Loughborough University

Learning Collaboration Moderator Services: Supporting Knowledge based Collaboration

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Summary of the Presentation

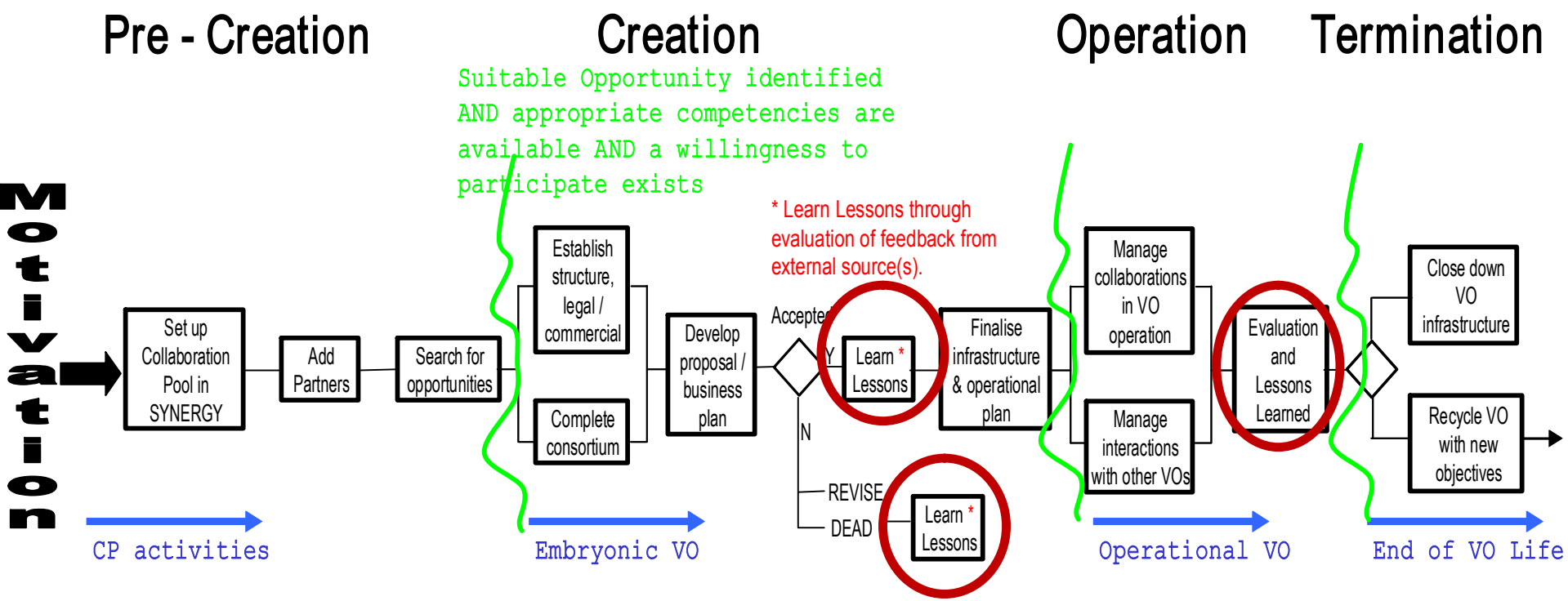
- Context of Research
- SYNERGY Framework
- VO life cycle and Learning
- Collaboration Moderator Service
- Construction Project Based Collaborative Network and PPR
- Knowledge Miners for Learning from PPRs
- A Case Study
- Shortcomings and Conclusion

- GOAL: to enhance support of the collaborative Networked Organization in successful, timely creation of and participation in by providing an infrastructure and service to discover, capture, deliver and apply knowledge relevant to collaboration creation and operation.

