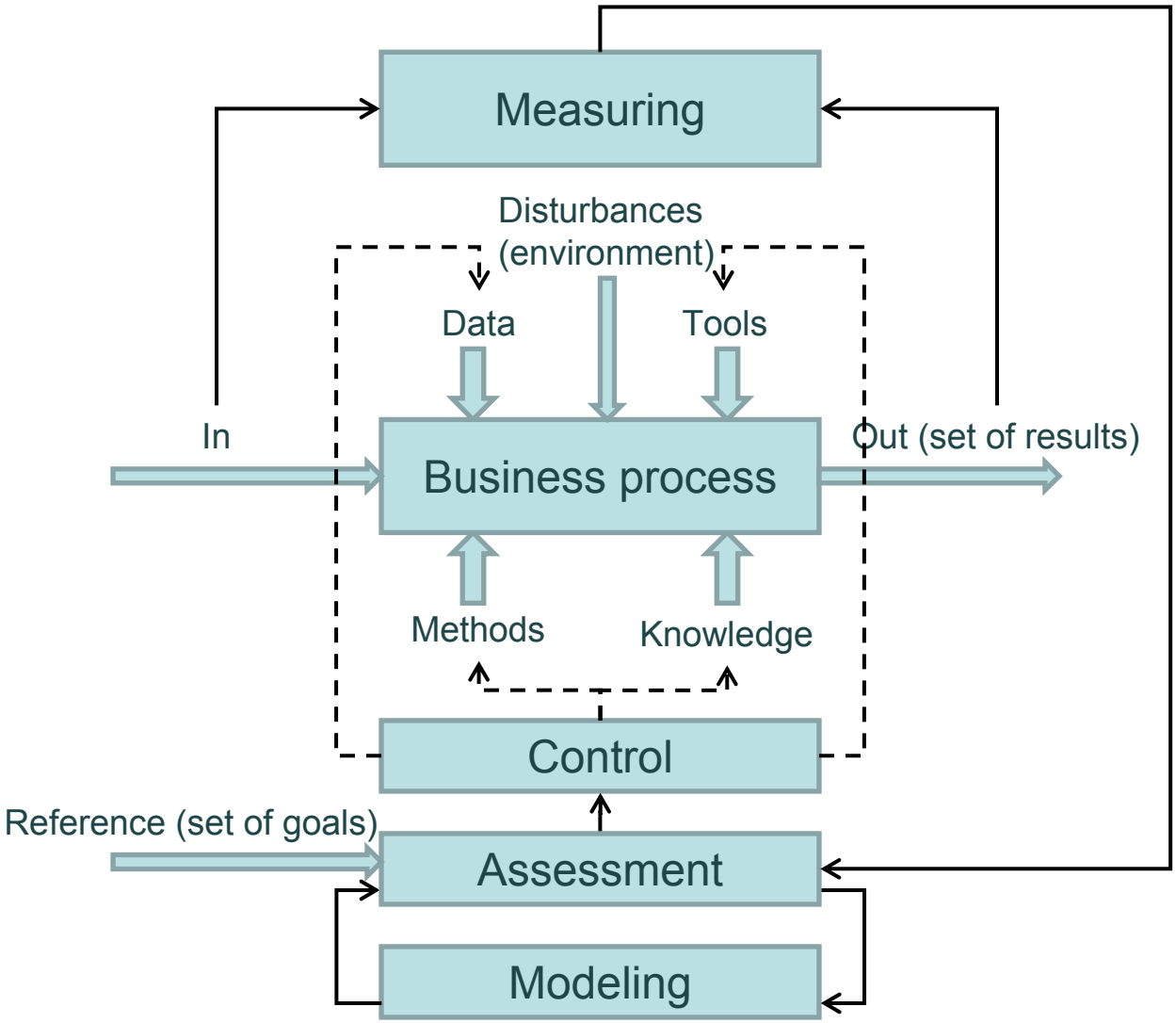
Top-down modeling

Bottom-up modeling

data

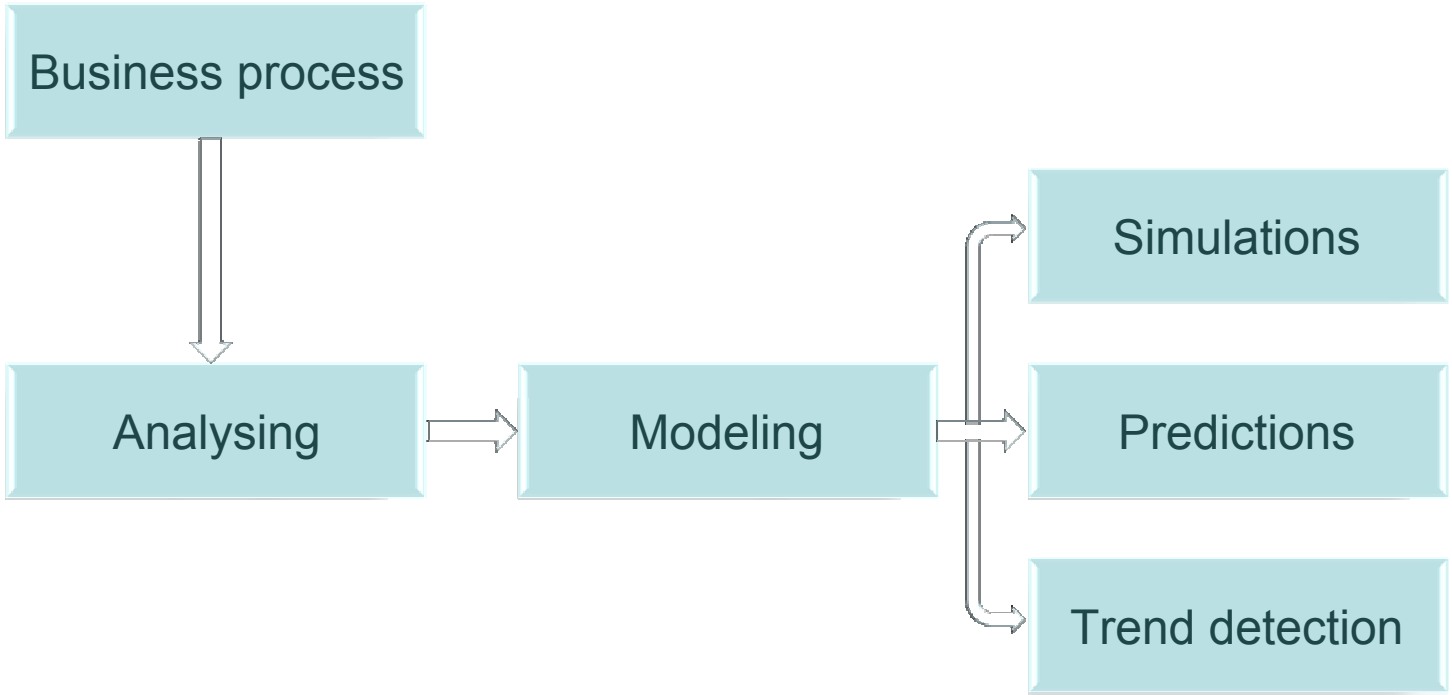
ECOLEAD

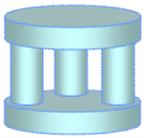
BUSINESS PROCESS



ECOLEAD

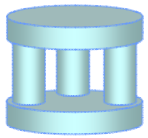
KNOWLEDGE TECHNOLOGIES SUPPORT





ECOLEAD

EXAMPLES OF USING KNOWLEDGE TECHNOLOGIES FOR NETWORKED ORGANISATIONS



TOOLS AND METHODS FOR K-PROCESSES

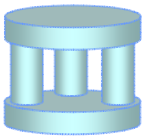
Knowledge storage and development (Content management)
tracking and workflow, reference materials, ontologies, semantics, BBS, yellow pages, content and media databases...

Knowledge transfer (Training)
(distance) learning, intelligent searching, portals, personalisation, machine learning, learning methods, didactics, pedagogy,…

Knowledge generation and acquisition
data analysis: x mining, statistic methods,...
business intelligence: scenario planning, game theory,...
content acquisition: digitalisation, classification, filtering, ranking,...
Modeling, decision support, expert systems,...

Knowledge use, customisation and resource networking
collaboration, community, teams, experts, virtual networks,...

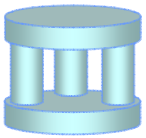
mitja.jermol@ijs.si



ECOLEAD

KT TO KM VIEW

- (O'Leary 1998)
- ***Converting individual to group knowledge:*** knowledge sharing
- ***Converting data to knowledge****:* uncovering patterns in databases using data mining
- ***Converting text to knowledge****:* uncovering patterns in texts using text mining tools, Debating and negotiating meaning.
- ***Connecting people to knowledge****:* visualisation, knowledge mapping
- ***Connecting knowledge to knowledge****:* Agents, Ontologies and metadata, Boundary objects
- ***Connecting people to people****:* knowledge mapping, shared workspaces
- ***Connecting knowledge to people****:* agent systems, personalisation



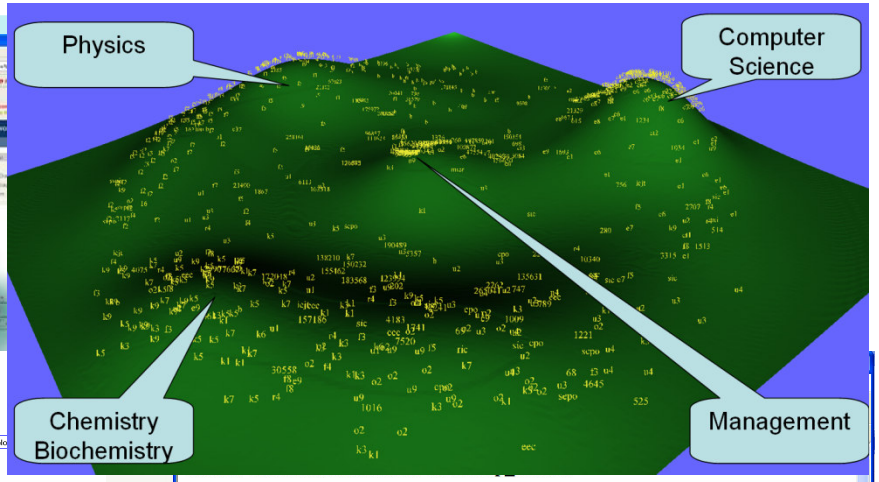
ECOLEAD

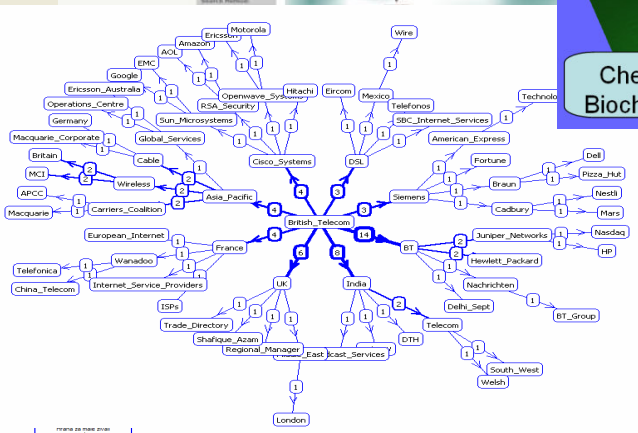
EXAMPLES

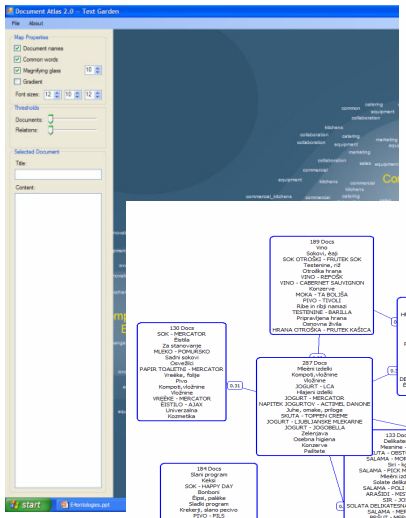
- **Knowledge discovery**
  - Textgarden set of tools
- **Knowledge mapping**
  - Partner finding tool (IST-World)
  - Knowledge map (Document atlas)
- **Knowledge sharing**
  - Personalised Knowledge Transfer (videolectures.net)
  - Virtual Learning Communities (ECOLEAD VLC)
- **Knowledge formalisation (Ontologies)**
  - Ontogen
  - Standards
  - Cyc
- **Knowledge use**
  - Decision support systems (…intelligence,)
  - Reasoning mechanisms (CyC)
  - Knowledge in business process (ACTIVE, PROLIX, TENCOMPETENCE)

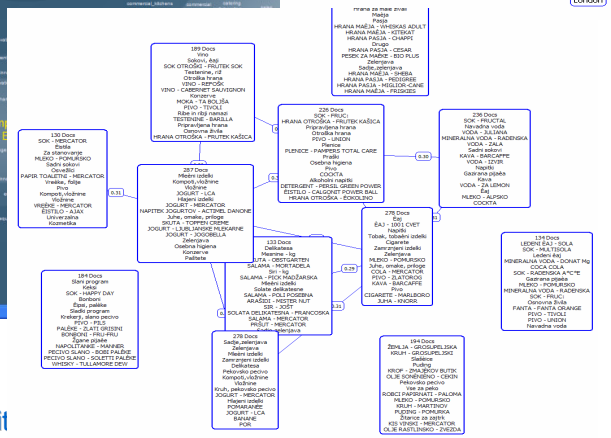
ECOLEAD

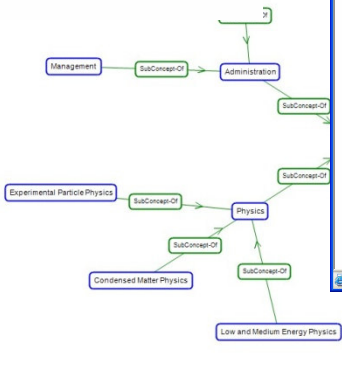
SOME CKM TOOLS

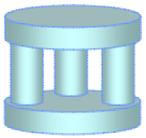






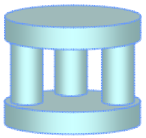






ECOLEAD

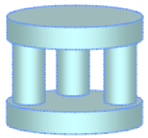
KNOWLEDGE DISCOVERY



ECOLEAD

WHAT IS TEXT-GARDEN?

- **Text-Garden is a software library and collection of software tools for solving large scale tasks dealing with structured, semi-structured and unstructured data**
  - …in particular, emphasis of functionality is on dealing with text
- **It can be used in various ways covering research and applicative scenarios**
  - used by several institutions such as CMU, BT, MSR, …



ECOLEAD

FUNCTIONALITY BLOCKS

Lexical text processing
(tokenization, stop-words, stemming, n-grams, Wordnet)

Unsupervised learning
(KMeans, Hierarchical-KMeans, OneClassSVM)

Semi-Supervised learning
(Uncertainty sampling)

Supervised learning
(SVM, Winnow, Perceptron, NBayes)

Dimensionality reduction
(LSI, PCA)

Visualization
(Graph based, Tiling, Density based, …)

Named Entity Extraction
(capitalization based)

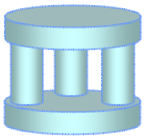
Cross Correlation
(KCCA, matching text with other data)

Keyword Extraction
(contrast, centroid, taxonomy based)

Large Taxonomies
(dealing with DMoz, Medline)

Crawling Web and Search Eng.
(for large scale data acquisition)

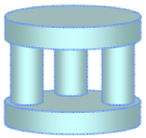
Scalable Search (inverted index)



ECOLEAD

TECHNICAL ASPECTS

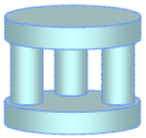
- **Text Garden is almost entirely written in portable C++**
  - …it compiles under Windows (Microsoft Visual C++, Borland C++) and Unix/Linux (GNU C)
  - …it runs under 32bit and 64bit platforms
  - …it consists of ~200.000 lines of code



ECOLEAD

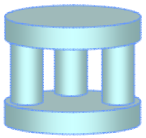
MULTIPLATFORM TEXT-GARDEN

- **Text-Garden has the following interfaces with the same API:**
  - **C/C++** - through simplified DLL & native C++
  - **Java** – through JNI
  - **.NET** – e.g. accessible through C#, VB, …
  - **Matlab** – through standard Matlab interface
  - **Python** – through standard Python interface
  - **Mathematica, Prolog, R** – in preparation
- **API has ~40 classes and ~250 functions**
  - …interfaces to the all above platforms are generated automatically from the master Text-Garden header file
- **Text-Garden is under LGPL licence**
  - It is available from www.textmining.net



ECOLEAD

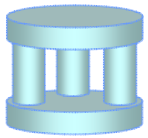
KNOWLEDGE MAPPING



ECOLEAD

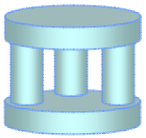
KNOWLEDGE MAPPING OVERVIEW (I)

- **Knowledge Mapping (PROCESS) discovers:**
  - the constraints, assumptions, location, ownership, value and use of knowledge artifacts,
  - agents (people, groups, objects) and their expertise,
  - blocks to knowledge creation, and
  - opportunities to leverage existing knowledge.
- **Knowledge Map (VISUALISATION TOOL) portrays:**
  - the sources, flows, constraints and sinks of explicit and tacit knowledge within an organization,
  - relationships between knowledge stores and the dynamics.
- **Knowledge Repository (DATABASE):**
  - A model and a set of tools that covers formal and informal means of storing information of Knowledge Mapping
- **Knowledge Space (MODEL) describes:**
  - the dynamics of a knowledge evolution following the predescribed learning process



KNOWLEDGE MAPPING OVERVIEW (II)

- **Knowledge mapping covers:**
  - mind maps
  - concept maps
  - pattern languages
  - dialogue mapping
  - graphic facilitation
  - geographical information mapping (GIS)
  - quantitative charts and graphs
  - process and procedure flow charts
  - timelines
  - mapping public issues
- **and all other forms of visual presentation of information:**
  - semantic networks
  - relational diagrams
  - knowledge landscapes
  - dynamic knowledge fields
  - ...



