



Analyzing Knowledge Networks in Organizations

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Content

- Knowledge as a social construction – understanding the processes of generation, transformation and diffusion of knowledge in organizations
- Knowledge networks representing the relational capital of an organization – implications for the reporting of intellectual capital in organizations
- Analyzing knowledge networks – consequences for the management of knowledge in organizations

Two Approaches in Knowledge Management

- **Focusing on knowledge sharing**
 - Valuable knowledge exists already in the organization
 - KM-Tasks: capturing, codifying and sharing of knowledge

- **Focusing on knowledge production**
 - Relevant knowledge is continuously produced and revised in a social process
 - KM-Tasks: enhance the capacity of an organization to produce and satisfy its demand for new knowledge

(McElroy 2003)

Knowledge Processes in Social Systems

- Organizations are considered as complex social systems, which are self-organizing in the way they produce and integrate knowledge.
- Knowledge is constructed by each person on the basis of his or her experience in interaction with others.
- Organizational knowledge will be generated, applied, communicated and preserved by supporting the interaction of individuals in experimental settings.

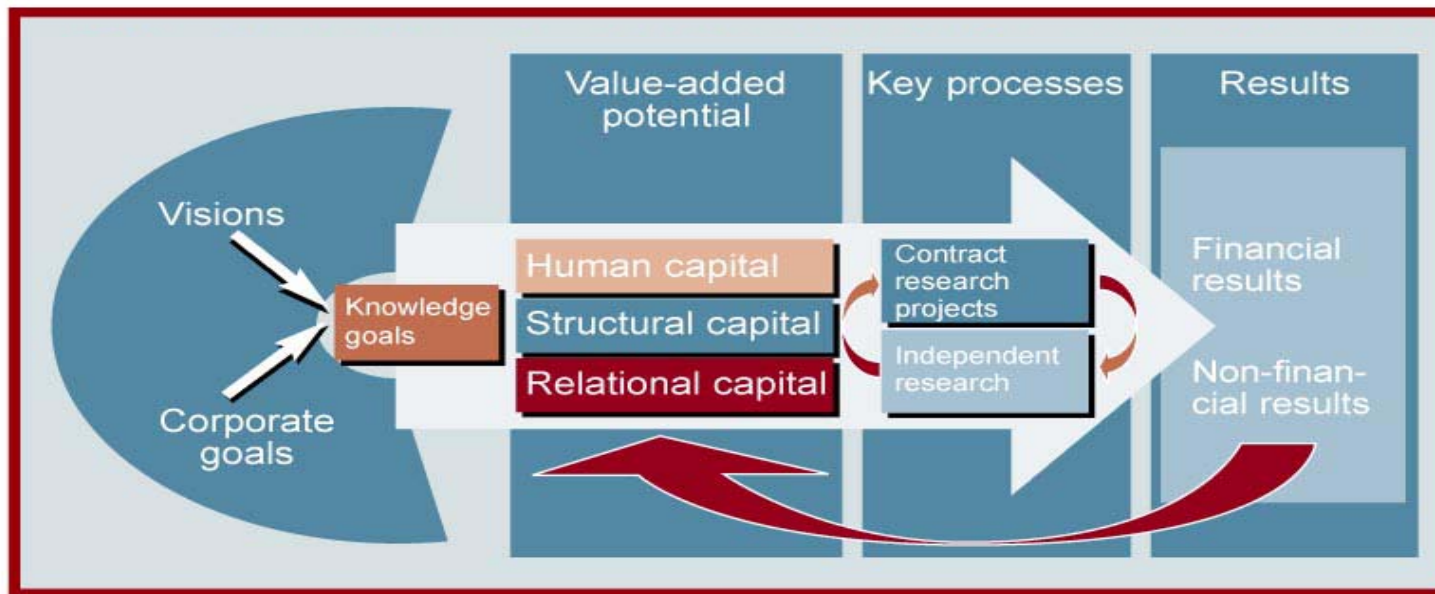
- Efficient knowledge management establishes a framework which enhances the process of (re-)construction of shared knowledge.
- Knowledge management implements methods for the intelligent creation, promotion and shaping of cross-linked cooperative knowledge networks – the relational capital of an organization.