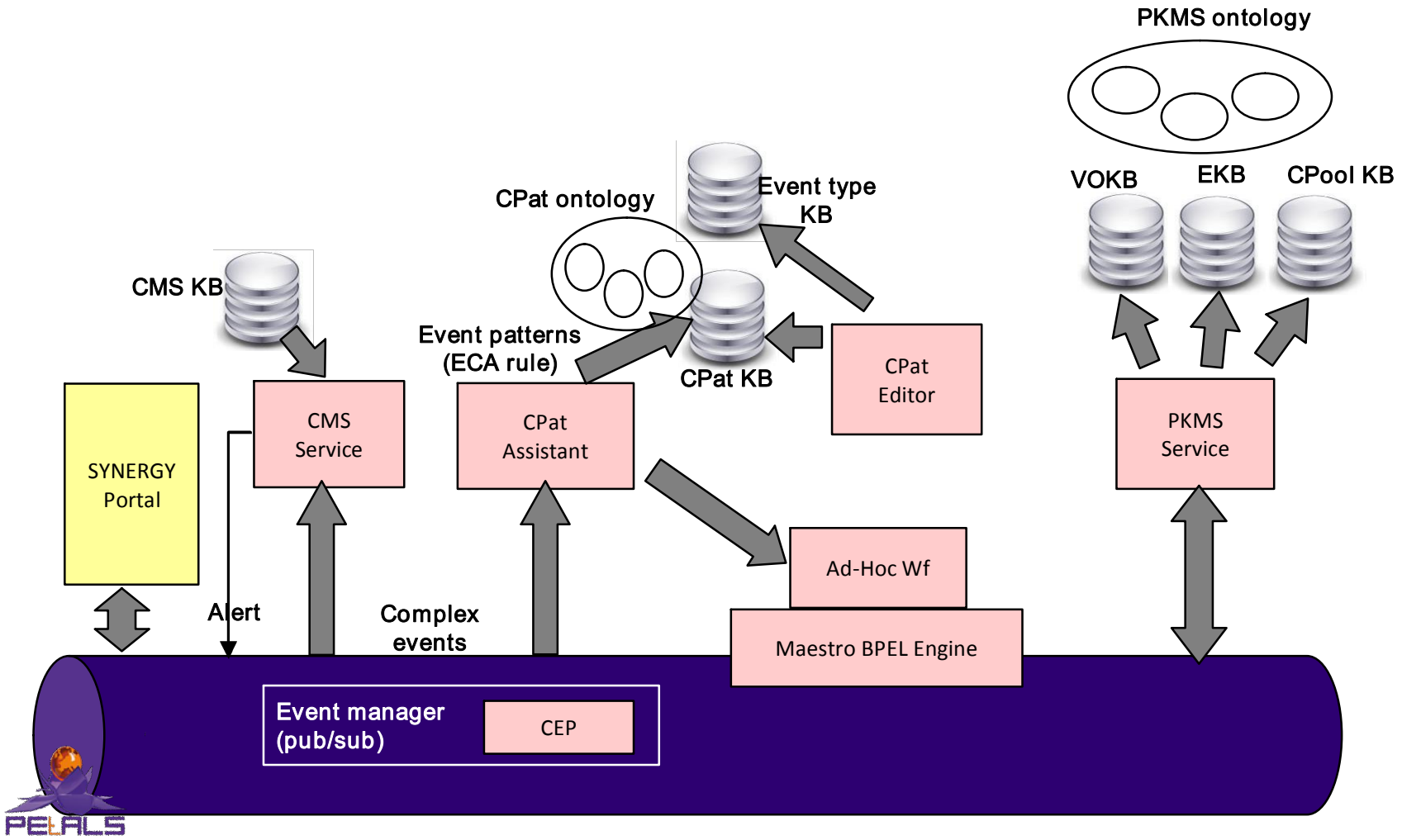
- GOAL: Extracting Knowledge from Post Project Reports of construction projects using KDD.