ECOLEAD

IMPLEMENTATIONS

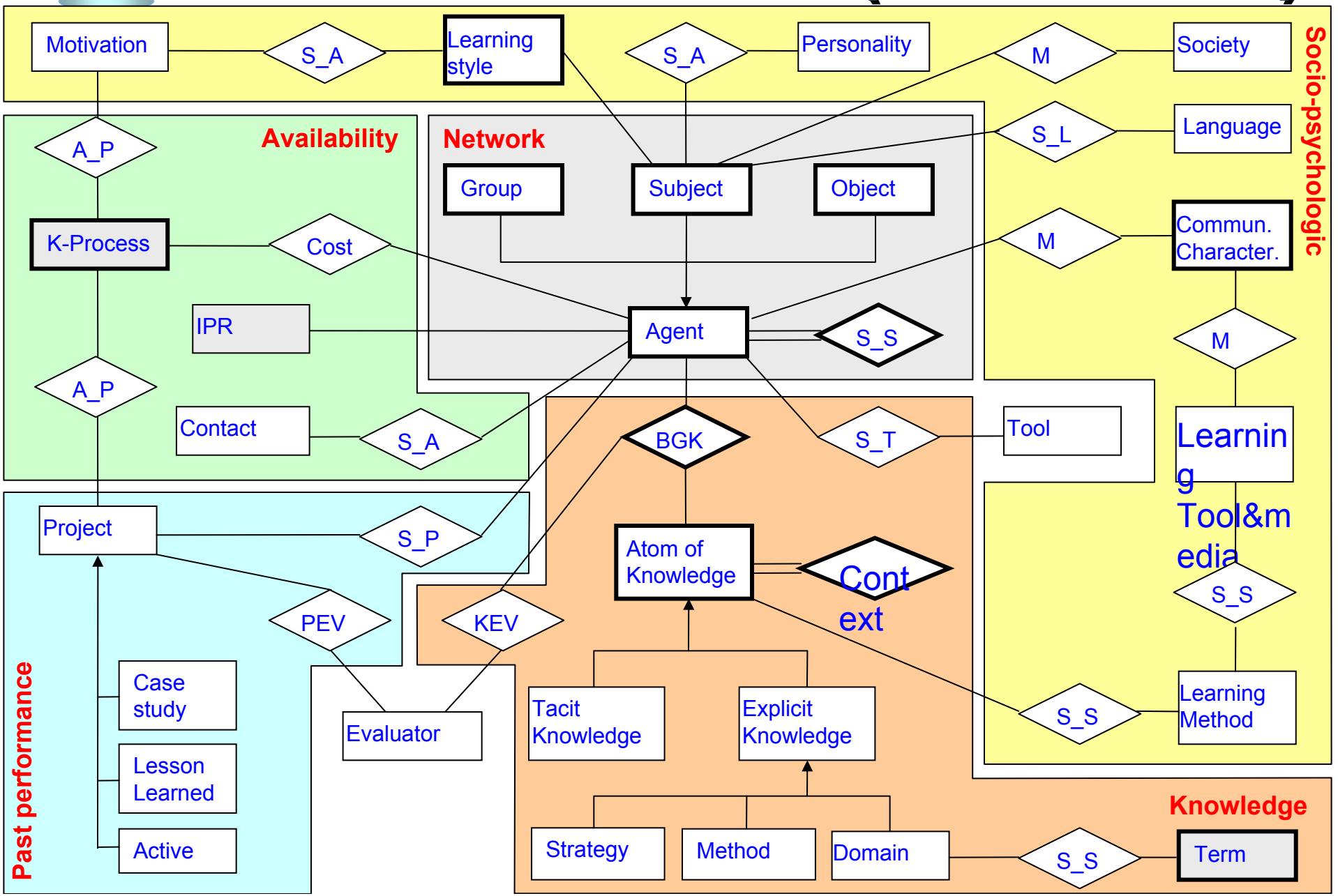
- **IT tools to support knowledge management**
  - helpdesk and customer service
  - data & text mining with data marts, OLAP and other backups\
  - intranets
  - conversation servers
  - groupware and workflow
  - virtual communities, psychographics and e-commerce
  - search engines,
  - text & data visualization
- **Business intelligence, push and scanning applications**
- **Training in systems thinking, creative thinking, on-line facilitation**
- **Specialized knowledge engineering services:**
  - corporate memory,
  - heuristics,
  - expert systems,
  - ontology development,
  - concept extraction,
  - knowledge structuring,
  - patterns,
  - communities of practice.

ECOLEAD

AGENTS' KNOWLEDGE

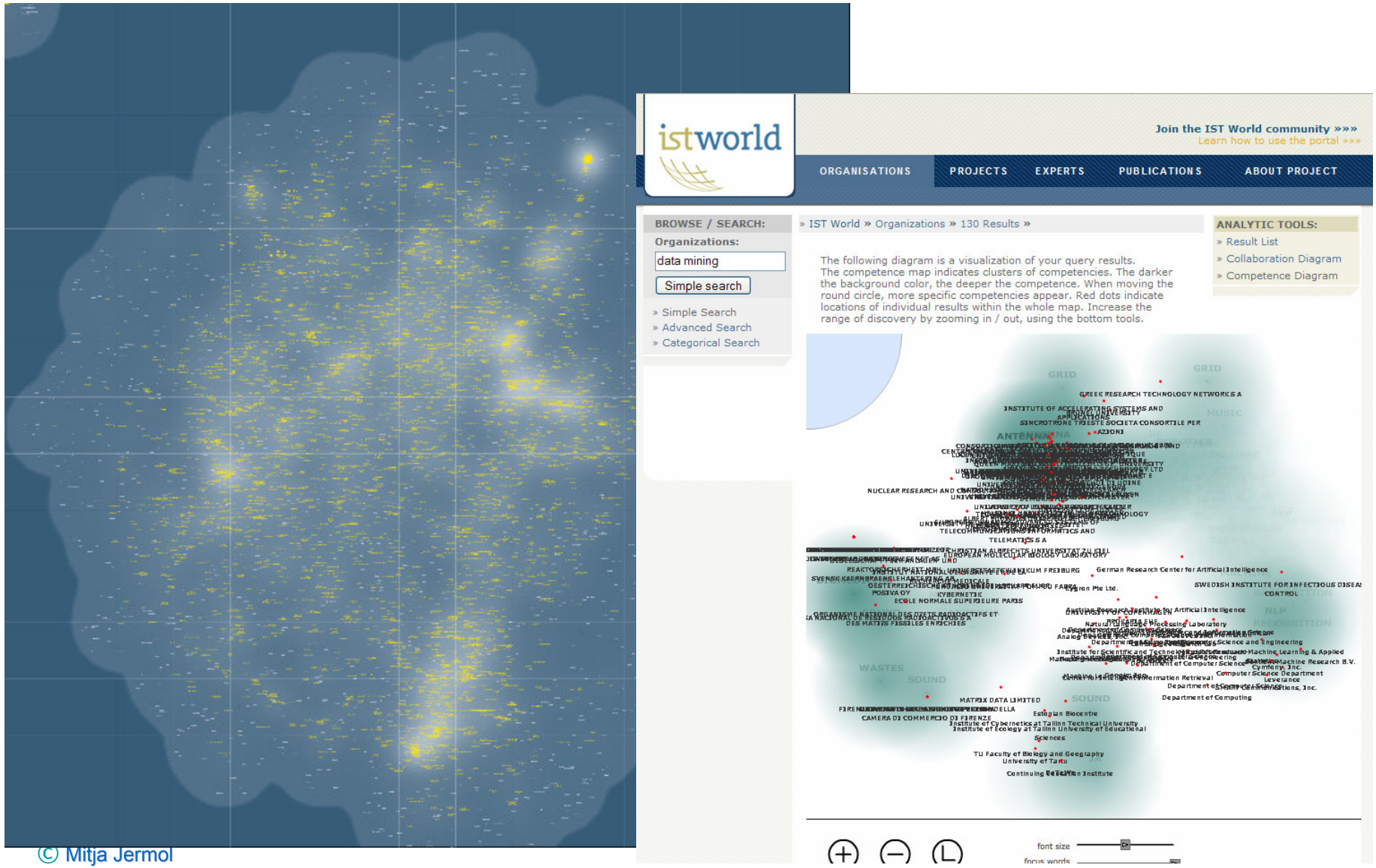
- **sociological data:** group and team effectiveness, sociological type, network intelligence NQ,…
- **psychological data:** personality type, creativity level, basic motivation, values and beliefs,…
- **partner's cultural and organization knowledge**
- **group and team knowledge** (functional, group dynamics,…)
- **partner/group/individual background knowledge** (core, additional, specific), learning styles and communication characteristics
- partner/group/individual **connections** to other's knowledge
- **process's knowledge and object type knowledge** (tools, methods, techniques performances)
- **personal lessons learned**

KNOWLEDGE MAP (E-R MODEL)



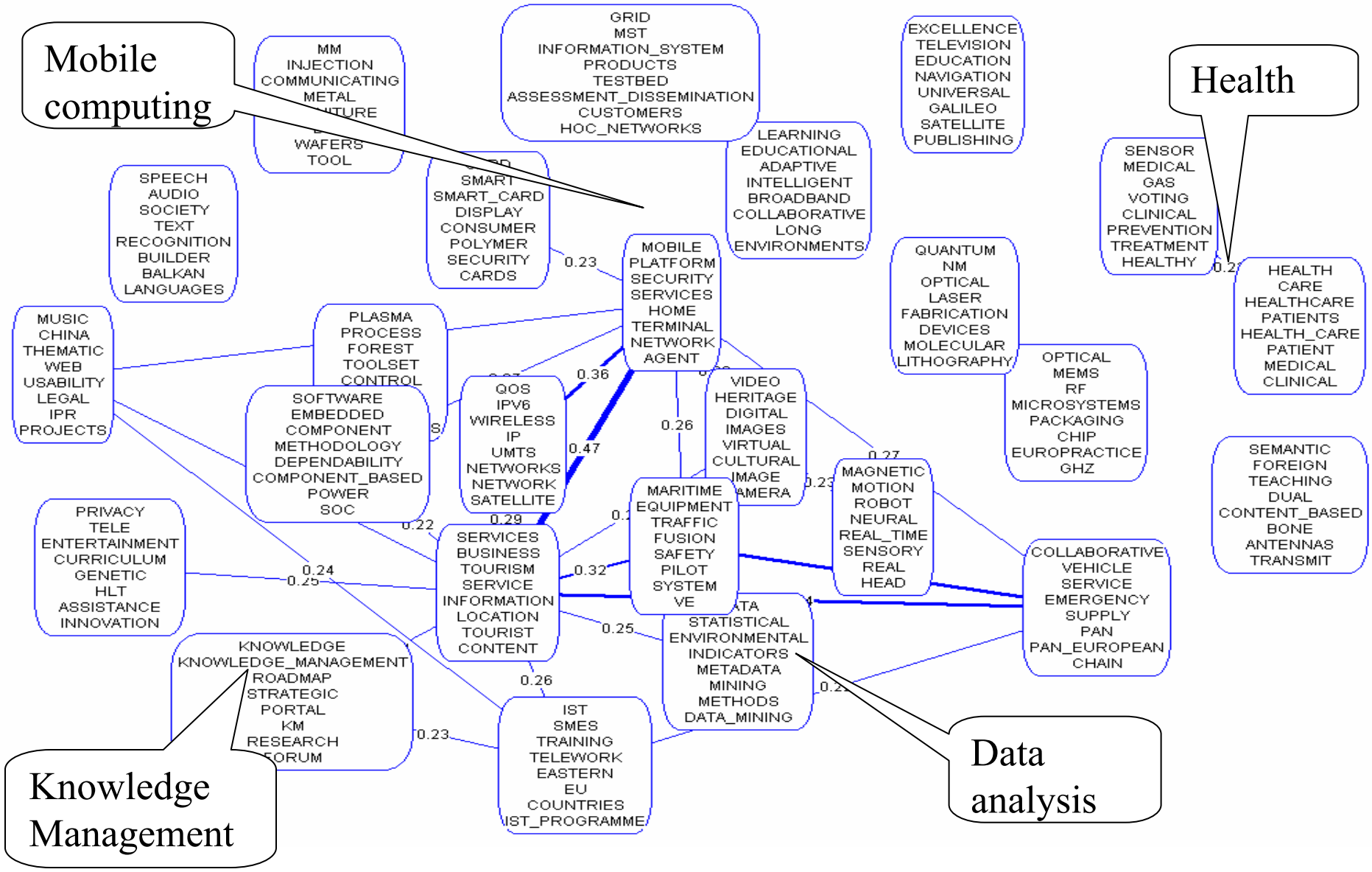
ECOLEAD

KNOWLEDGE MAP (I)



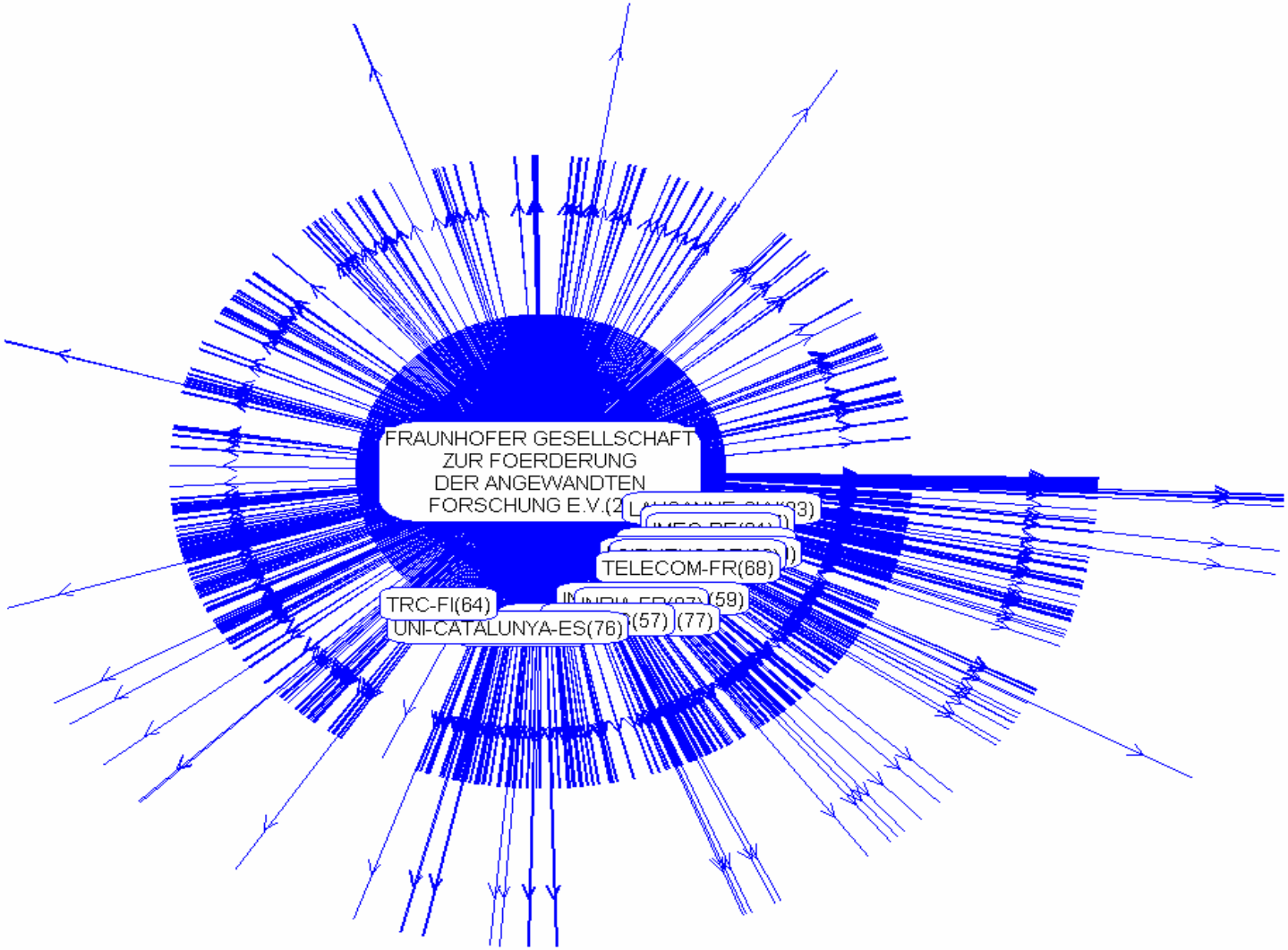
KNOWLEDGE (STRUCTURE) MAP (II)