Knowledge-based Economy - Need for New Reporting Instruments

- Increasing investment in intangible assets such as
 - human resources, research and development, organisational development, software, marketing, relationships
- Increasing intellectual capital (IC = resources and assets generated by these investments)
- Traditional management and reporting systems are unable to provide the essential information on knowledge-based processes and intangible resources. → Asking for new instruments!
- One answer to this question: Intellectual Capital Reports
 - New management and reporting system
 - Various organisations, especially in the Scandinavian region, started to develop IC Reports to measure intellectual capital of firms and communicate the results to different stakeholders.
 - Seibersdorf Research - the first European IC Report of a RTO (2000)

The ARC Intellectual Capital Report Model

- Classification of intellectual capital: structural, human and relational capital.
- Process model: Tracing the knowledge production processes and knowledge flows of a research organization



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Visualization of the Relational Capital

■ Relational Capital

- Relationships between the single employees of the organization
- Relations between employees of the organization and their external partners
- Sources of information: publications, lectures, patents, teaching assignments, theses, dissertations and habilitations

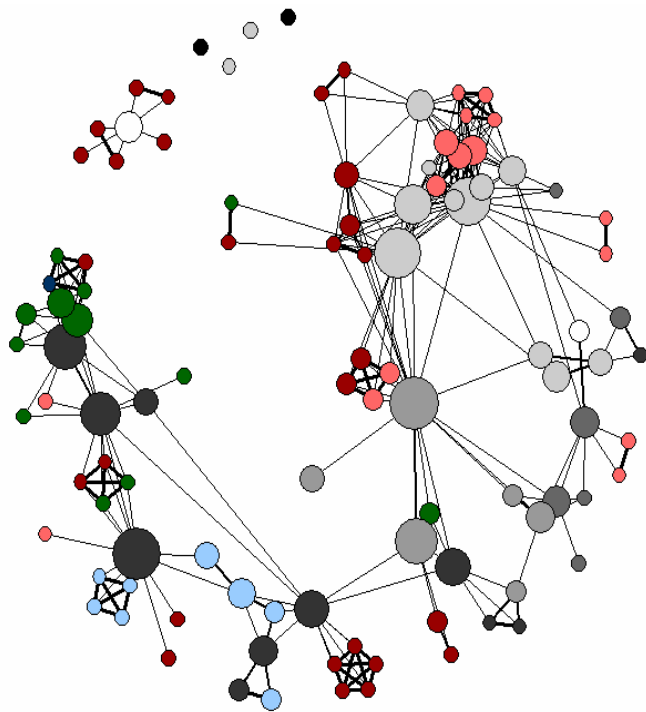
■ Method of Analysis

- Bibliometrical analysis: calculation of co-occurencies of words (individuals)
- Visualization of the intensity of the relations between co-authors as geographical information in a so-called “knowledge map”

■ Results

- Presentation of the relationships between two individuals, who published articles together or worked on the same research topic