A typical VO life-cycle: SYNERGY Context

Business Evolution and Viability Enhanced by SYNERGY



SYNERGY Architecture



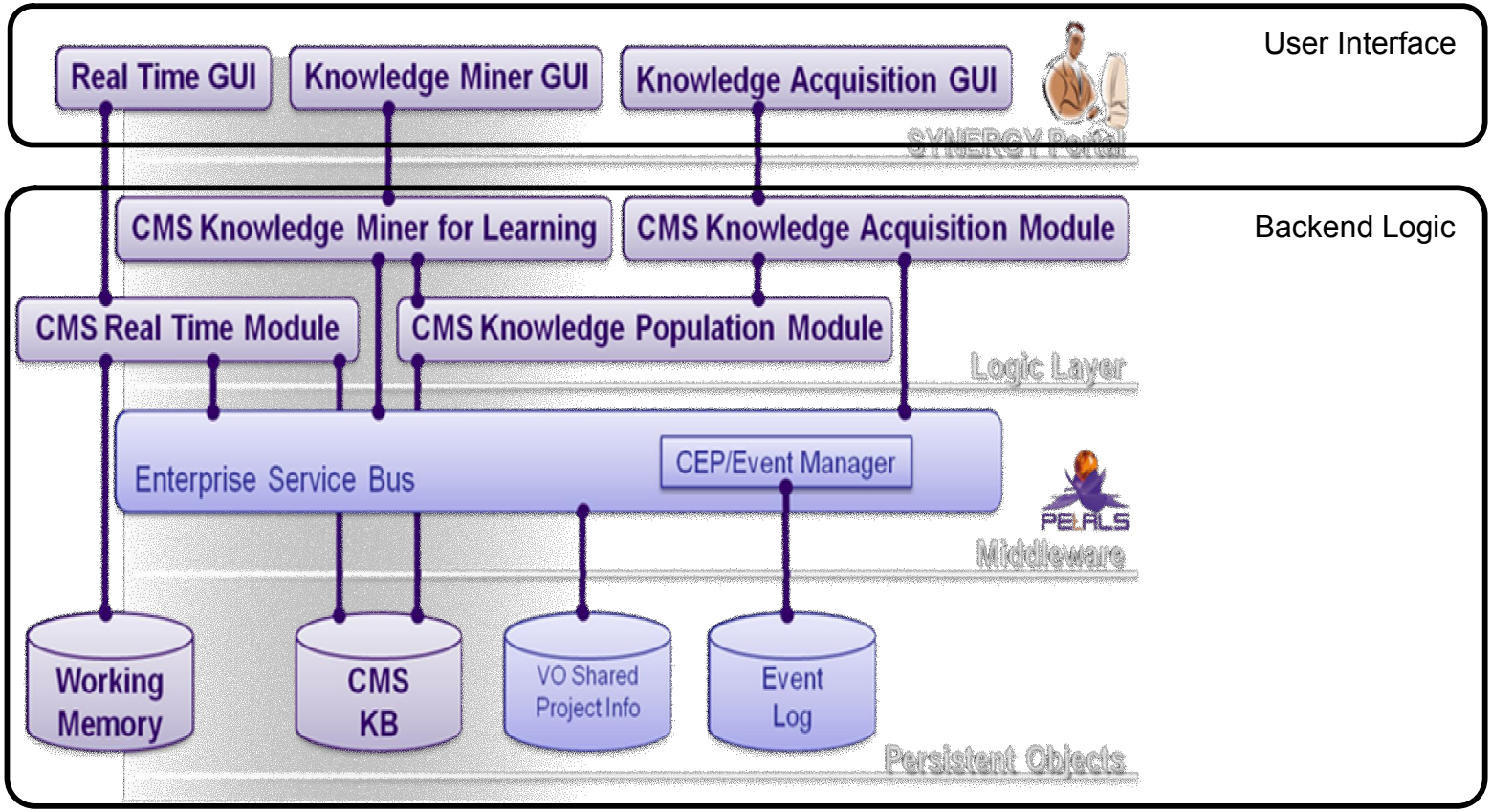
Moderator to Collaboration Moderator

- MOSES Project (1996)
- MISSION Project (2001)
- Extended Enterprise Moderator (2004)
- KOATING Moderator (2008)
- Collaboration Moderator (2010)