ECOLEAD



KNOWLEDGE (CONNECTIVITY) MAP

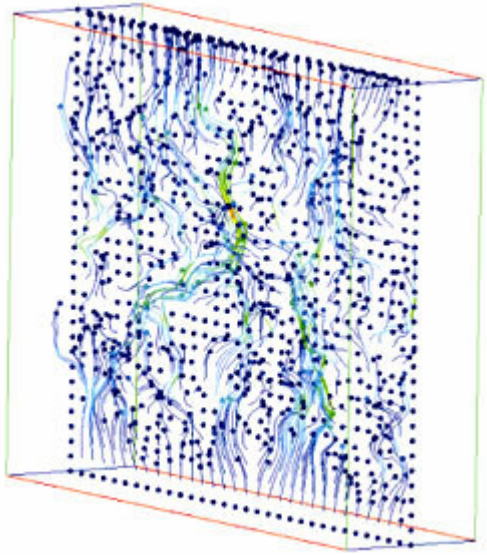
ECOLEAD

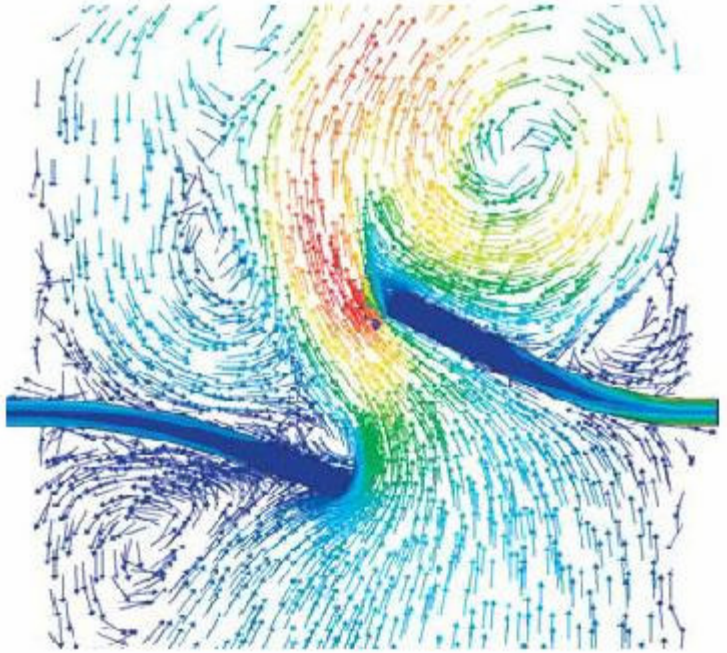


mitja.jermol@ijs.si

ECOLEAD

KNOWLEDGE (CARRIER - FLOW) MAP

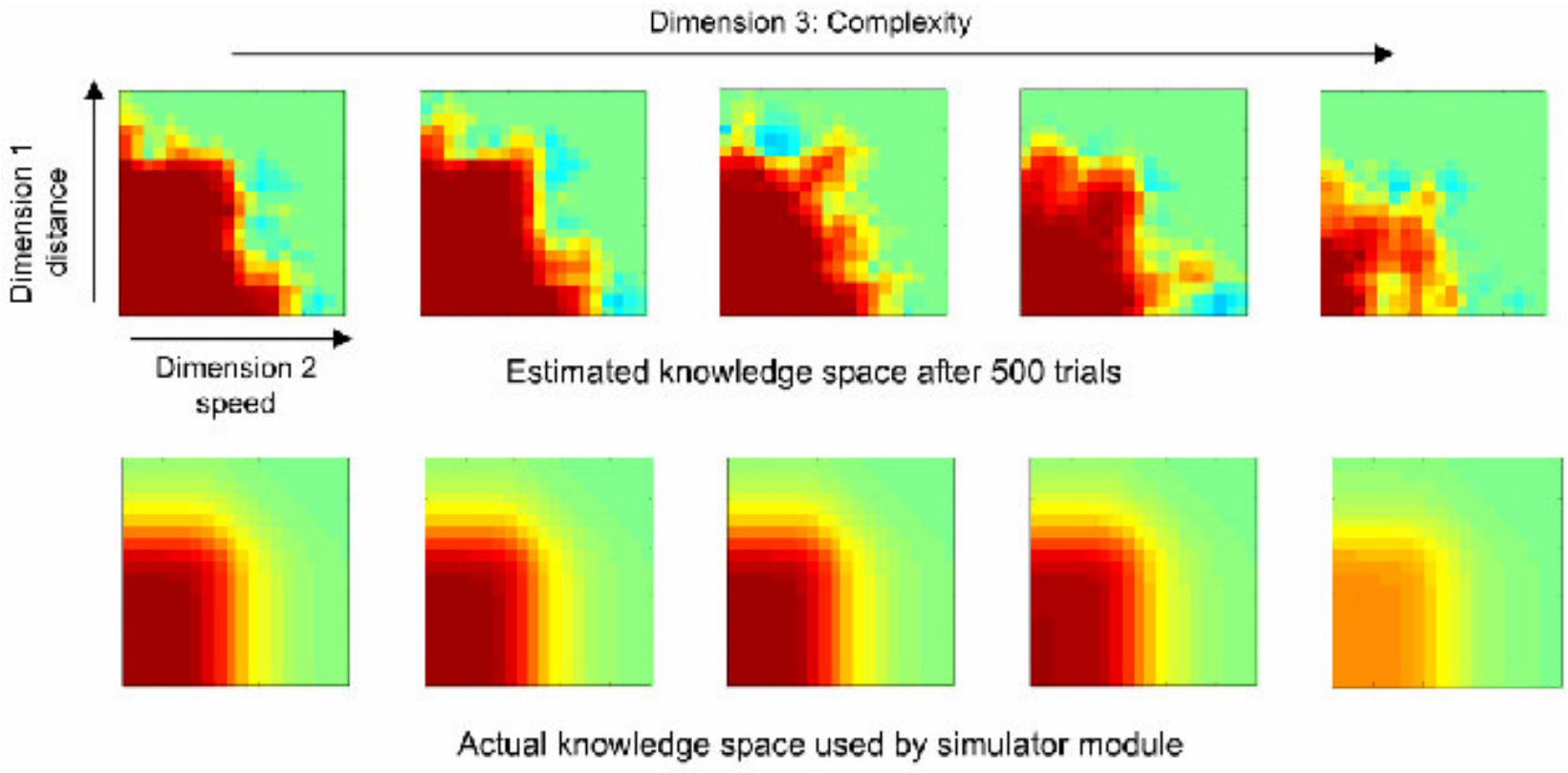




Dynamic fluid fields

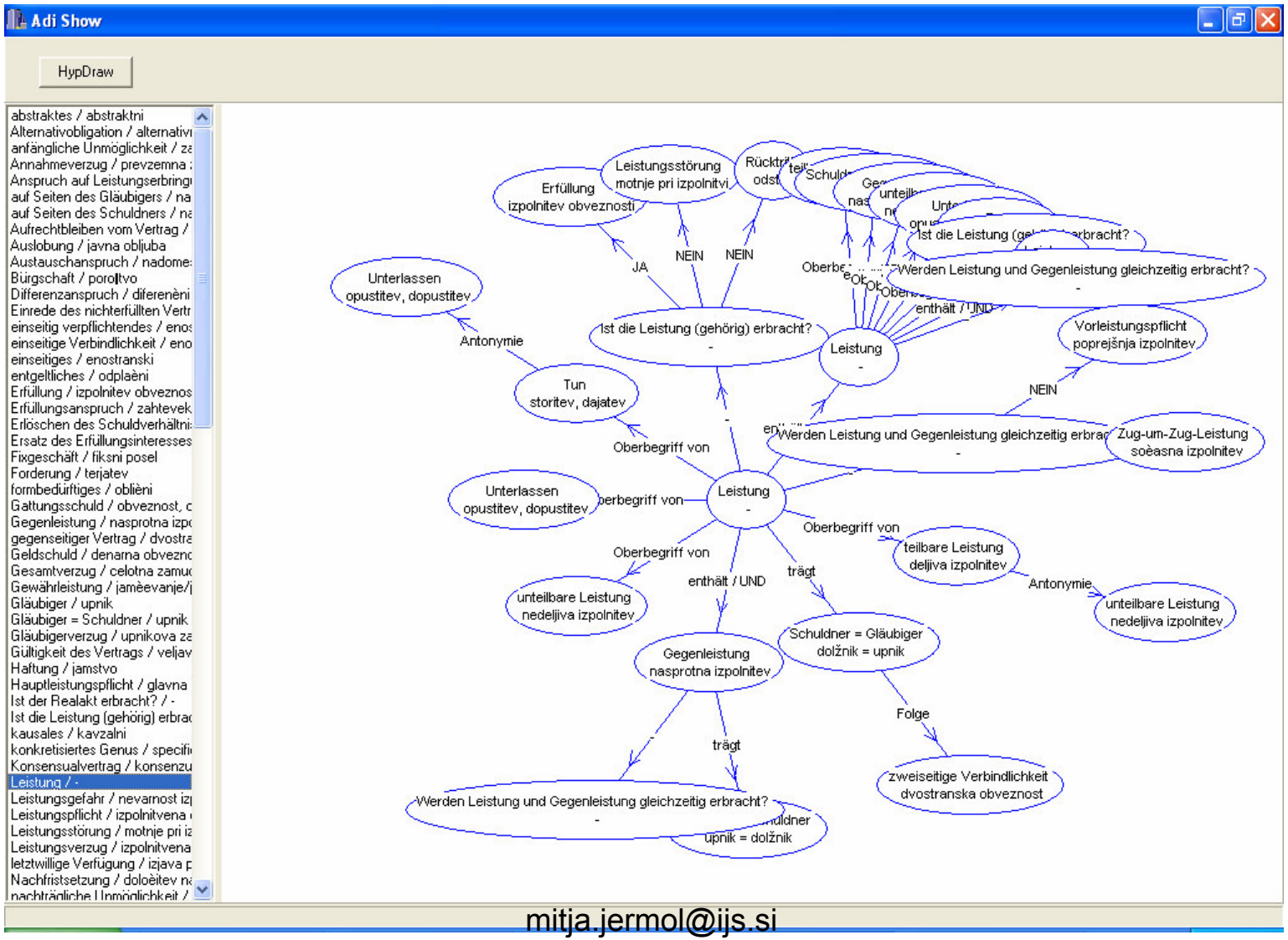
ECOLEAD

K- (DEVELOPMENT) MAP – KNOWLEDGE SPACE



ECOLEAD

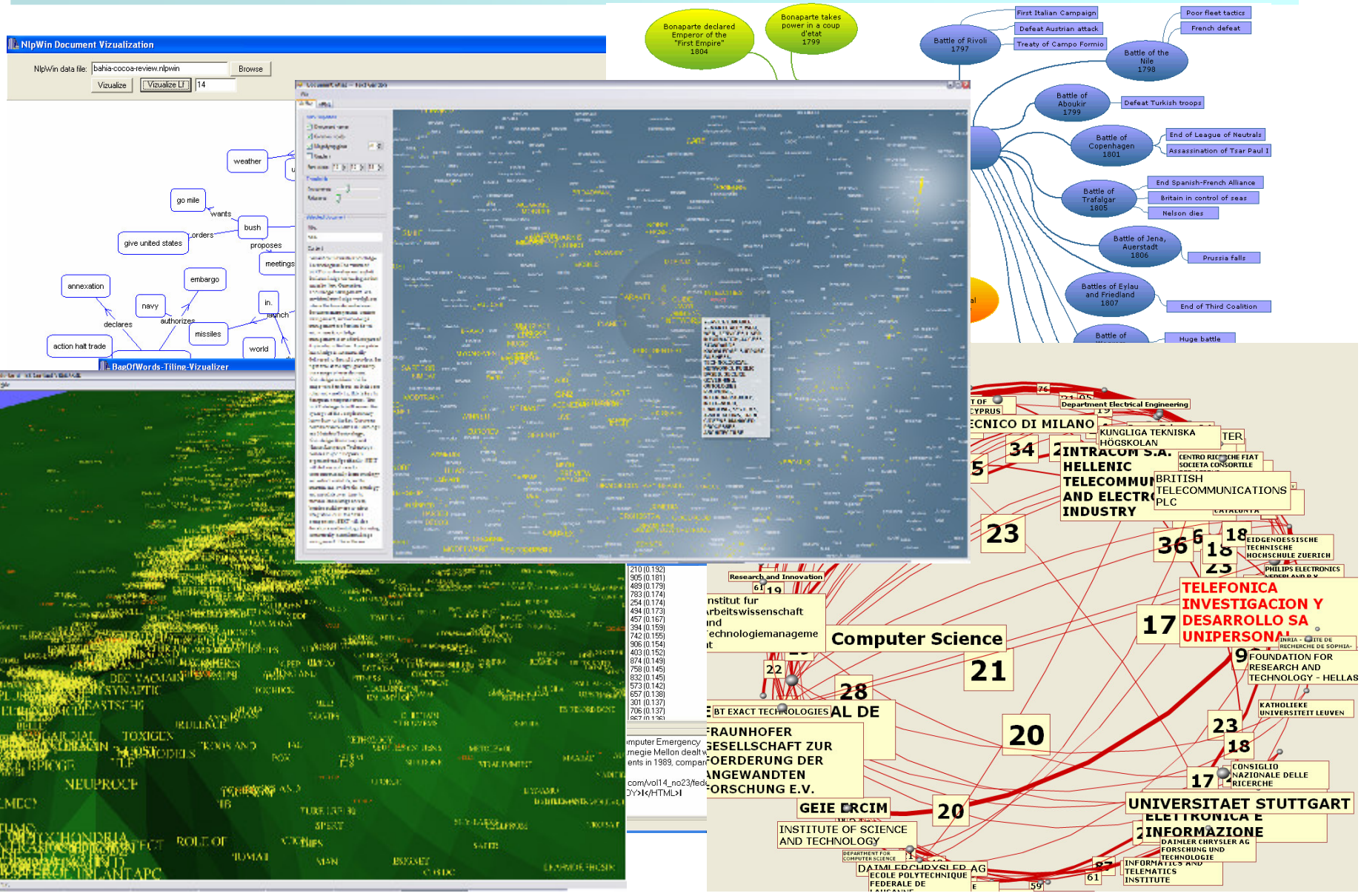
KNOWLEDGE (ASSET) MAP

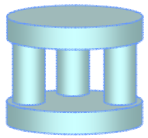


mitja.jermol@ijs.si

ECOLEAD

VISUALISATIONS





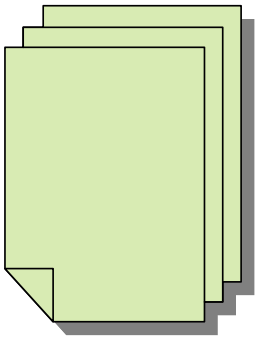
ECOLEAD

DOCUMENT ATLAS

- **Given a collection of documents (time stamps, if available)**
  - eg., news articles, publication record
- **Visualize in 2D:**
  - content of documents,
  - named entities,
  - relationships (social networks),
  - changes over time
- **Installation is publicly available in binaries at http://docatlas.ijs.si/**