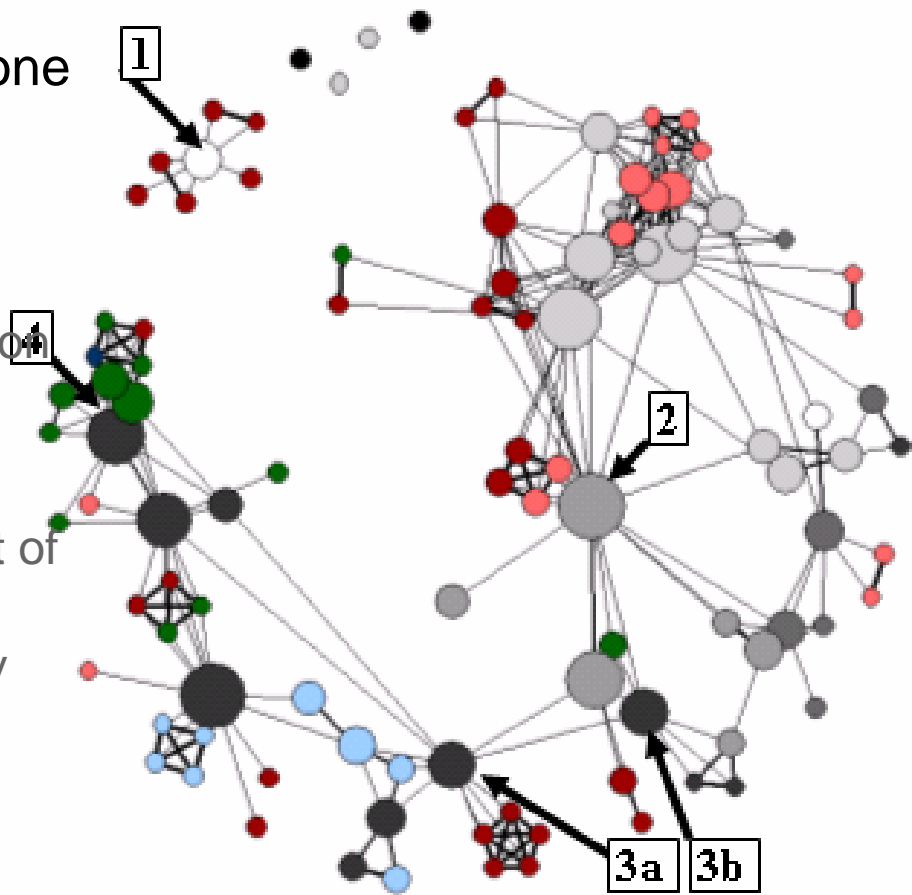
Network of Authors based on Co-Authorships



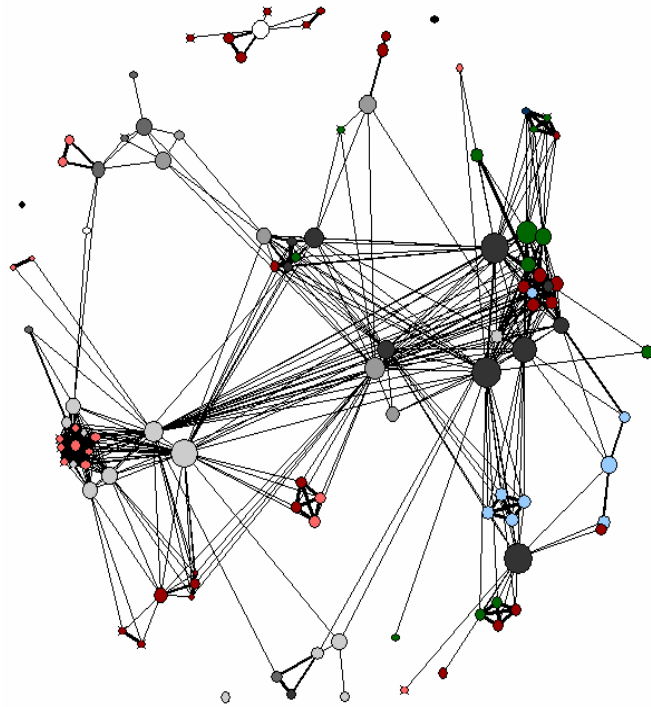
- **Nodes:** authors of publications of an organization
- **Links:** Co-authors are linked by ties. Repeated co-operation causes strong ties.
- **Node size:** number of publications of this author
- **Node positions** show co-operation structures of the organization.
- **Node colour** gives the internal author's department or the organization type for extern partners (Universities, RTOs, Federal Ministeries or Industry).

Network of Authors based on Co-Authorships

- 1: Author with a lot of extern partners but not a single intern one
 - new staff member
- 2: most visible author
 - Highest number of publications
 - Internal and external collaboration
- 3a, 3b: interdepartmental co-operation
 - Link their department to the rest of the organization
 - Rest of their department: mainly external partners
- 3a, 4: Authors do not publish together → s. later