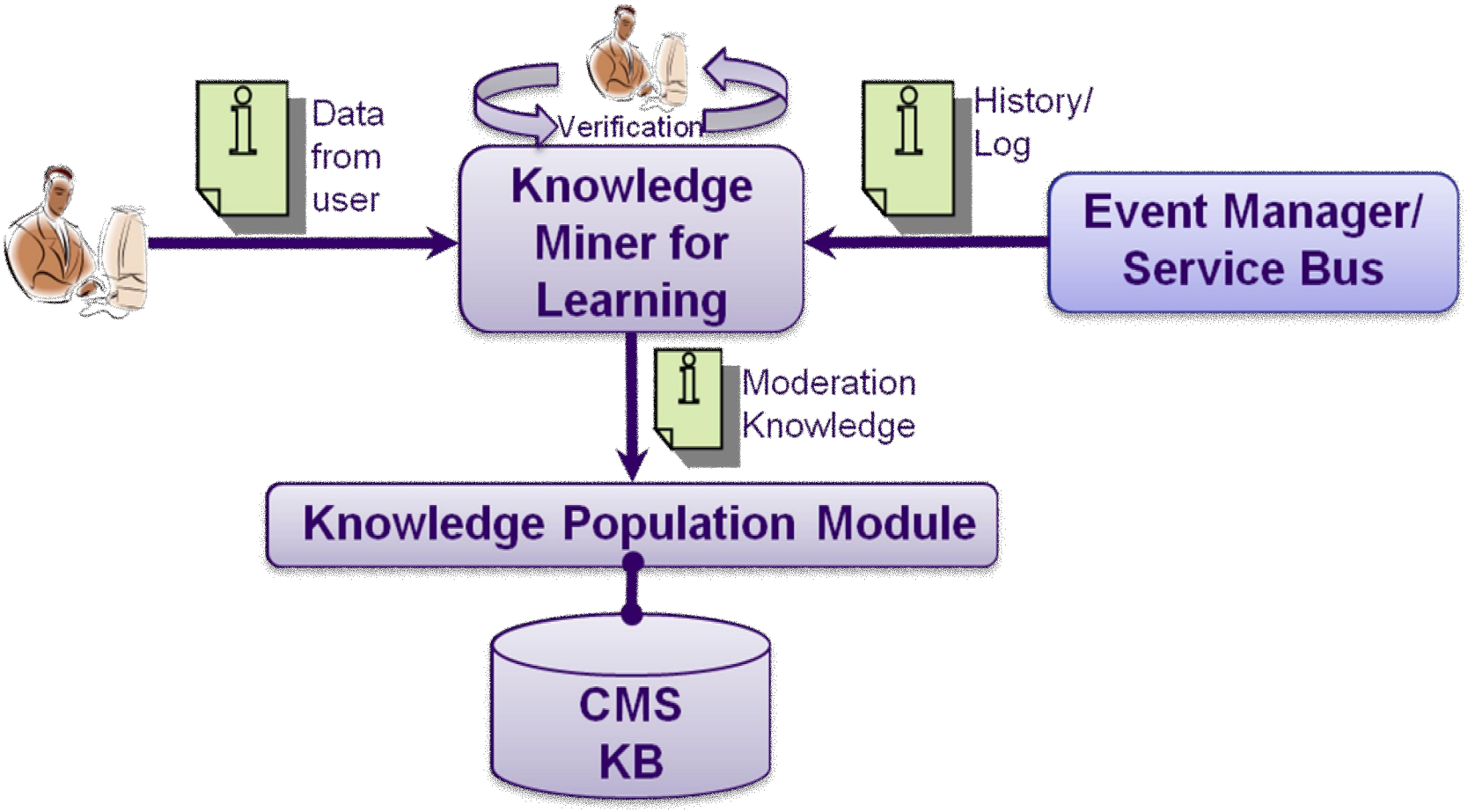
Functionality of CMS

- Raising awareness of new or changed information relating to “items of interest” e.g. potential business opportunities (and competencies required or short-falls of competencies) to partners subscribed to CMS,
- Raising awareness (of partners subscribed to CMS) of alternatives or better options relating to their “items of interest”.
- Monitoring an active project and alerting the project partners subscribed to CMS of events or changes to information related to their “items of interest” – thereby raising their awareness of events or decisions made by others which are relevant to and may affect them.
- Raising awareness of lessons learnt etc.

CMS modules and repositories



CMS Knowledge Miner for Learning

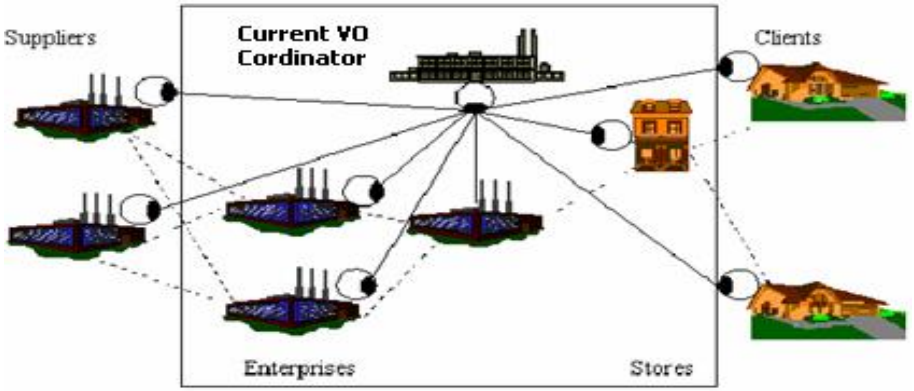


Construction Project Based Collaborative Network and PPR

Contractor, Sub-Contractor

Designers, Architects, Estimators, Planners, Project Managers, Labourers, Foremen, etc.