ECOLEAD

APPROACH DESCRIPTION



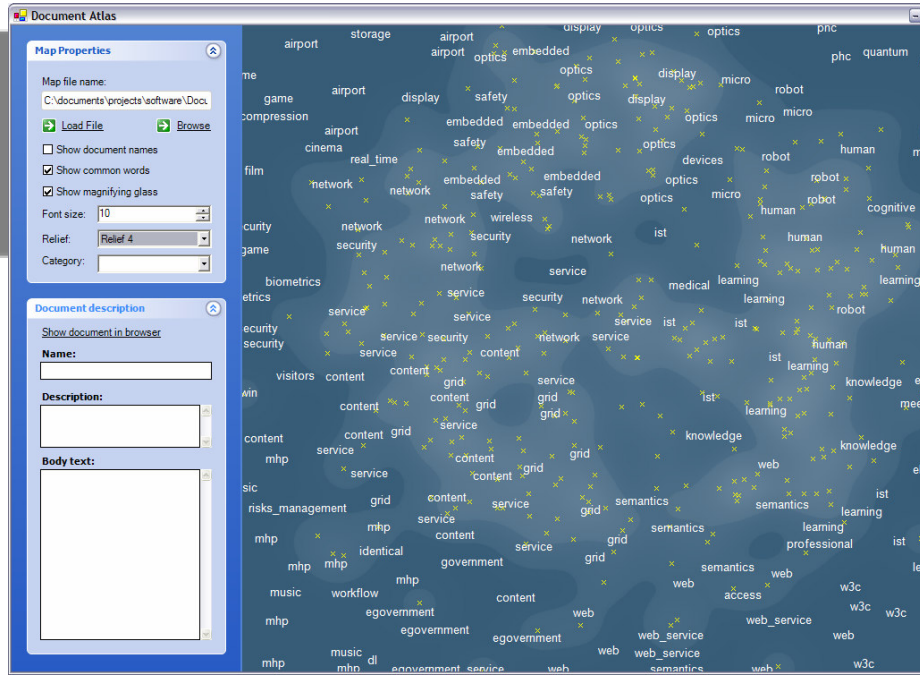
>10,000

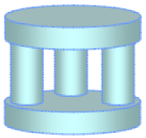
Latent Semantic Indexing

>100

Multidimensional scaling

2





ECOLEAD

KNOWLEDGE SHARING – PERSONALISED KNOWLEDGE TRANSFER

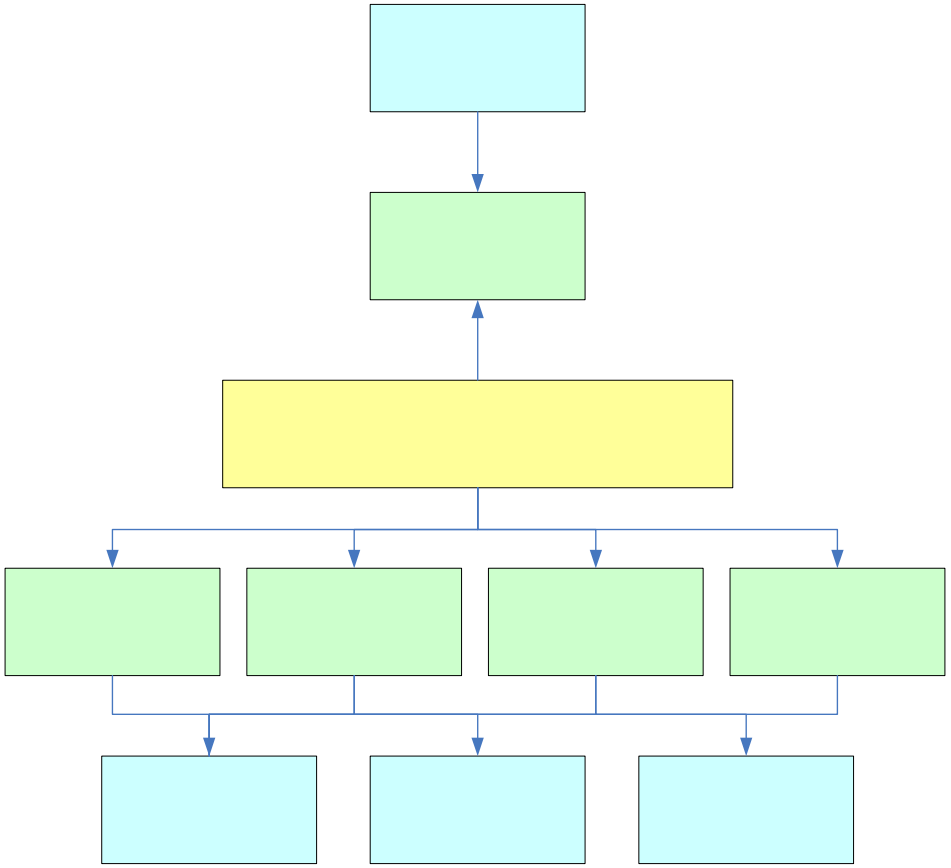
ECOLEAD

ICT BASED TRAINING

- **KT (learning) is one of the main processes in KM.**
- **KM stimulates and fosters continuous learning.**
- **Introducing**
  - new methods, concepts and ways of learning
  - new didactic concepts, methodology, pedagogy,…
  - new tools, content types, media,...
- **There is no target population (personalization):**
  - all subjects
  - all levels (Life long learning)
  - all types of education

ECOLEAD

ICT BASED TRAINING



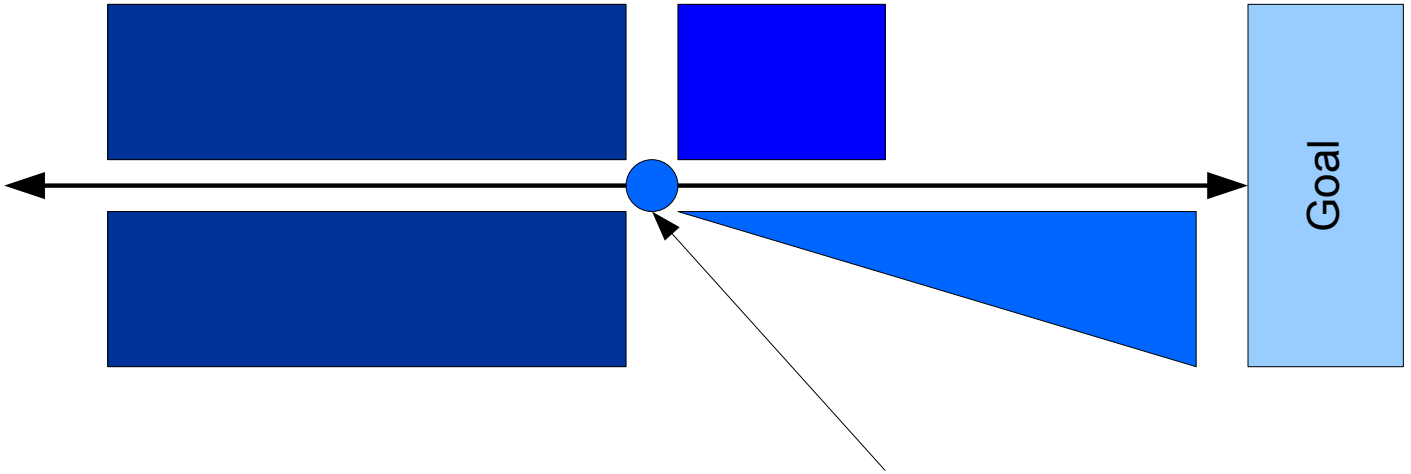
Tutorin

Distanc
Learnir

ECOLEAD

KNOWLEDGE TRANSFER

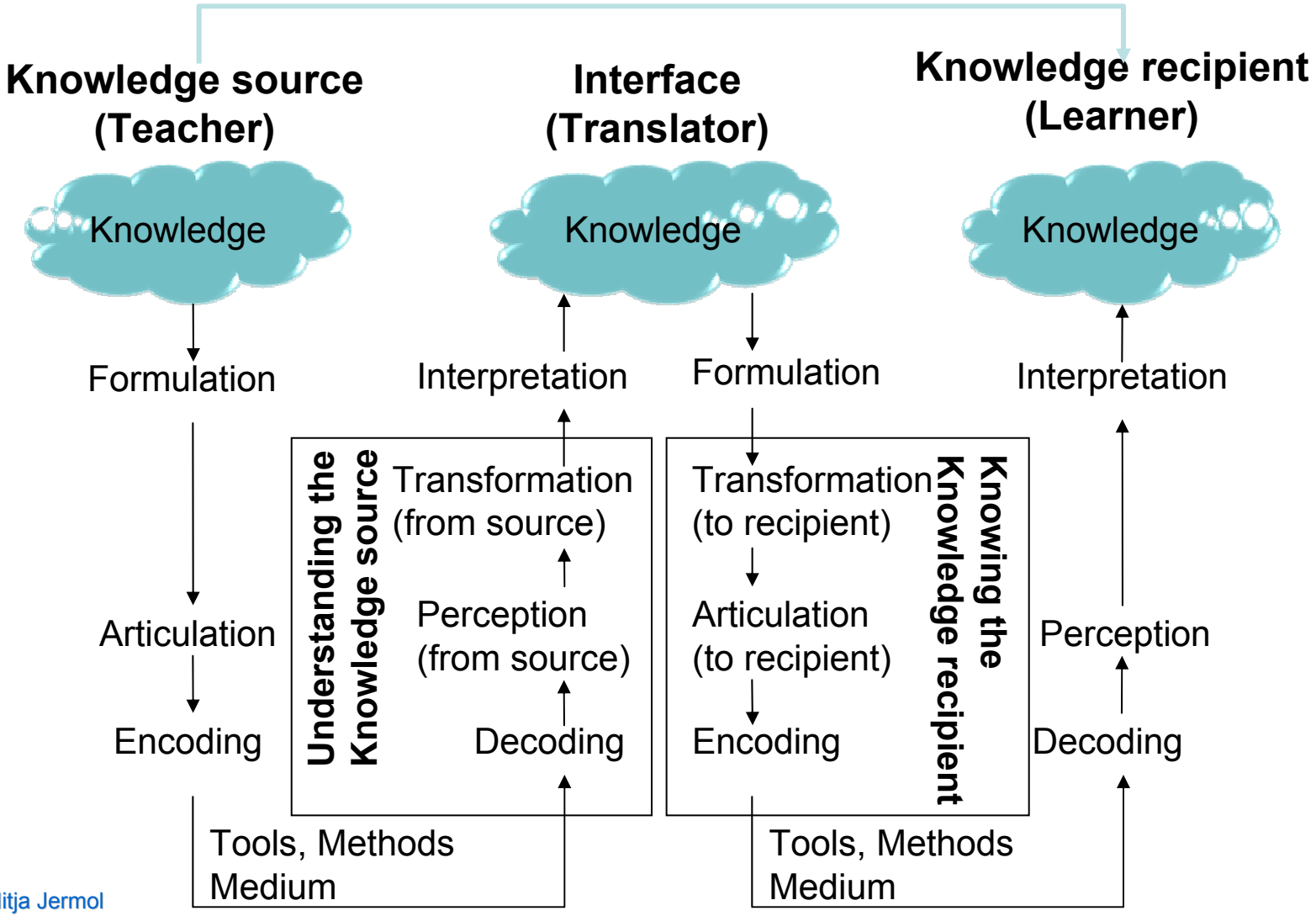
- Training is a challenge, because it is not something you give; but a process based on guidance



- Personalization of methods, content, tools, guidance, control, motivation and goal.

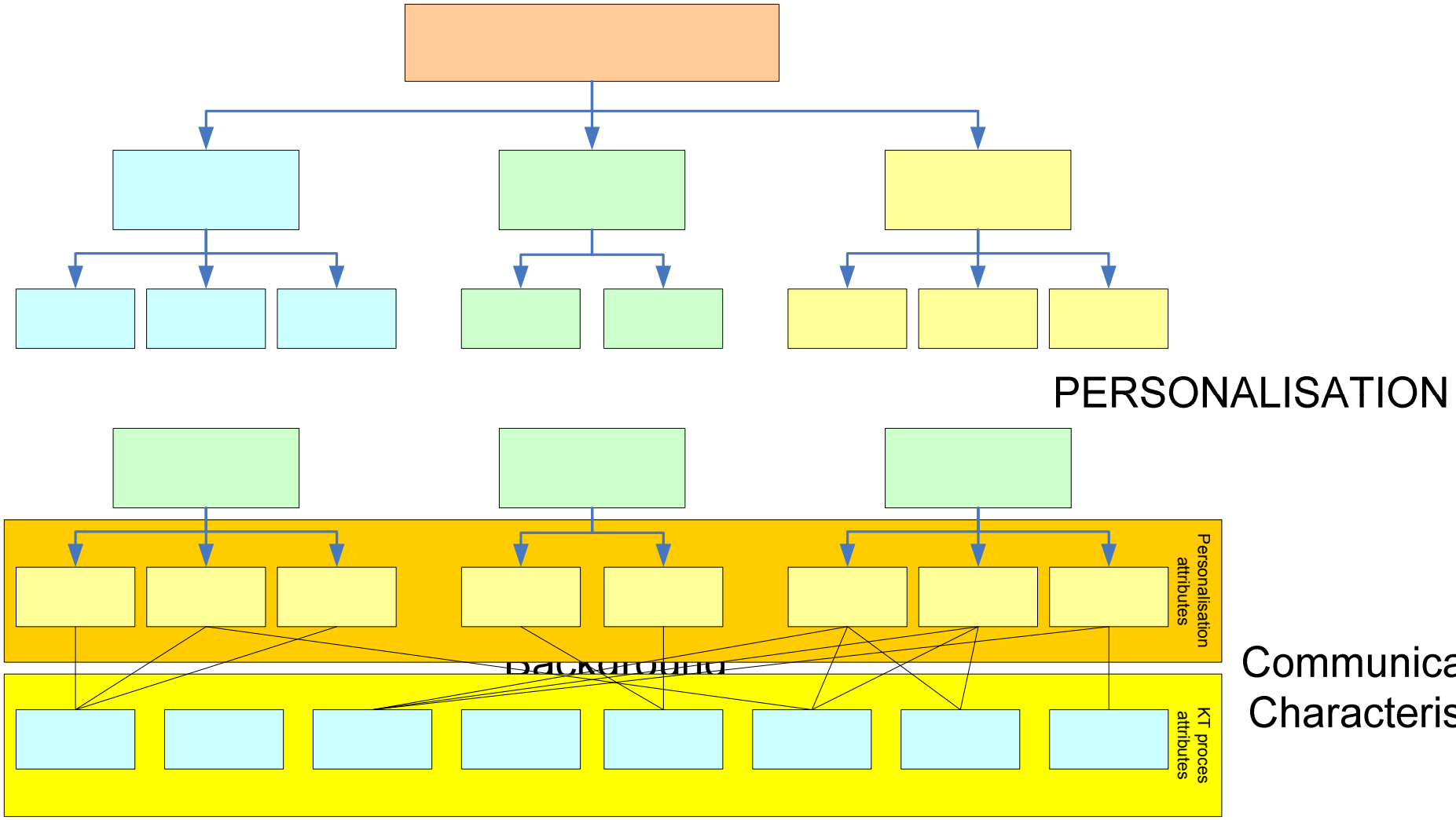
ECOLEAD

PERSONALISATION (MOD SCOPOS)

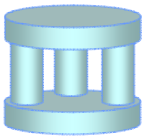


PERSONALISATION ATTRIBUTES MATCHING

ECOLEAD



Knowledge Map | Knowledge Space | Competence Directory | Codes



CONTENT META STANDARDS

- **RDF** Resource Description Framework (W3C)
  http://www.w3.org/TR/1999/REC-rdf-syntax-19990222/
- **TEI** Text Encoding Initiative (SGML/XML) **http://www.tei-c.org/**
- **DOI** Document Object Identifier (Avtorske pravice)
  http://www.doi.org/
- **GILS** Government Information Service **http://www.gils.net/**
- **PICS** Platform for Internet Content Selection
  http://www.w3.org/PICS/
- **IMS** Learning Resource Meta-data **http://www.imsproject.org/metadata/**
- **LTSC-LOM** (Learning Technology Standards Committee Learning Objects Metadata) **http://ltsc.ieee.org/wg12/**
- **DC** Dublin Core **http://dublincore.org/**

ECOLEAD

ECOLEAD TRAINING

Active Virtual Learning Community
386 members
50 self learning courses
172 video seminars from 16 events,
100 authors, 89 lectures
122 prepared documents

2 training DVDs

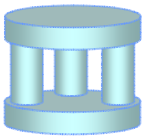
ECOLEAD

VIDREOLECTURES.NET

Status 02.9.2007
128 events,
1536 authors,
2022 lectures,
2659 videos

App 2000 visits/day
150.000 visits since 1.3.2007
500.000 pageviews

638 visits from CZ



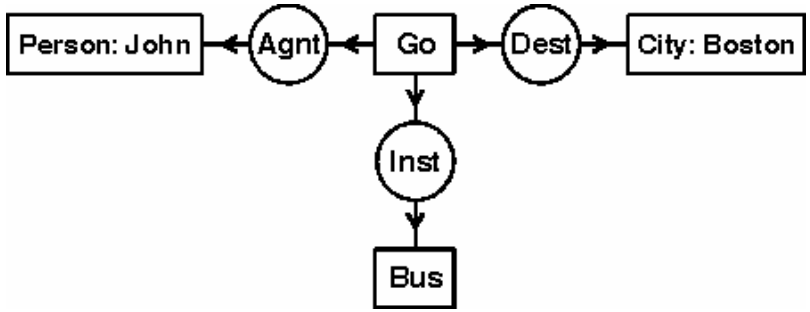
ECOLEAD

KNOWLEDGE FORMALISATION

ECOLEAD

STANDARDS – CONCEPTUAL

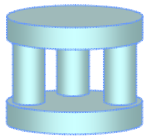
- Cg – conceptual graphs - http://www.cs.uah.edu/~delugach/CG/



- CycL - http://www.cyc.com/cycdoc/ref/cycl-syntax.html, CycL is a formal language whose syntax derives from first-order predicate calculus (the language of formal logic) and from Lisp.

