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Beyond Information Access: the Information Specialist's role in Extracting, Analyzing and Packaging S&T Intelligence to support Innovation.

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NRC-CNRC

*Canada Institute
for Scientific
and Technical
Information*

Beyond information access:

**The information specialist's role in extracting,
analyzing and packaging S&T intelligence to
support innovation**

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IATUL 2005, Quebec

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National Research
Council Canada

Conseil national
de recherches Canada

Canada

Agenda

..Context

..Value-added information services at NRC

..A few examples

..Impact on information specialists and services

Evolution in a complex and collaborative environment

- Public R&D organizations ; increased interactions with an expanding S&T **and** business related environment, motivated by :
 - Entrepreneurial approaches
 - Patenting, licensing, commercializing
 - Start-ups, support SME development
 - Collaboration
 - Special Interest groups (SIG), joint projects with industry
 - Technological clusters, knowledge networks, partnership
 - Multi / transdisciplinarity
 - Project support, granting agencies
 - Validate relevance / impact of project
 - Strategic planning, program orientation

Identifying and answering needs

- *Lower uncertainty* in decision-making processes *but also raise awareness* of ongoing activities in the environment
 - In order to drive the *advancement and adaptation* of the organization : catch opportunities, create partnerships...
- *Identify, capture, process and transform* signals emerging from the organization's environment into a coherent and readable representation.

S&T environment and decision-making

KNOWLEDGE DOMAINS

(Biblio-Scientometrics social studies of science)

- Research assessment
- Development of S&T
- Knowledge domains development
- Mapping of research groups activities
- Mapping of collaboration

TECHNOLOGICAL LANDSCAPE

(Patents, S&T Pubs, Industry news, grants ...)

- Development, trajectories of technology
- Players activity (competition, collaboration)
- Applications opportunities
- Technology trends and gaps
- Legislation, social trends

BUSINESS SPHERE

(Market reports, M&A, Industry news, grants ...)

- Players activity (competition, collaboration)
- Applications opportunities
- Market drivers, forecasts

IS Input ↑

Exploratory phase

Development phase

Commercialization phase

Process ↓

•Is this field crowded or open ?

•Do we go forward with this project ?

•How does this domain is evolving ?

•Which tech should be developped ?

•Is this invention worth patenting ?

•Whom could we collaborate with ?

•Are there partnering or licensing opportunities ?

•Is there alternative applications for our tech. ?

▲ Strategic planning

▲ Technology management

▲ Research - Concept

▲ Roadmapping

▲ Patenting or other IP

▲ Outsourcing

▲ Collaboration (develp.)

▲ Knowledge sharing /diffusion

▲ Licensing, knowledge transfer

▲ Start-up, spin-off, incubators

▲ New opportunities

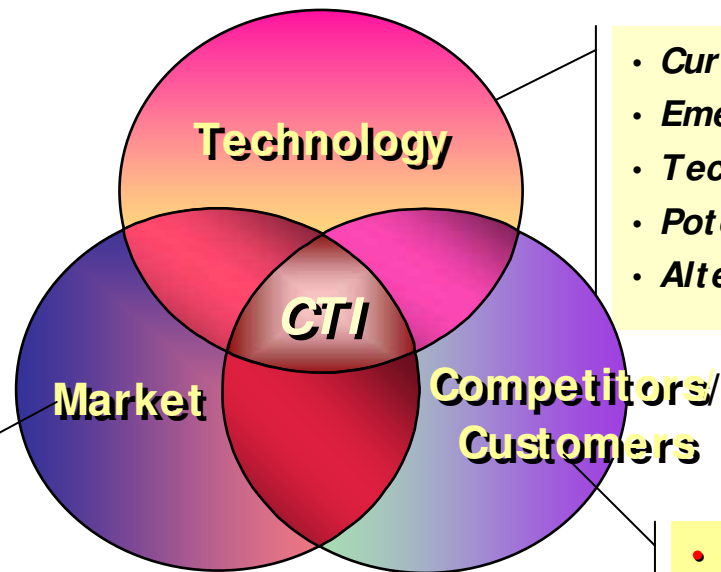
NRC, CISTI and NIS

- **National Research Council of Canada (NRC)**
 - Canada's premier organization for research and development.
- **Canada Institute for Scientific and Technical Information (CISTI)**
 - Mission : to advance research and innovation through high-value information and publishing services in science, technology, and medicine.
- **NRC Information Services (NIS)**
 - Information specialists (IS) to serve specific NRC Institutes, Industrial Research Assistance Program (IRAP) ITAs, SME's and external clients
 - Since January 2004 : Competitive Technical Intelligence (CTI)

Competitive Technical Intelligence (CTI)

“...**Business sensitive information** on external **scientific or technological threats, opportunities or developments** that have **the potential to affect** a company's **competitive situation**.”