People



Process

Designing, Estimating, Planning, Project Management, Method statements

Technology

Assisting technologies, Computer technology, Robotics, Automation, Construction technologies

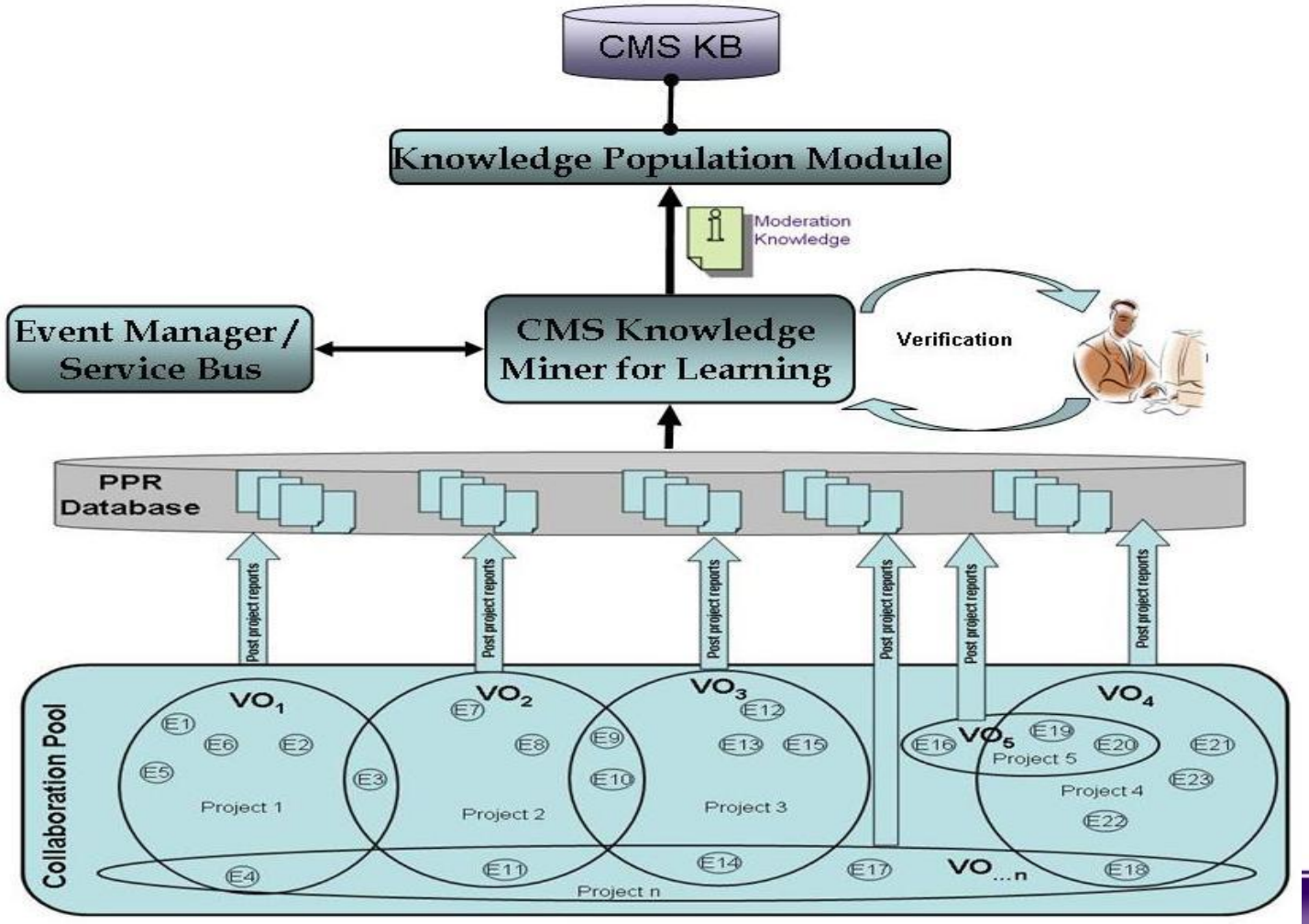
Post Project Reports(PPRs)

Post Project Review

Post Project Reviews and Need for KDD

- Why are they important?
  - Attempts to capture project knowledge and therefore learn
  - Critique positive and negative aspects
  - Opportunity to share project team views and exchange ideas
- Problems with Project Reviews
  - Knowledge from previous PPRs are not routinely transferred to future or ongoing projects.
  - Collections of PPRs are not commonly analyzed for recurring problems or patterns or good/bad practices.
  - Large quantity of documentation.