- DAML+OIL - http://www.daml.org/ - is a semantic markup language for Web resources. It builds on earlier W3C standards such as RDF and RDF Schema, and extends these languages with richer modelling primitives. The use of DAML+OIL is illustrated here via an annotated example

- DQL- DAML query language - www.daml.org/**dql**/



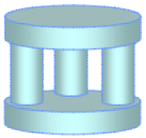
ECOLEAD

STANDARDS – FORMATS

- KIF - logic.stanford.edu/kif/kif.html - Knowledge Interchange Format is a language designed for use in the interchange of knowledge among disparate computer systems

- OKBC - http://www.ai.sri.com/~okbc/ , Open Knowledge Base Connectivity is an application programming interface for accessing knowledge bases stored in knowledge representation systems - DARPA

- RuleML, http://www.ruleml.org/, Rule Markup Language permitting both forward (bottom-up) and backward (top-down) rules in XML for deduction, rewriting, and further inferential-transformational tasks



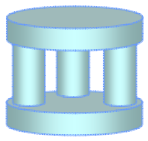
ECOLEAD

STANDARDS - INITIATIVES

- SHOE, http://www.cs.umd.edu/projects/plus/SHOE/ , is a small extension to HTML which allows web page authors to annotate their web documents with machine-readable knowledge – transition to OWL

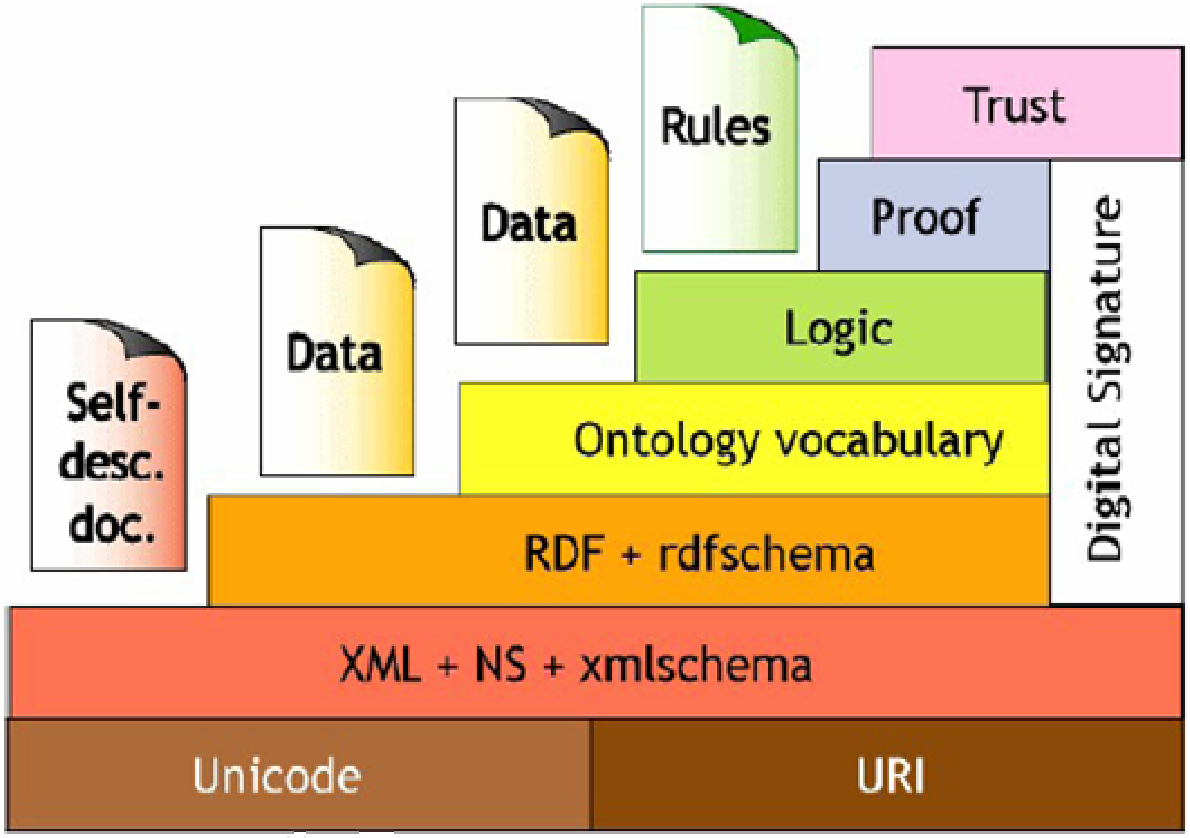
- SUO (IEEE P1600.1), http://suo.ieee.org/, Standard Upper Ontology, is limited to concepts that are meta, generic, abstract and philosophical, and therefore are general enough to address (at a high level) a broad range of domain areas

- XTM Topic Maps, http://www.topicmaps.org/, development of an XML grammar for interchanging Web-based Topic Maps, called the XTM Specification



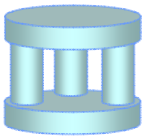
ECOLEAD

THE SEMANTIC WEB LAYER



16-bit character set that assigns unique character codes to characters

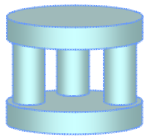
Uniform Resource Identifier



ECOLEAD

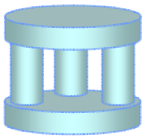
SEMANTIC WEB LAYERS

- **XML layer**
  - Syntactic basis
- **RDF layer**
  - RDF basic data model for facts
  - RDF Schema simple ontology language
- **Ontology layer**
  - More expressive languages than RDF Schema
  - Current Web standard: OWL



WHAT IS AN ONTOLOGY?

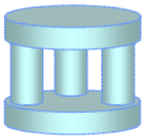
- **In the context of knowledge sharing, the term ontology means a "*specification of a conceptualization*"**
- **We usually refer to an ontology as being a graph/network structure consisting from:**
  - Set of concepts (vertices in a graph)
    - Types of data
  - Set of instances assigned to a particular concepts (data records assigned to vertices in a graph)
    - Actual data records
  - Set of relationships connecting concepts (directed edges in a graph),
    - Labeled links between classes denoting relationship



ECOLEAD

WHY DEVELOP AN ONTOLOGY?

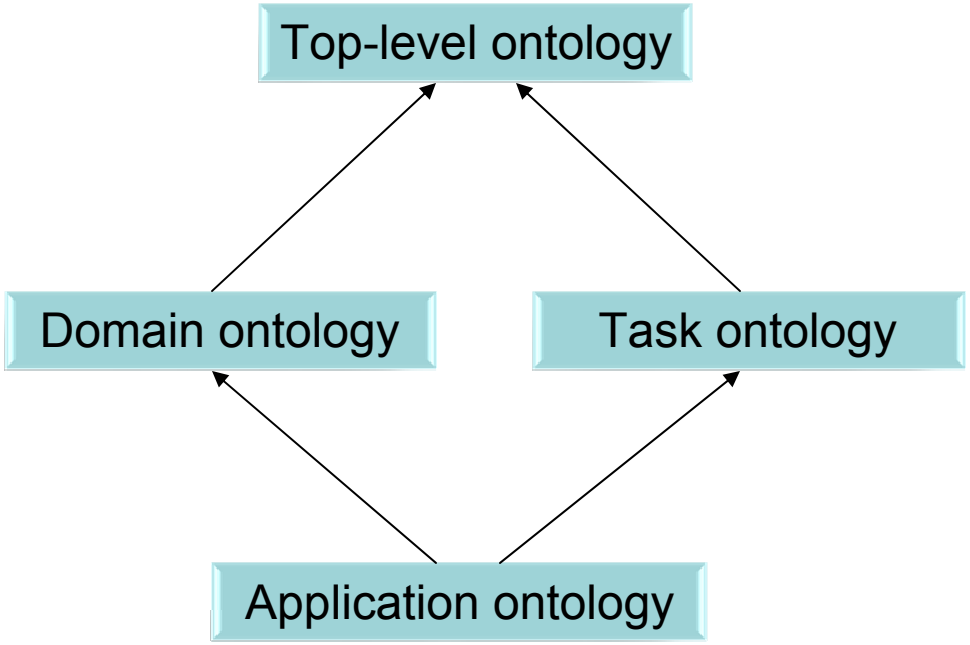
- **To make domain assumptions explicit**
  - Easier to change domain assumptions
  - Easier to understand and update legacy data
- **To separate domain knowledge from operational knowledge**
  - Re-use domain and operational knowledge separately
- **A community reference for applications**
- **To share a consistent understanding of what information means**



ECOLEAD

TYPES OF ONTOLOGIES

Describe **very general concepts** like space, time, event, which are independent of a particular problem or domain. It seems reasonable to have unified top-level ontologies for large communities of users.

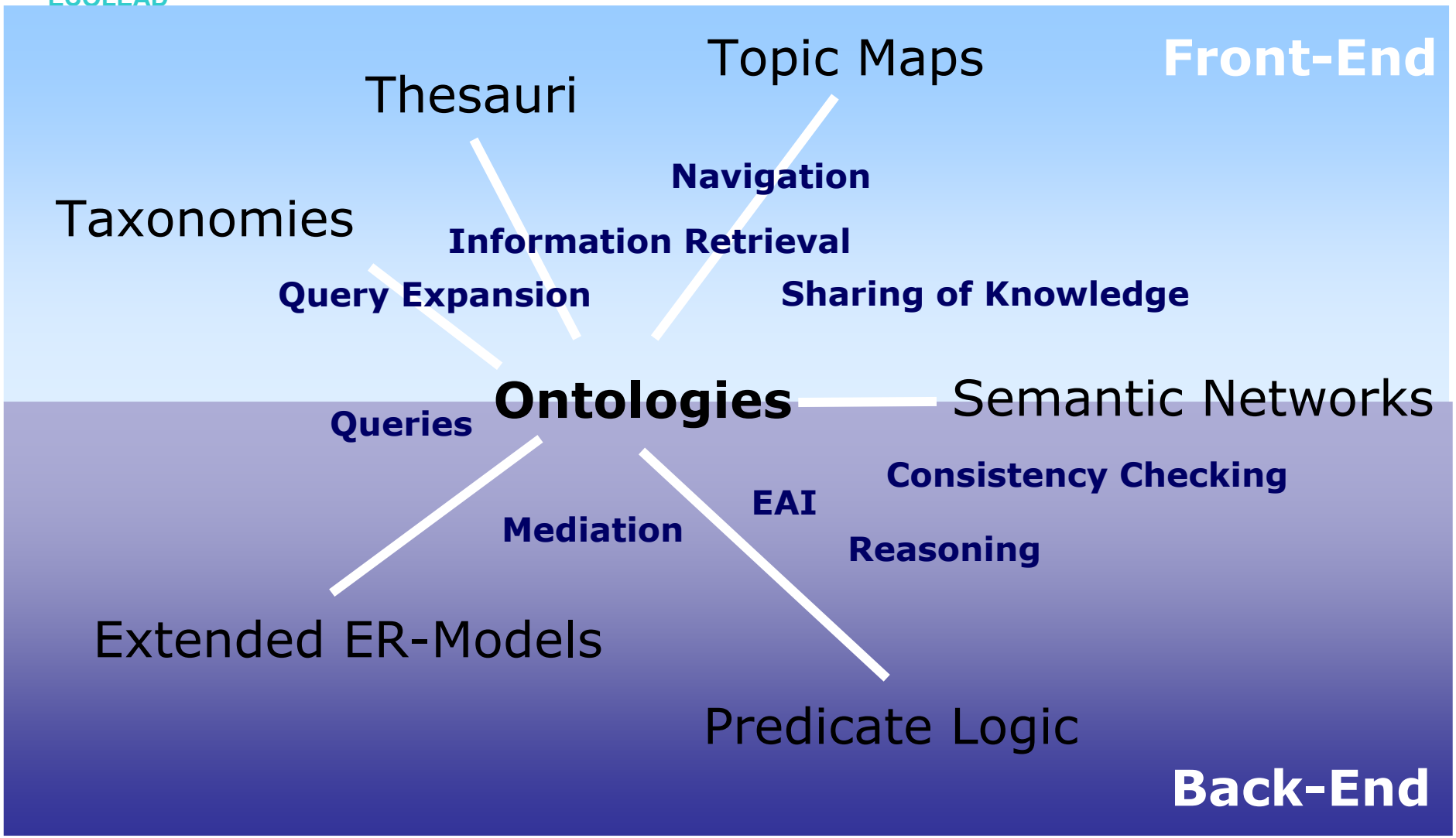


Describe the vocabulary related to a **generic domain** by specializing the concepts introduced in the top-level ontology.

Describe the vocabulary related to a **generic task or activity** by specializing the top-level ontologies.

These are the most specific ontologies. Concepts in application ontologies often correspond to **roles played by domain entities while performing a certain activity**.

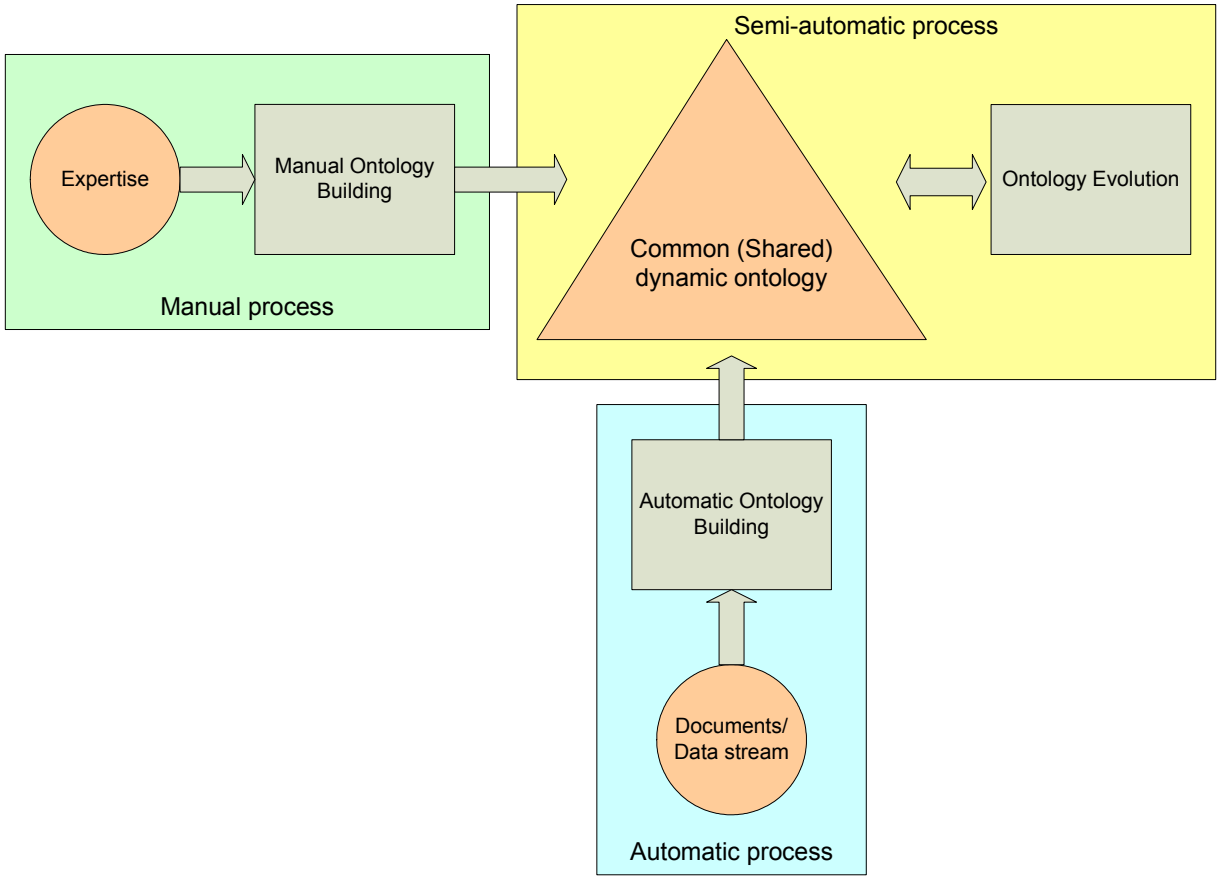
ONTOLOGIES AND THEIR RELATIVES

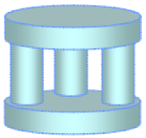


ECOLEAD

ONTOLOGY DEVELOPMENT

- Scenario 1 – Top-down: Expert building the ontology - manually
- Scenario 2 – Bottom-up: Ontology build from documents, email logs, etc…

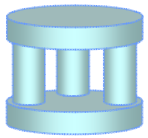




ECOLEAD

ONTOLOGY EVOLUTION

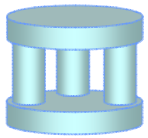
- **"Ontology evolution" appears in a situation where the modeling domain is not fixed or known in advance**
- **Initially we start with an empty or "upper-level" ontology**
- **Dynamics in "ontology evolution" is defined as a set of transformation operations:**
  - Add & delete a class
  - Add & delete a relationship
- **Decision which operation to take is taken manually or (semi) automatically to optimize compliance of the current ontological conceptual structure and the data to be modeled and collected so far**



ONTOLOGY MANAGEMENT

- Idea: Shared vocabulary (concepts, relations, axioms) of the various actors in a KM information system

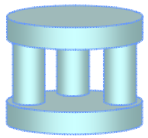
- Ontology Management is an important means to *balance between local and global concerns* in Distributed Organizational Memory scenarios



ECOLEAD

WHY TO USE ONTOLOGIES IN NO?