B. Ashton & D. Klavans



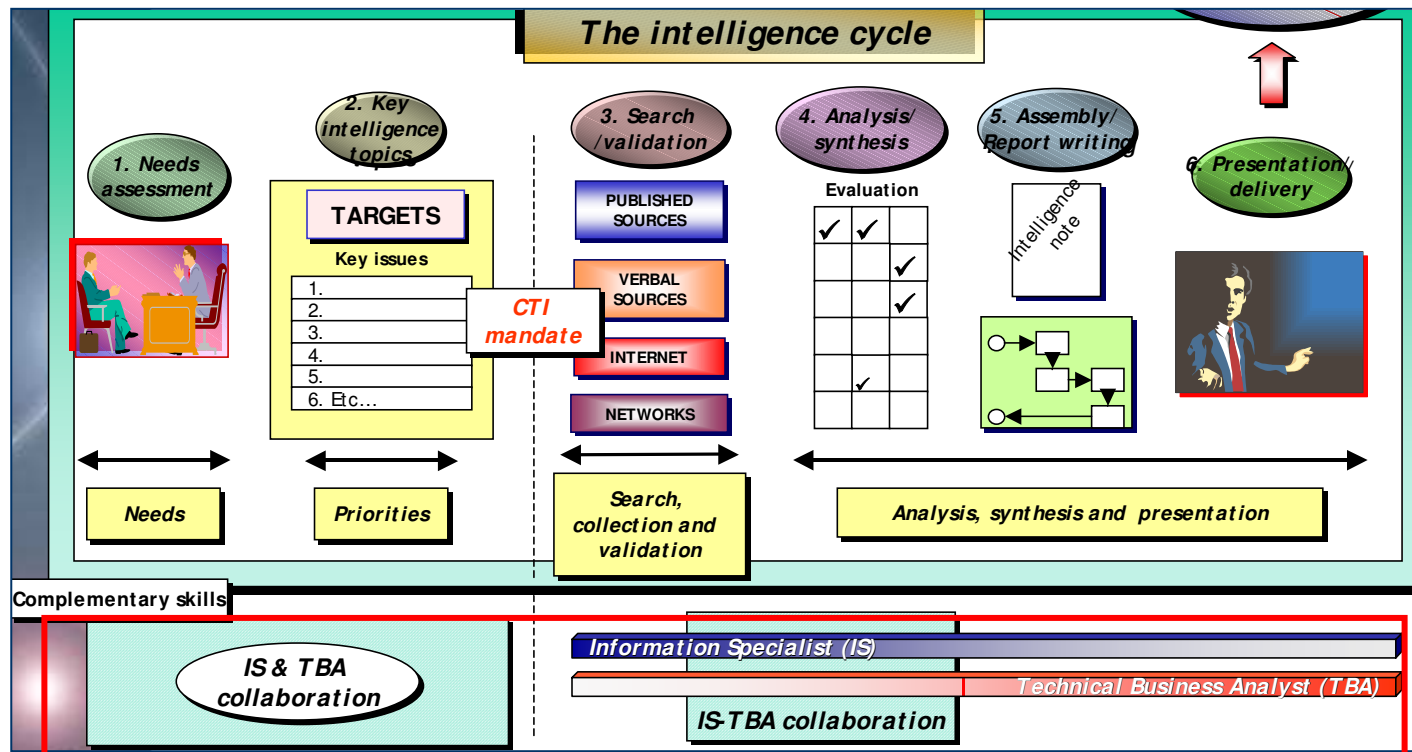
- **Market drivers & trends**
- **High value market segments**
- **Future market needs...**