Functioning of CMS KM for Learning



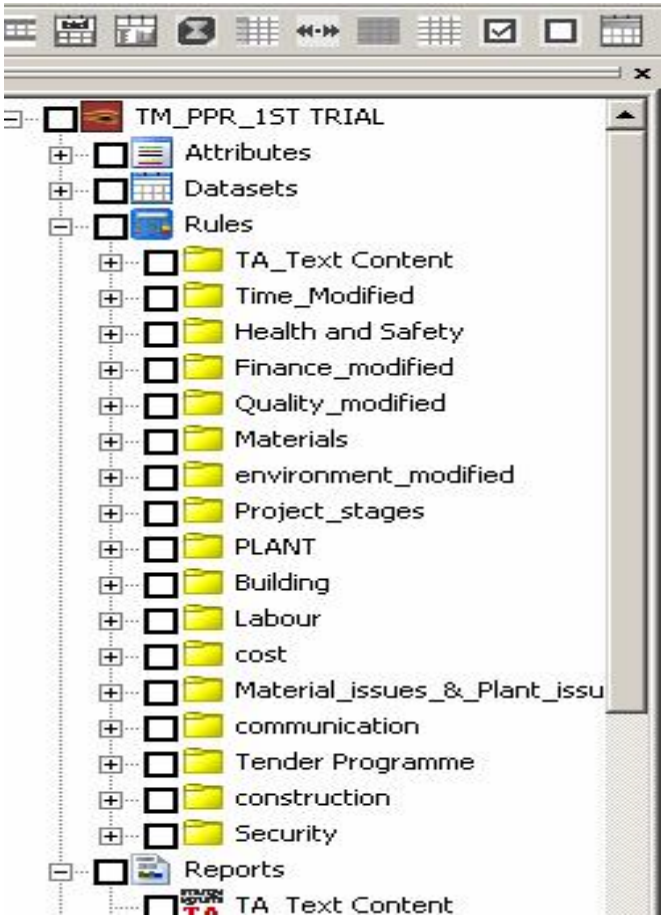
A Case Study

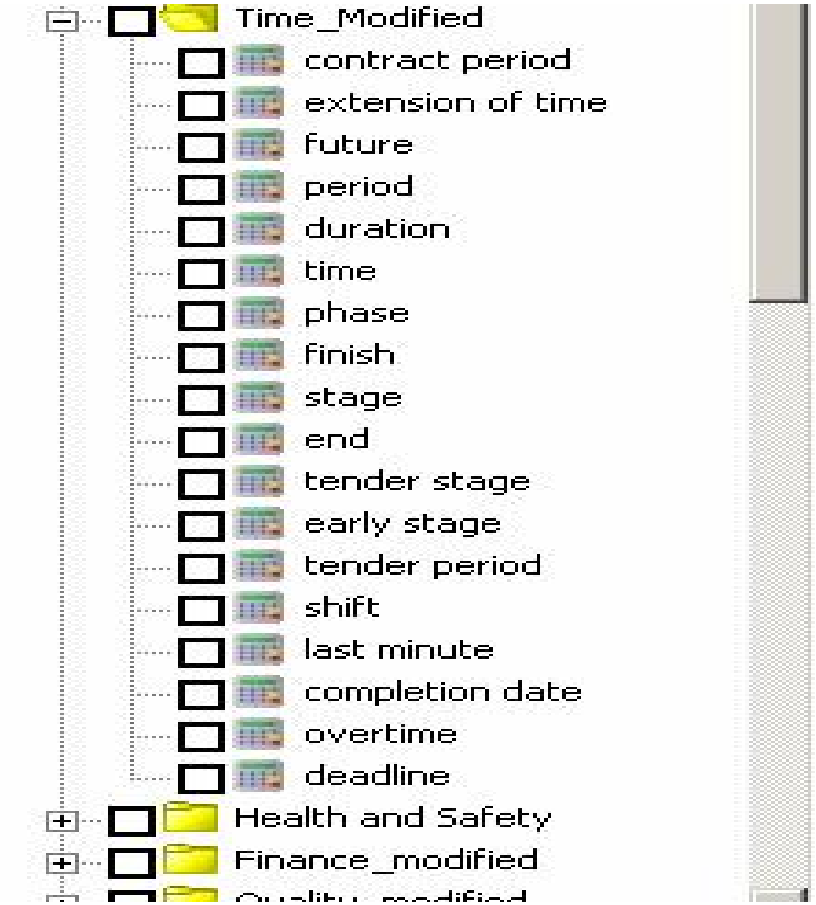
- PPR documents of 40 Projects over 3 years
- Nature of report
- Aim: KM for Learning to use KDD to extract useful knowledge
- Iterative Methodology
  - Discussion with domain expert
  - Key Knowledge areas
  - KDD and TM
  - Evaluation of Results
  - Representation of Knowledge and Update