- **NO development and user community**
  - E4 “Constitution” - a reference formal description of common understanding
  - a common vocabulary, rules and formulations
  - a background for an integrated architecture
  - multilinguality and multimodality support
  - …
- **Benefits to the user**
  - Solving inconsistencies - Reference vocabulary
  - Sharing - Enabling the connectivity to NO community on the level of business processes, resources and BOM
  - Open and integrated - Connectivity to existing ontologies that are user defined and/or relevant for NO
  - …



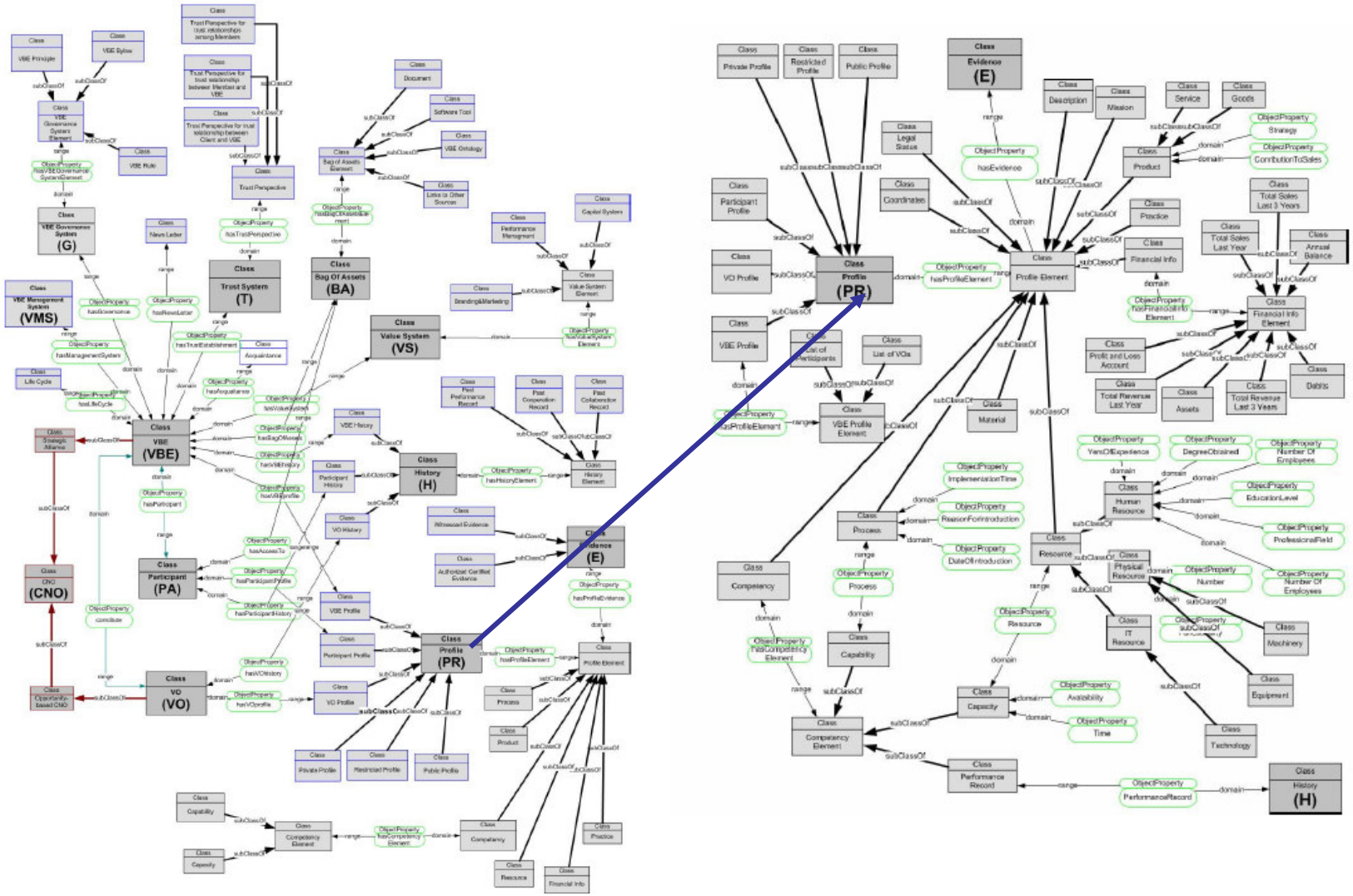
ECOLEAD

OVERVIEW OF EXISTING ONTOLOGIES

- **Terminological ontologies:** WordNet, VerbNet, FrameNet, Sensus
- **Domain ontologies:** The Gene Ontology (GO), PSL (Process Specification Language Ontology), The CEO project
- **Upper ontologies:** SUMO (Suggested Upper Merged Ontology), Mikrokosmos, OpenCyc, Sowa's top-level ontology
- **Ontologies with common-sense knowledge:** Cyc, ConceptNet
- **Business-oriented Ontologies:** The AIAI enterprise ontology, The TOronto Virtual Enterprise's ontology (TOVE), The BPMO (Business Process Management Ontology)

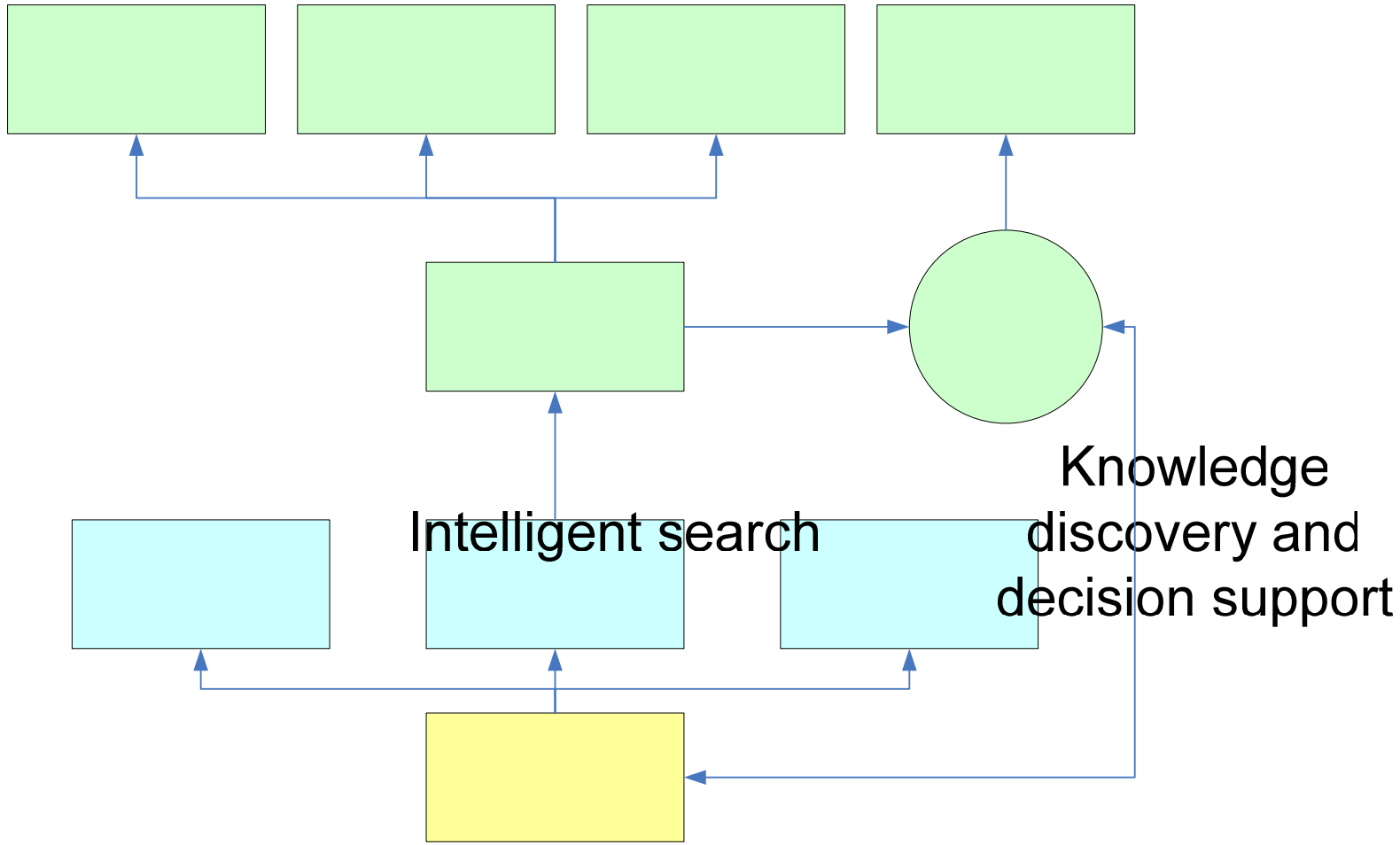
ECOLEAD

ECOLEAD ONTOLOGY



ECOLEAD

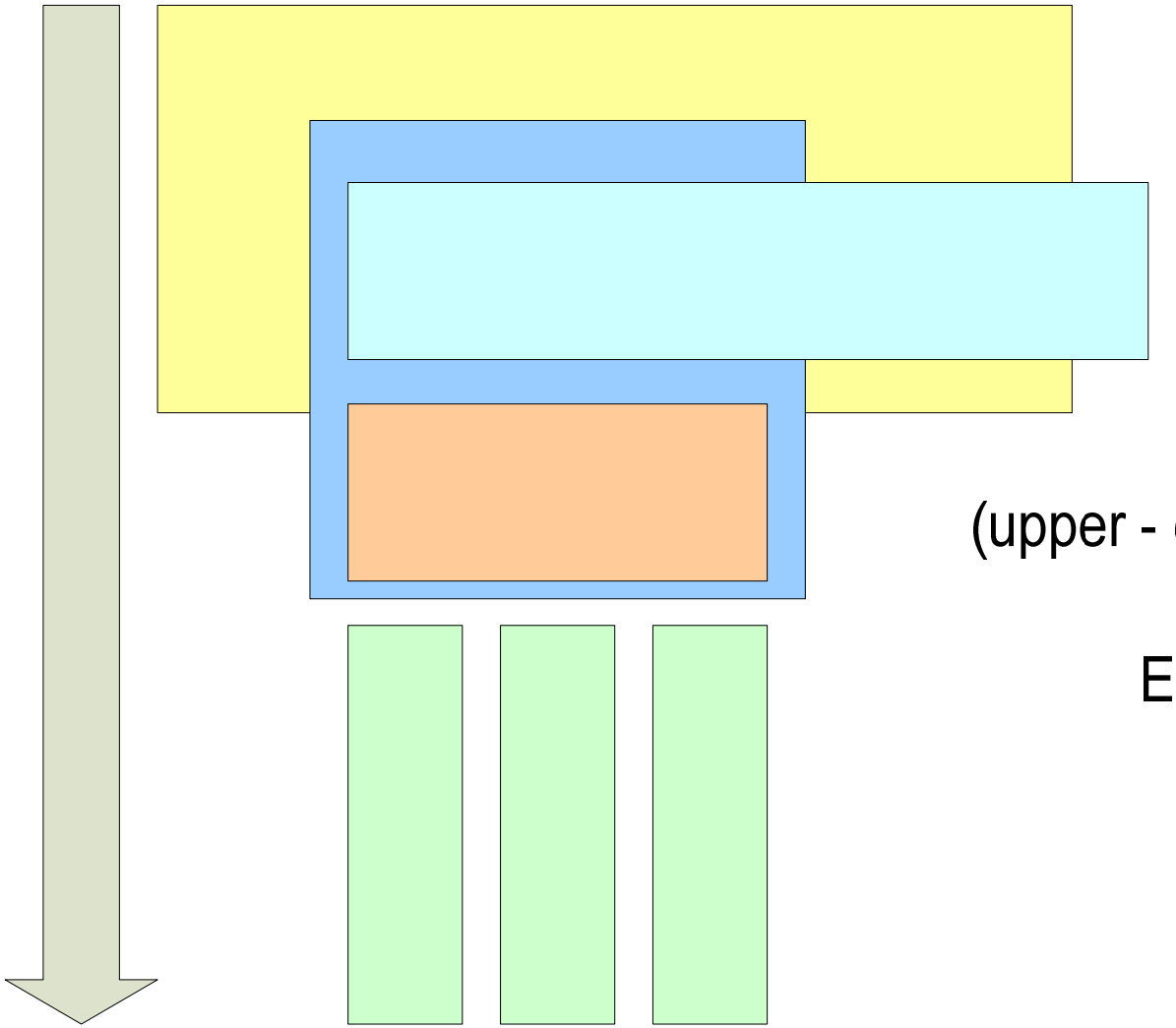
ADVANCED SERVICES (E4 CASE)



Intelligent se

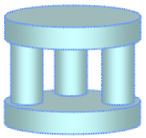
ECOLEAD

ONTOLOGY (E4 CASE)



Cy
(upper - common sense on

E4 ontology that will

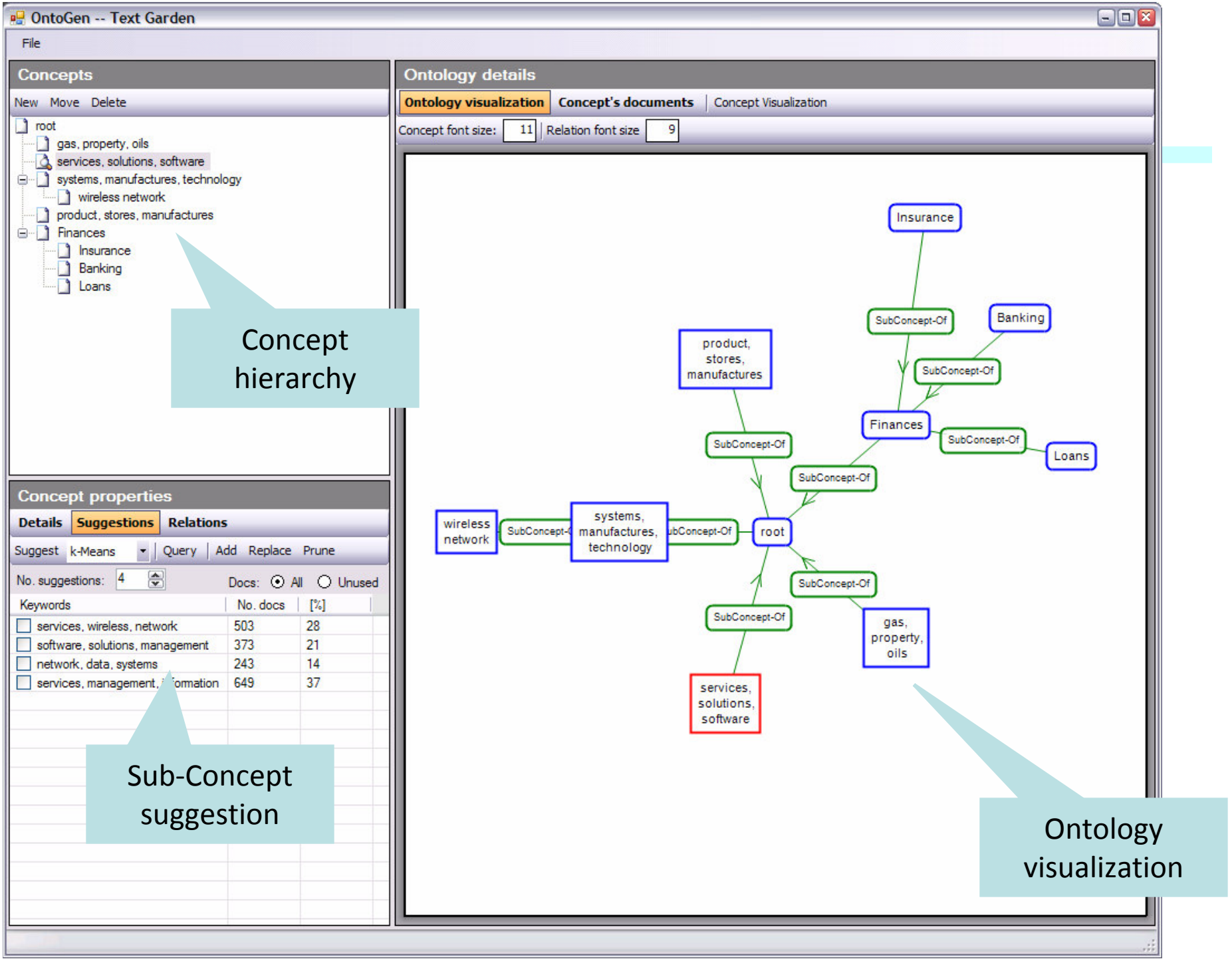


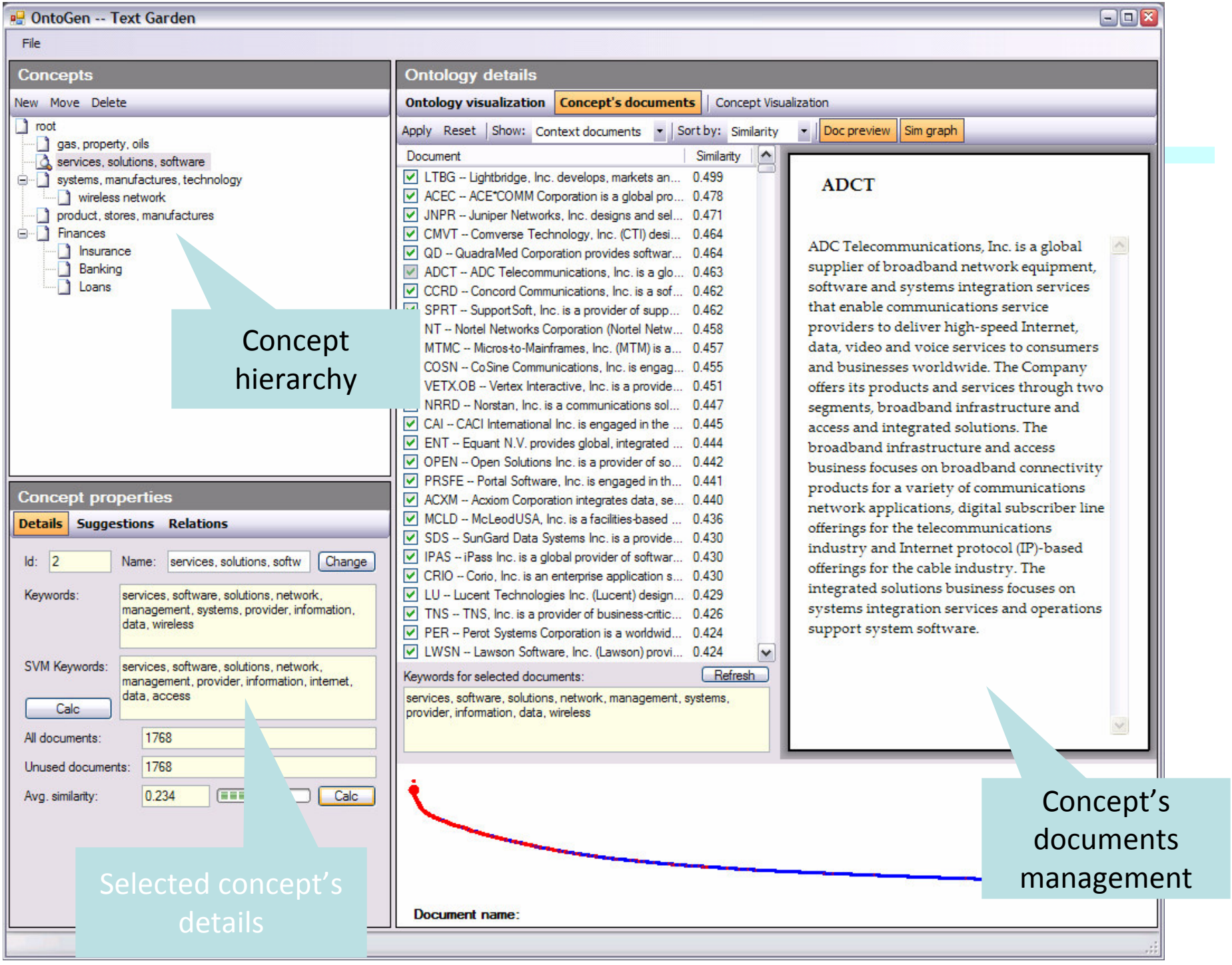
ECOLEAD

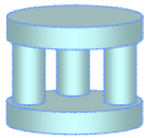
ONTOGEN

- **Semi-Automatic**
  - Text-mining methods provide suggestions and insights into the domain
  - The user can interact with parameters of text-mining methods
  - All the final decisions are taken by the user
- **Data-Driven**
  - Most of the aid provided by the system is based on some underlying data provided by the system
  - Instances are described by features extracted from the data (e.g. bag-of-words vectors)