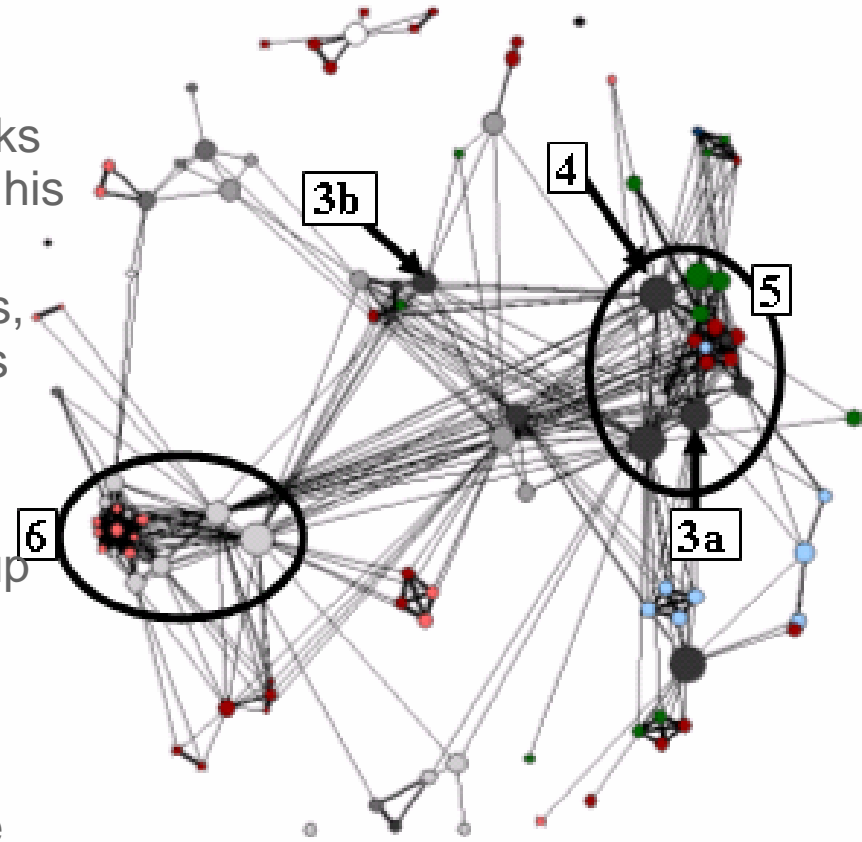
Network of Authors based on Co-Content



- **Nodes:** authors of publications of an organization
- **Links:** Co-content links authors; the more overlap of topics, the stronger the link between authors
- **Node size:** vocabulary of this author
- **Node positions** show co-content structures of the organization.
- **Node colour** gives the internal author's department or the organization type for extern partners (Universities, RTOs, Federal Ministries or Industry).

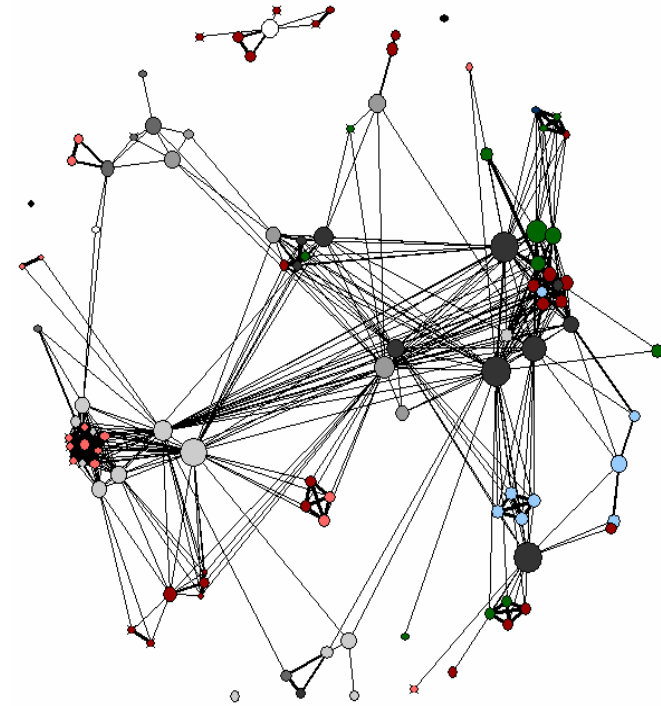
Network of Authors based on Co-Content

- 3a, 3b: part of different topic clusters
 - 3a: part of the main cluster, works on the same topic as the rest of his department
 - 3b: links a lot of different themes, covers a broader range of topics
- 6: topic cluster of only one department
 - core experts of this topic: a group of RTO partners
- 3a, 4: no collaboration
 - publishing on the same topics
 - parallel scientific work within the same department