KDT Method

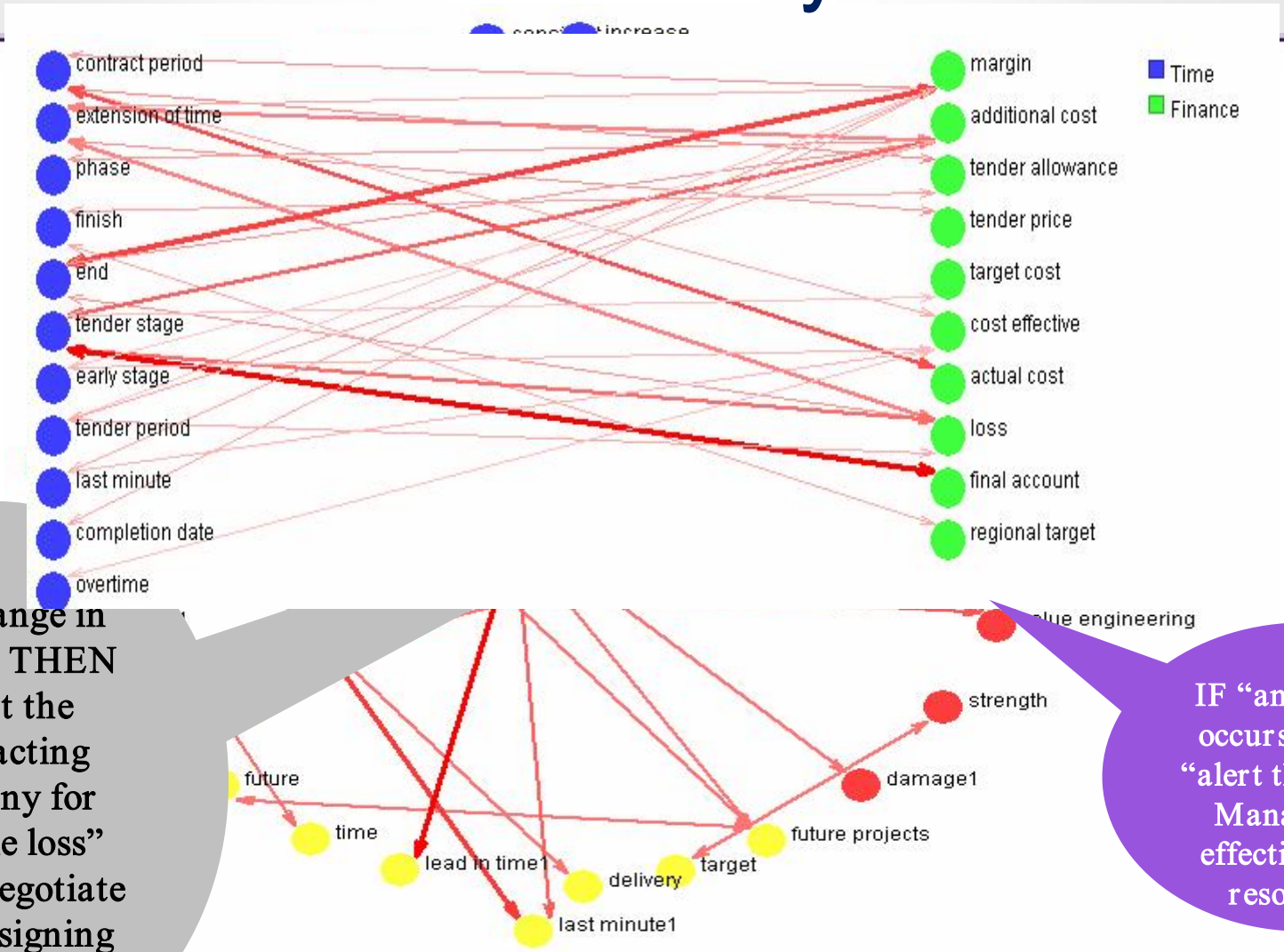
- Ontology Development for Key Knowledge Areas
- Data Preparation Module
- Text Mining Module
  - Text Analysis and Rules Application
  - Link Analysis
  - Dimensional Matrix