Installation package is publicly available in binaries at ontogen.ijs.si


OntoGen -- Text Garden
File
Concepts
New Move Delete
root
gas, property, oils
services, solutions, software
systems, manufactures, technology
wireless network
product, stores, manufactures
Finances
Insurance
Banking
Loans
Concept hierarchy
Concept properties
Details Suggestions Relations
Suggest k-Means Query Add Replace Prune
No. suggestions: 4
Docs: All Unused
Keywords
No. docs
[%]
services, wireless, network 503 28
software, solutions, management 373 21
network, data, systems 243 14
services, management, formation 649 37
Sub-Concept suggestion
Ontology details
Ontology visualization
Concept's documents
Concept Visualization
Concept font size: 11
Relation font size 9
Insurance
SubConcept-Of
Banking
product, stores, manufactures
SubConcept-Of
Finances
SubConcept-Of
Loans
SubConcept-Of
SubConcept-Of
wireless network
systems, manufactures, technology
root
SubConcept-Of
SubConcept-Of
gas, property, oils
services, solutions, software
Ontology visualization

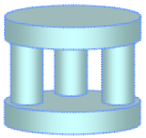

OntoGen -- Text Garden
File
Concepts
New Move Delete
root
gas, property, oils
services, solutions, software
systems, manufactures, technology
wireless network
product, stores, manufactures
Finances
Insurance
Banking
Loans
Concept hierarchy
Concept properties
Details Suggestions Relations
Id: 2
Name: services, solutions, softw
Change
Keywords:
services, software, solutions, network, management, systems, provider, information, data, wireless
SVM Keywords:
services, software, solutions, network, management, provider, information, internet, data, access
Calc
All documents: 1768
Unused documents: 1768
Avg. similarity: 0.234
Calc
Selected concept's details
Ontology details
Ontology visualization
Concept's documents
Concept Visualization
Apply Reset
Show: Context documents
Sort by: Similarity
Doc preview
Sim graph
Document
Similarity
LTBG -- Lightbridge, Inc. develops, markets an... 0.499
ACEC -- ACE*COMM Corporation is a global pro... 0.478
JNPR -- Juniper Networks, Inc. designs and sel... 0.471
CMVT -- Comverse Technology, Inc. (CTI) desi... 0.464
QD -- QuadraMed Corporation provides softwar... 0.464
ADCT -- ADC Telecommunications, Inc. is a glo... 0.463
CCRD -- Concord Communications, Inc. is a sof... 0.462
SPRT -- SupportSoft, Inc. is a provider of supp... 0.462
NT -- Nortel Networks Corporation (Nortel Netw... 0.458
MTMC -- Micros-to-Mainframes, Inc. (MTM) is a... 0.457
COSN -- CoSine Communications, Inc. is engag... 0.455
VETX.OB -- Vertex Interactive, Inc. is a provide... 0.451
NRRD -- Norstan, Inc. is a communications sol... 0.447
CAI -- CACI International Inc. is engaged in the ... 0.445
ENT -- Equant N.V. provides global, integrated ... 0.444
OPEN -- Open Solutions Inc. is a provider of so... 0.442
PRSFE -- Portal Software, Inc. is engaged in th... 0.441
ACXM -- Acxiom Corporation integrates data, se... 0.440
MCLD -- McLeodUSA, Inc. is a facilities-based ... 0.436
SDS -- SunGard Data Systems Inc. is a provide... 0.430
IPAS -- iPass Inc. is a global provider of softwar... 0.430
CRIO -- Corio, Inc. is an enterprise application s... 0.430
LU -- Lucent Technologies Inc. (Lucent) design... 0.429
TNS -- TNS, Inc. is a provider of business-critic... 0.426
PER -- Perot Systems Corporation is a worldwid... 0.424
LWSN -- Lawson Software, Inc. (Lawson) provi... 0.424
Keywords for selected documents:
Refresh
services, software, solutions, network, management, systems, provider, information, data, wireless
ADCT
ADC Telecommunications, Inc. is a global supplier of broadband network equipment, software and systems integration services that enable communications service providers to deliver high-speed Internet, data, video and voice services to consumers and businesses worldwide. The Company offers its products and services through two segments, broadband infrastructure and access and integrated solutions. The broadband infrastructure and access business focuses on broadband connectivity products for a variety of communications network applications, digital subscriber line offerings for the telecommunications industry and Internet protocol (IP)-based offerings for the cable industry. The integrated solutions business focuses on systems integration services and operations support system software.
Document name:
Concept's documents management



ONTOLOGY MERGING AND TEXT/SERVICES ANNOTATION

- **Merging ontologies**
  - Common vocabulary
  - Controling consistencies

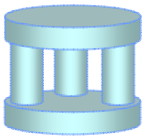
- **Annotation methods and tools**
  - Annotation of documents and services
  - Automating the annotation process as much as possible
  - Annotation software architecture



ECOLEAD

SOME TECHNIQUES

- **Automating the annotation process as much as possible**
  - Annotation by comparison of documents
  - Hypotheses checking
  - Google distance



ECOLEAD

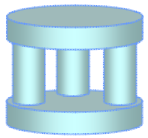
ONTOCLASIFY

- **System for scalable classification of text into large topic ontologies**
- **Available as Web service**
  - for DMoz directory of Web pages

    http://alchemist.ijs.si/ASP.NETv1.1/DMozClassify/OntoService.asmx

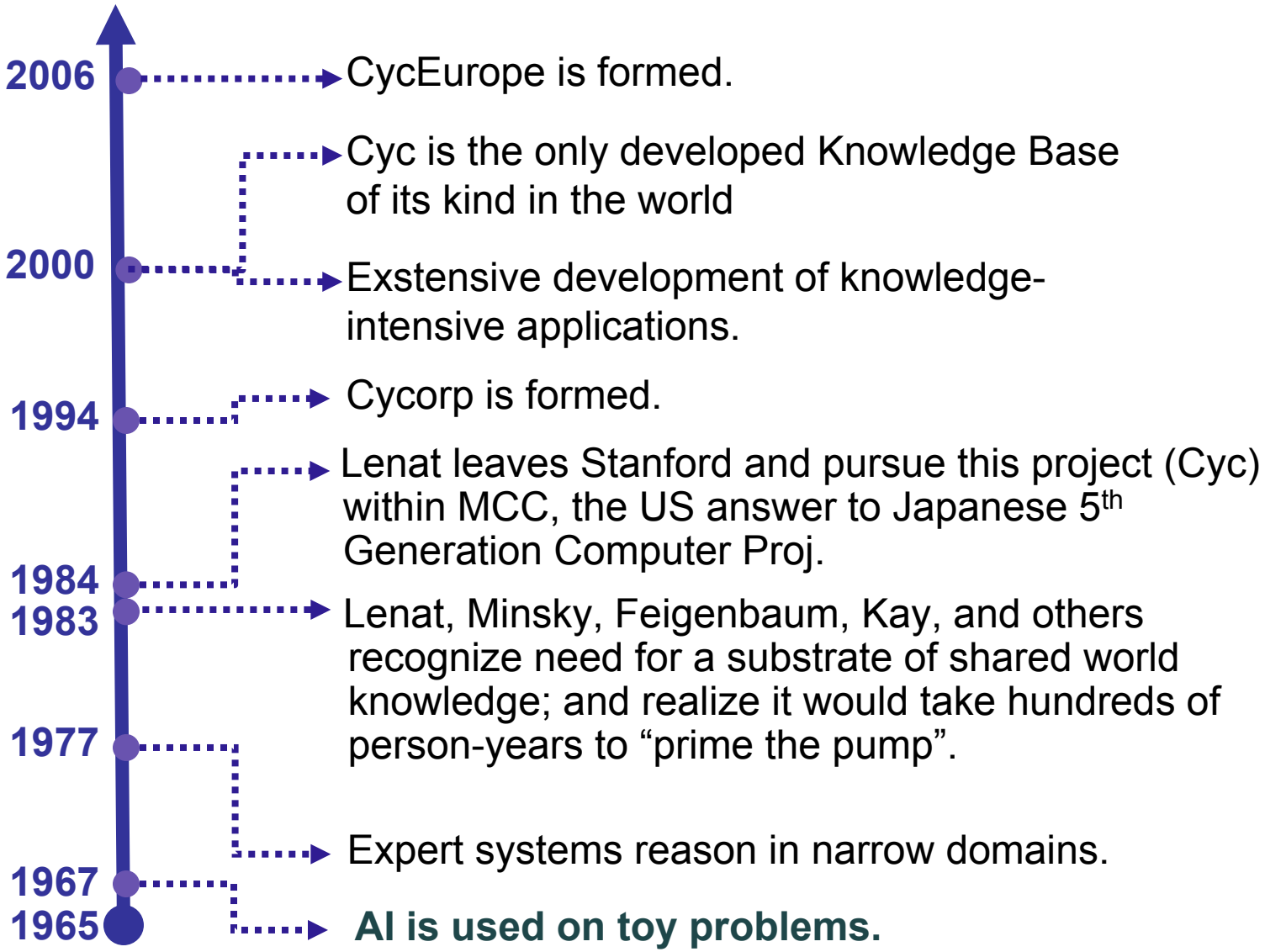
  - for Inspec ontology for annotating papers

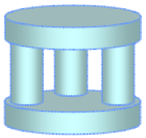
    http://alchemist.ijs.si/ASP.NETv1.1/InspecClassify/OntoService.asmx



ECOLEAD

(VERY) BRIEF HISTORY OF CYC





ECOLEAD

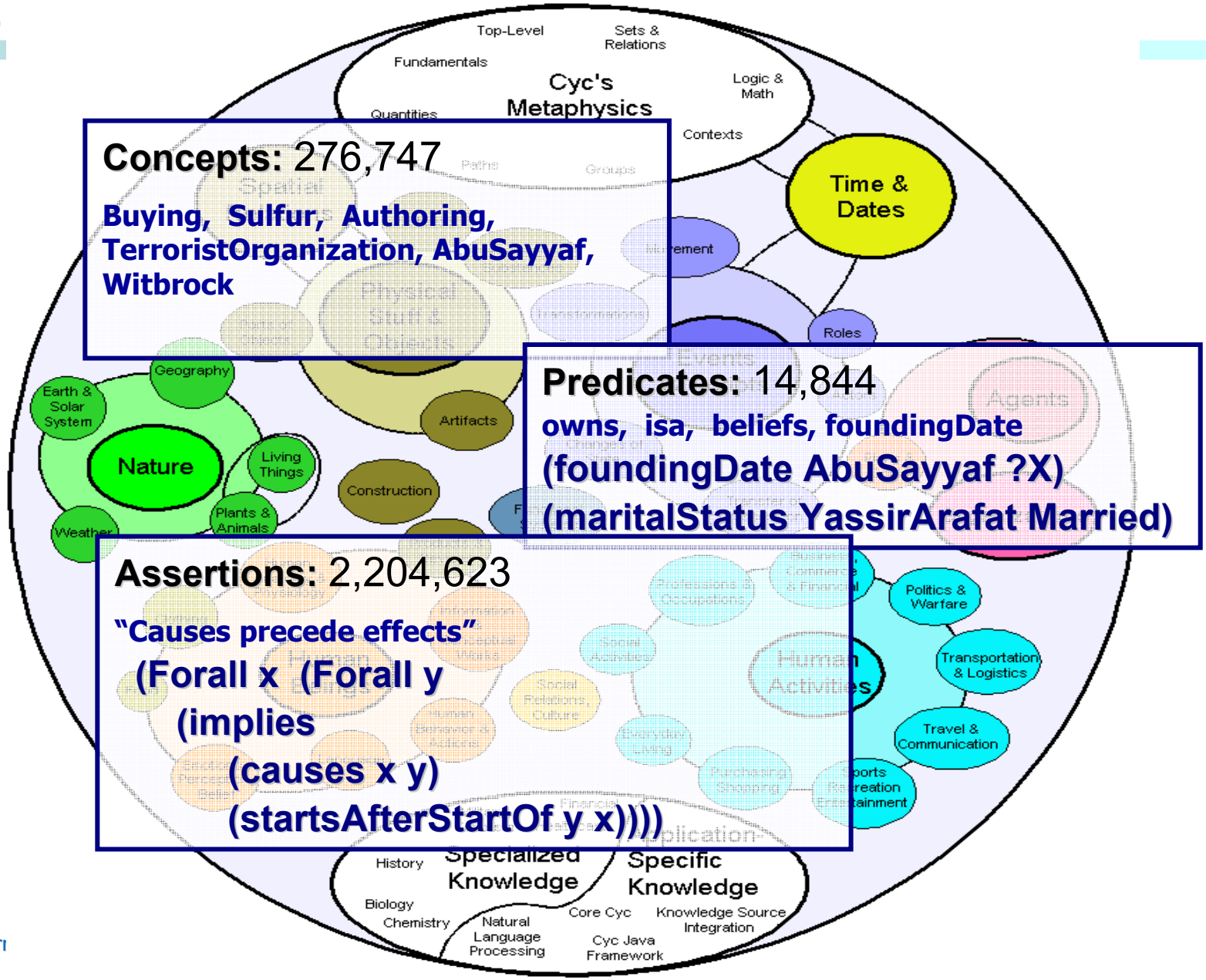
WHAT IS CYC?

- **the Cyc Knowledge BaseTM**
  - is a formalized representation of a vast quantity of fundamental human knowledge: facts, rules of thumb, and heuristics for reasoning about the objects and events of everyday life. The medium of representation is the formal language CycL
- **natural-language processing**
  - The Cyc-NL system has three components: the lexicon, the syntactic parser, and the semantic interpreter.
- **Semantic Integration BusTM**
  - Computer-based information is stored in many forms, including data that is structured (databases), semi-structured (spreadsheets, web pages), and unstructured (text files and text fields). Cyc can turn this information into usable knowledge, and the remainder can be annotated for easier access by humans.
- **developer toolsets**
  - interface tools to browse, edit, and extend the Cyc KB, to pose queries to the inference engine, and to interact with the natural-language and database integration modules.