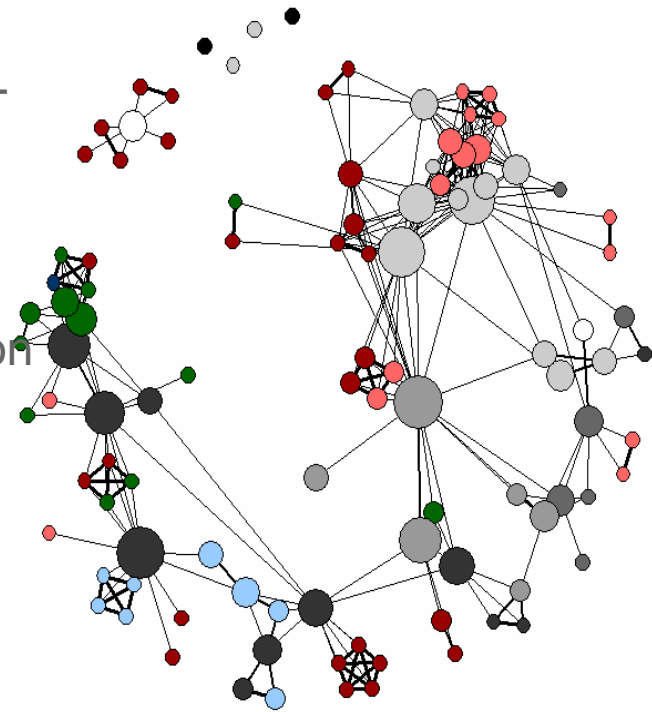
Results and Implications (1)

- Identification of relevant knowledge
 - Information about active themes and expertise
 - Process of self description to avoid randomness in knowledge creation
- Scope of knowledge
 - Range of knowledge is delimited by the range of communication
 - Visualizing the space of communication to define the range of sensitive knowledge within the organization
- Redundancy and communication
 - Employees with intermediary functions between different knowledge domains and knowledge carriers

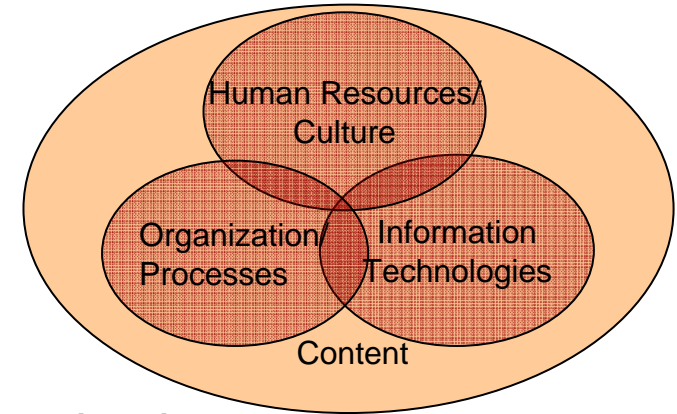


Results and Implications (2)

- **Reconstructing individual knowledge**
 - Identification of generalists and specialists - individualists and team player
 - Support for recruiting staff members
- **Multidisciplinarity and internal variety**
 - “Constructive non-conformity” – cooperation between heterogeneous partner
 - Raising the innovative capacity of the organization
- **Internal and external linkage**
 - External partner highlight the strategic necessity of this cooperation in specific knowledge domains.
 - Opportunity for hiring new employees, but also a critical instance of brain-drain



Conclusions



■ Content

- Raising the innovative capacity of the organization

■ Organization/processes

- Utilization of existing expertise and co-operation structures
- Identification of synergies and parallel working on specific topics
- Verification/adoption of organization structures due to informal structures

■ Human resources/culture

- Development and support of specific technical or social competencies
- Strategic involvement of key players and persons with bridge functions

■ Information technologies

- Implementation of customized solutions in order to provide appropriate information about potential cooperation partners