Text Analysis





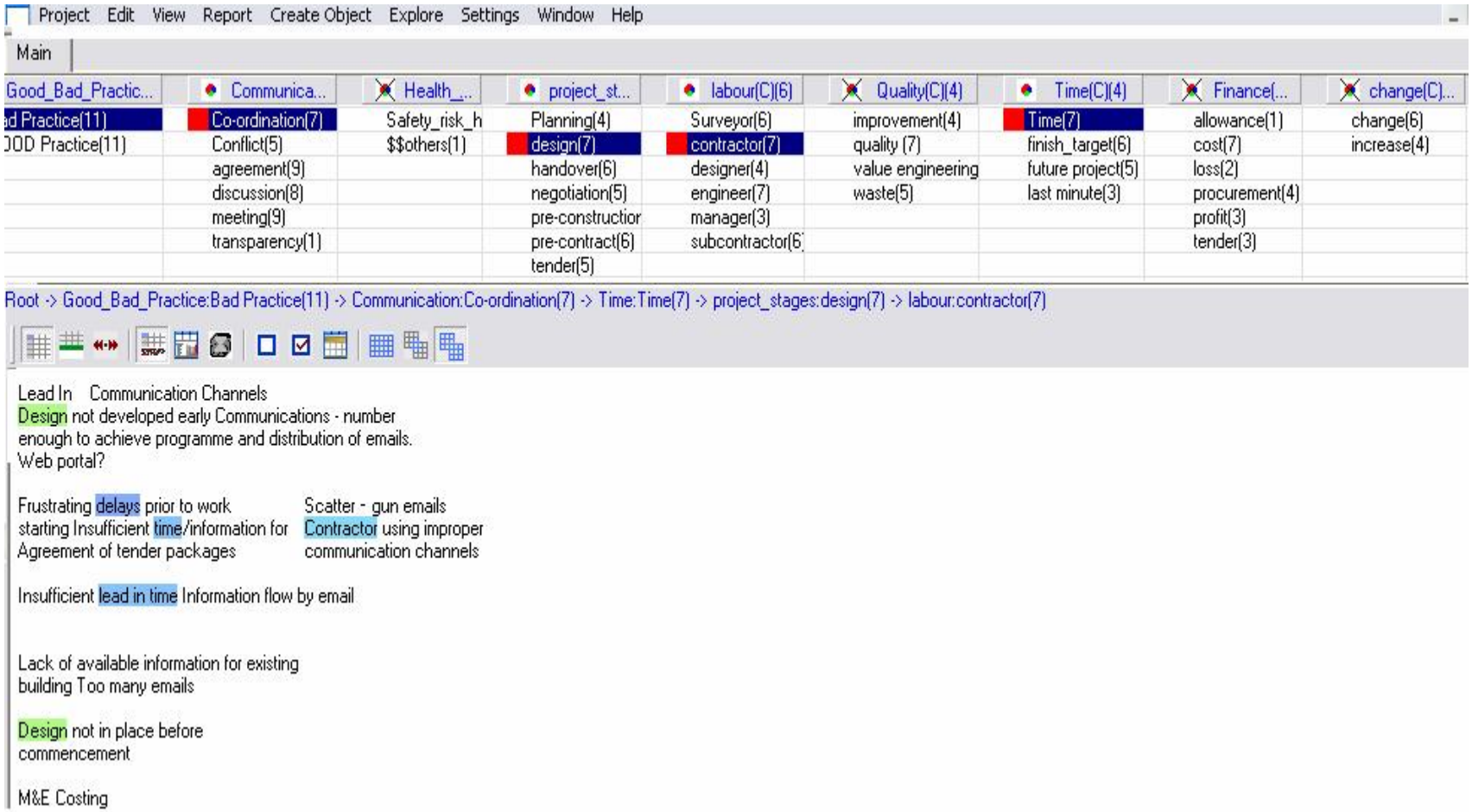
Link Analysis



IF "change in design" THEN "alert the contracting company for possible loss" AND "negotiate with designing team for redesign".

IF "an accident occurs" THEN "alert the Project Manager for effective use of resources"

Dimensional Matrix Application



Outcome

- Structure of reports were a big issue
- Limited access to company reports
- Report lengths too long
- Threshold values could be misleading
- Manual check of results important
- Time consuming exercise

What Next?

- Investigate Advanced text mining tools
- Segment reports into client, sub-contractor, type of project, etc to refine results
- CMS Application in areas such as different collaborative network scenario e.g. Autonomous Factory, Health, Logistics and Transportation