    (HTML Interface, A hierarchy browser, A lexicon editor, An English-to-CycL parser, A database tool interface, A WordNet browser, An English generator)

ECOLEAD

CYC



Concepts: 276,747

Buying, Sulfur, Authoring, TerroristOrganization, AbuSayyaf, Witbrock

Predicates: 14,844

owns, isa, beliefs, foundingDate

(foundingDate AbuSayyaf ?X)

(maritalStatus YassirArafat Married)

Assertions: 2,204,623

"Causes precede effects"

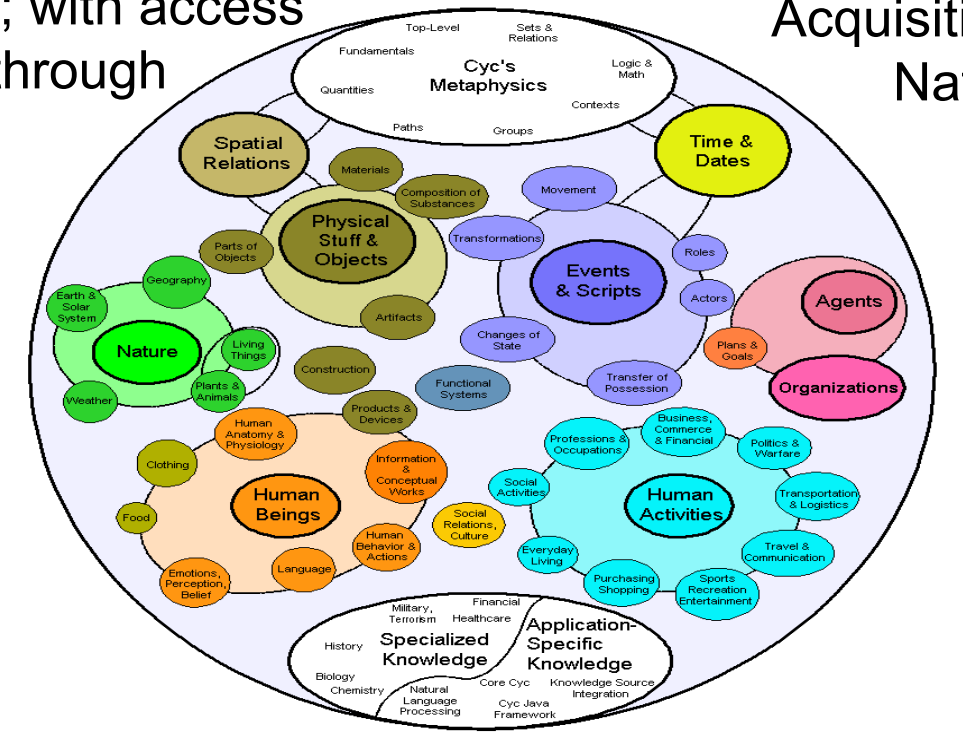
(Forall x (Forall y
(implies
(causes x y)
(startsAfterStartOf y x))))

ECOLEAD

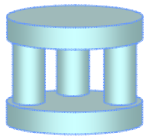
CYC TODAY

Reasoning via deduction, abduction, induction; with access to other reasoning (through heuristic modules)

Growing ability to support Knowledge Acquisition and use via Natural Language



General-purpose platform: Supports apps. involving search, question answering, knowledge management, scenario generation, situation reporting, (re-)planning, *etc.*

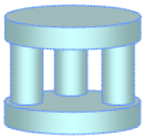


ECOLEAD

WHAT CAN BE DONE WITH CYC?

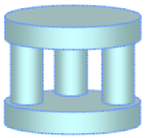
- **Capabilities**
  - Integration of Heterogeneous Databases
  - Intelligent Search
    - Knowledge-Enhanced Retrieval of Captioned Information
    - WWW Information Retrieval
  - Distributed AI

- **Potential Applications**
  - Sophisticated modeling
  - Online brokering of goods and services
  - “Smart" interfaces
  - Intelligent character simulation for games
  - Enhanced virtual reality
  - Improved machine translation and speech recognition
  - Semantic data mining
  - Advice Services: E-shopping Assistant



ECOLEAD

KNOWLEDGE USE



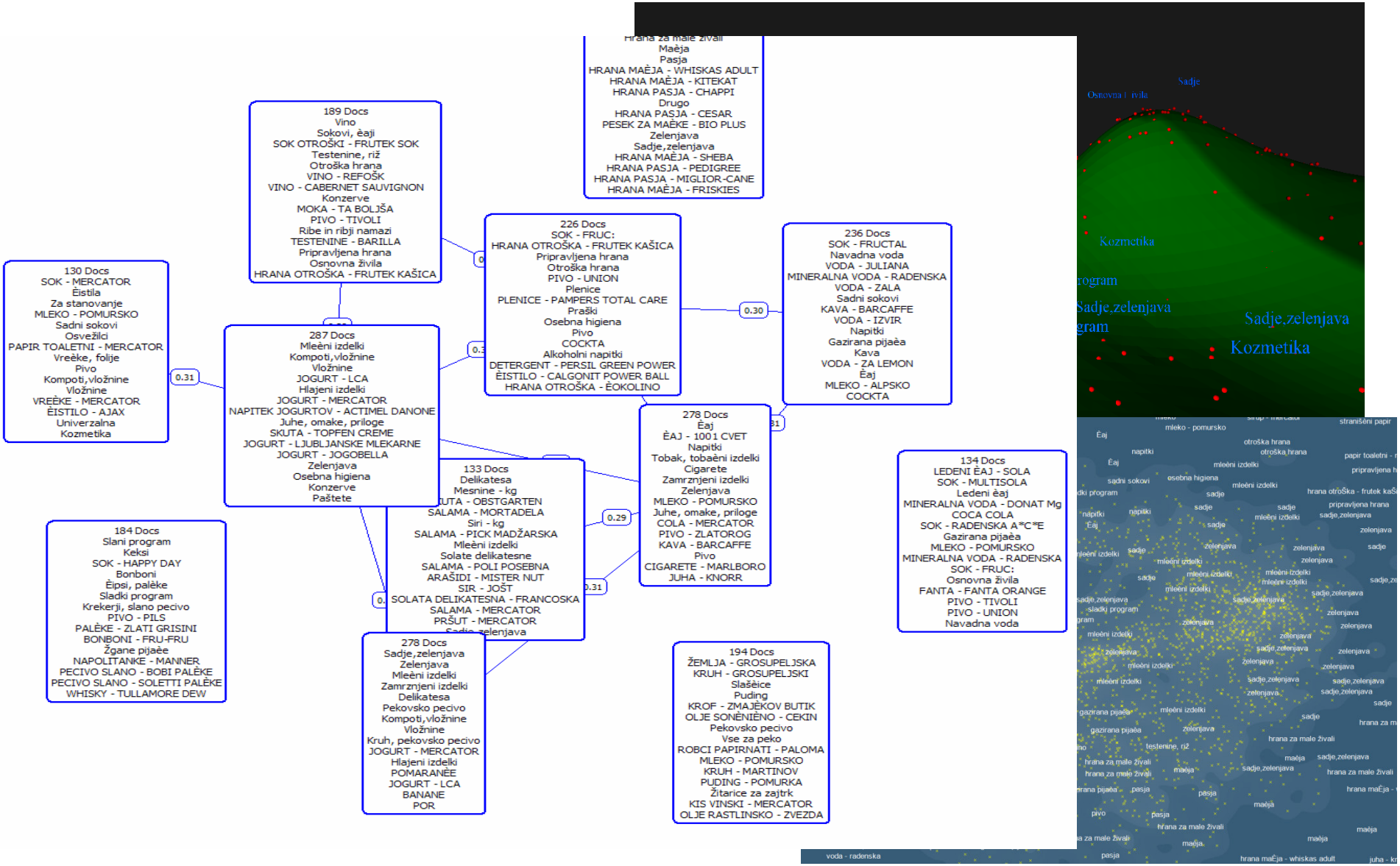
ECOLEAD

DECISION SUPPORT SYSTEMS

- Business intelligence tools
- Cargo intelligence (Euridice)
- Project intelligence (www.ist-world.org)

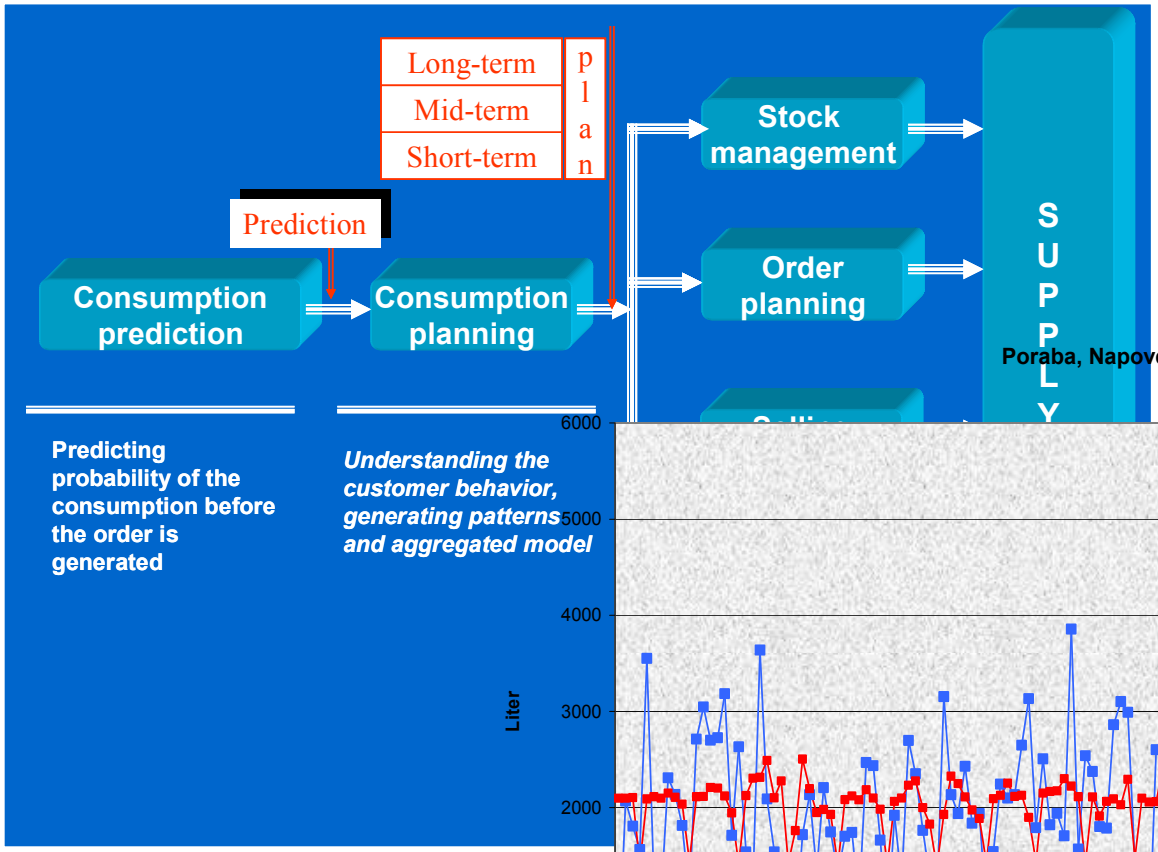
ECOLEAD

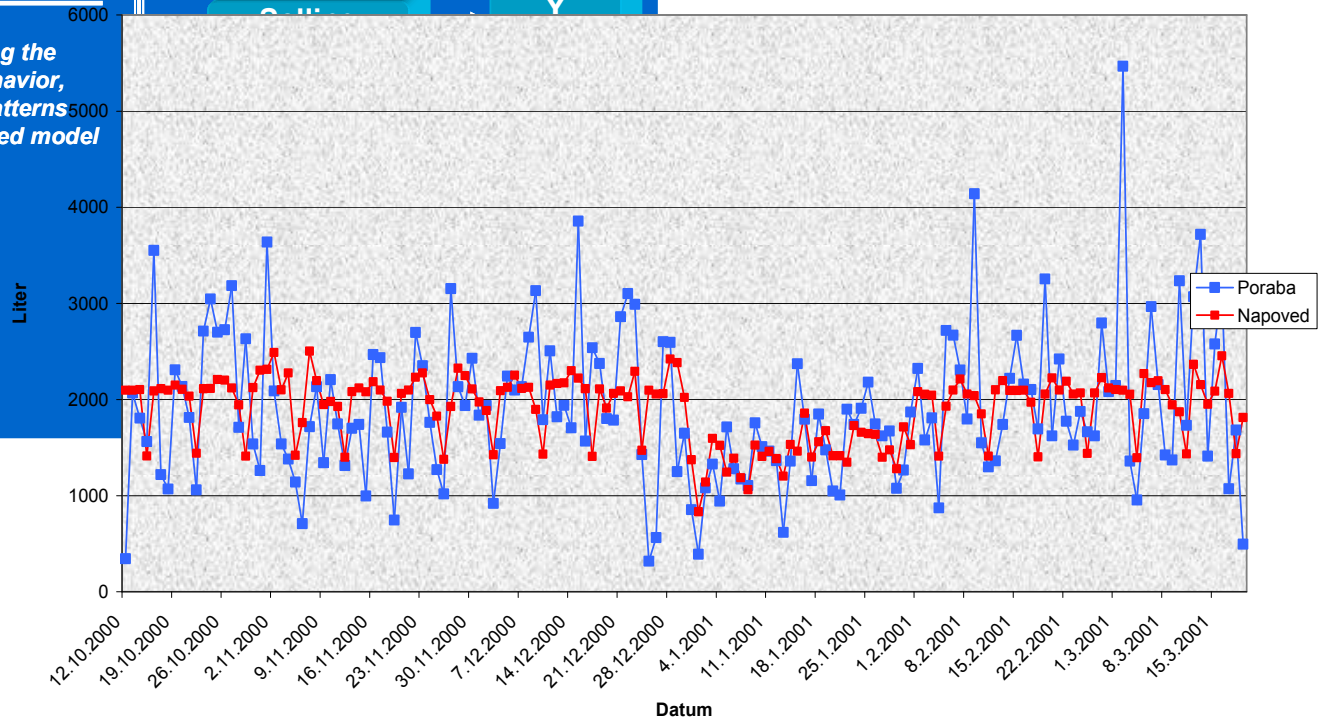
CUSTOMER SEGMENTATION DEFINING MARKETING GROUPS



ECOLEAD

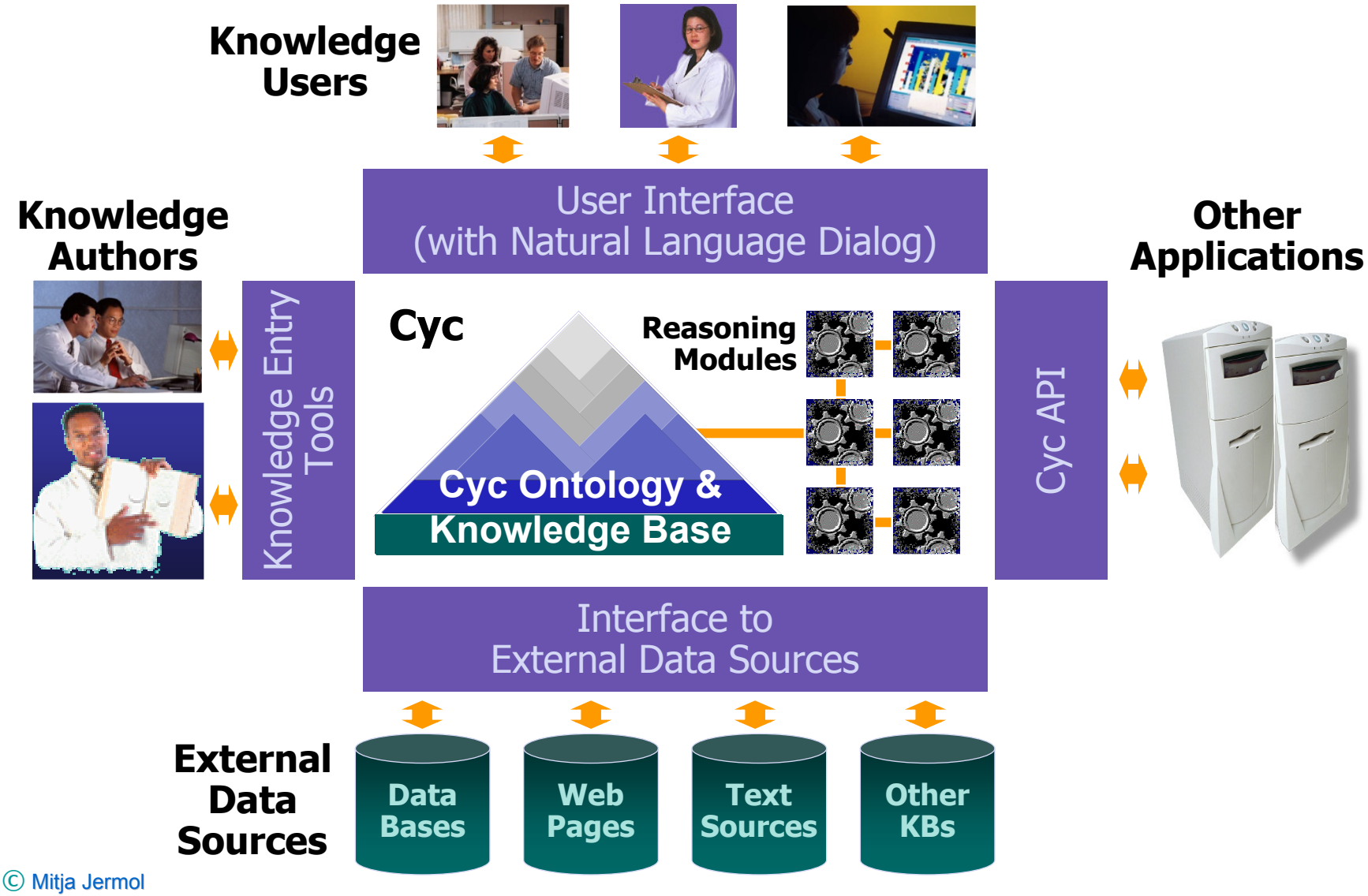
SUPPLY CHAIN PREDICTION

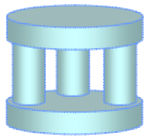




ECOLEAD

CYC ENVIRONMENT





ECOLEAD

KNOWLEDGE IN BUSINESS PROCESS

- ACTIVE FP7 IP unleashing tacit knowledge from available document sources
- KaaS in COIN FP7 IP
- PROLIX http://www.prolixproject.org,
- TENCOMPETENCE http://www.tencompetence.org) - lifelong competence development