- **Current R&D activities**
- **Emerging trends**
- **Technical landscape**
- **Potential breakthroughs**
- **Alternative technologies...**

- **Best-in-class competitors**
- **Strategies of key players**
- **Performance ...**

JP. Plante

CTI at CISTI

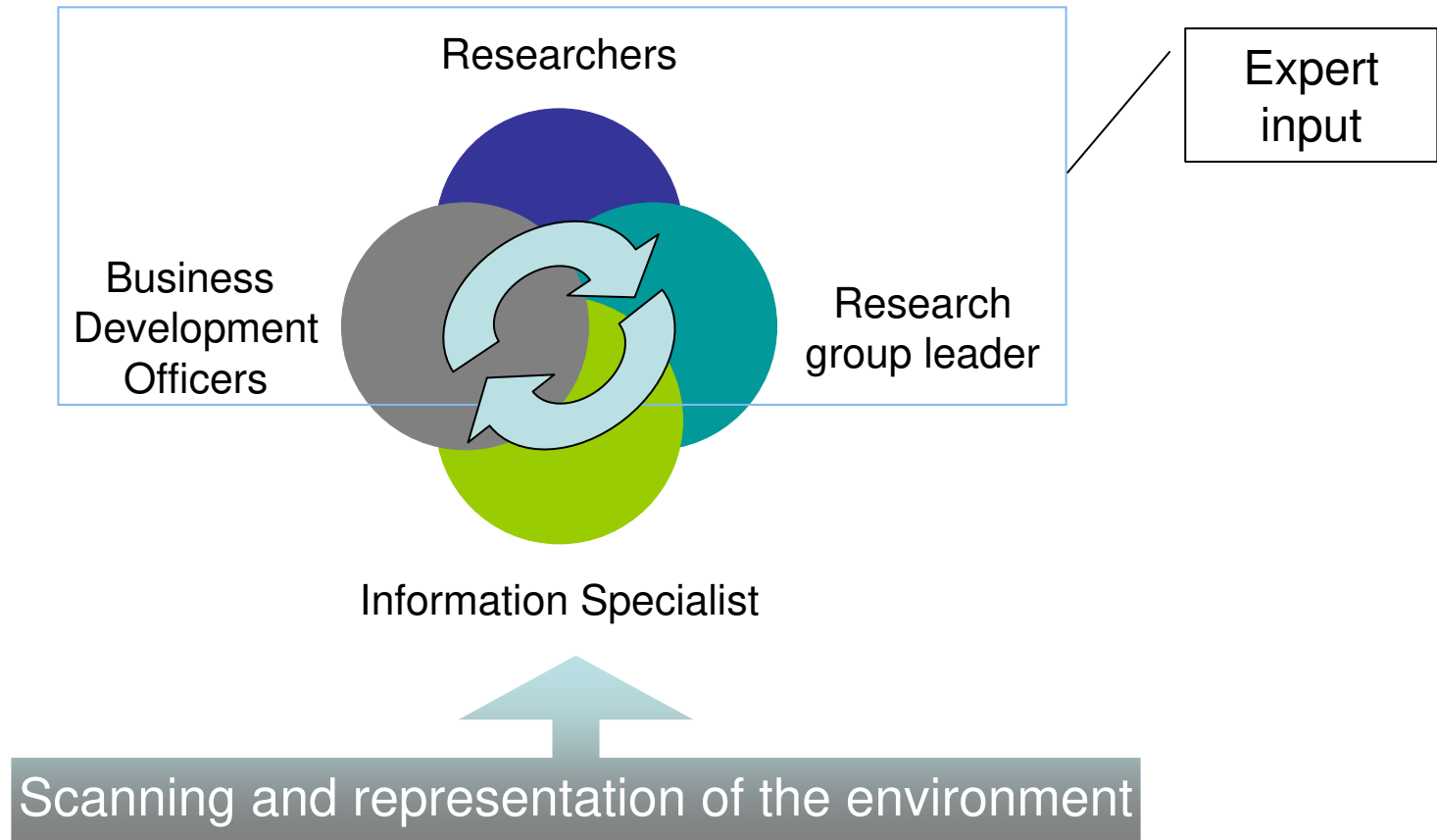


JP. Plante

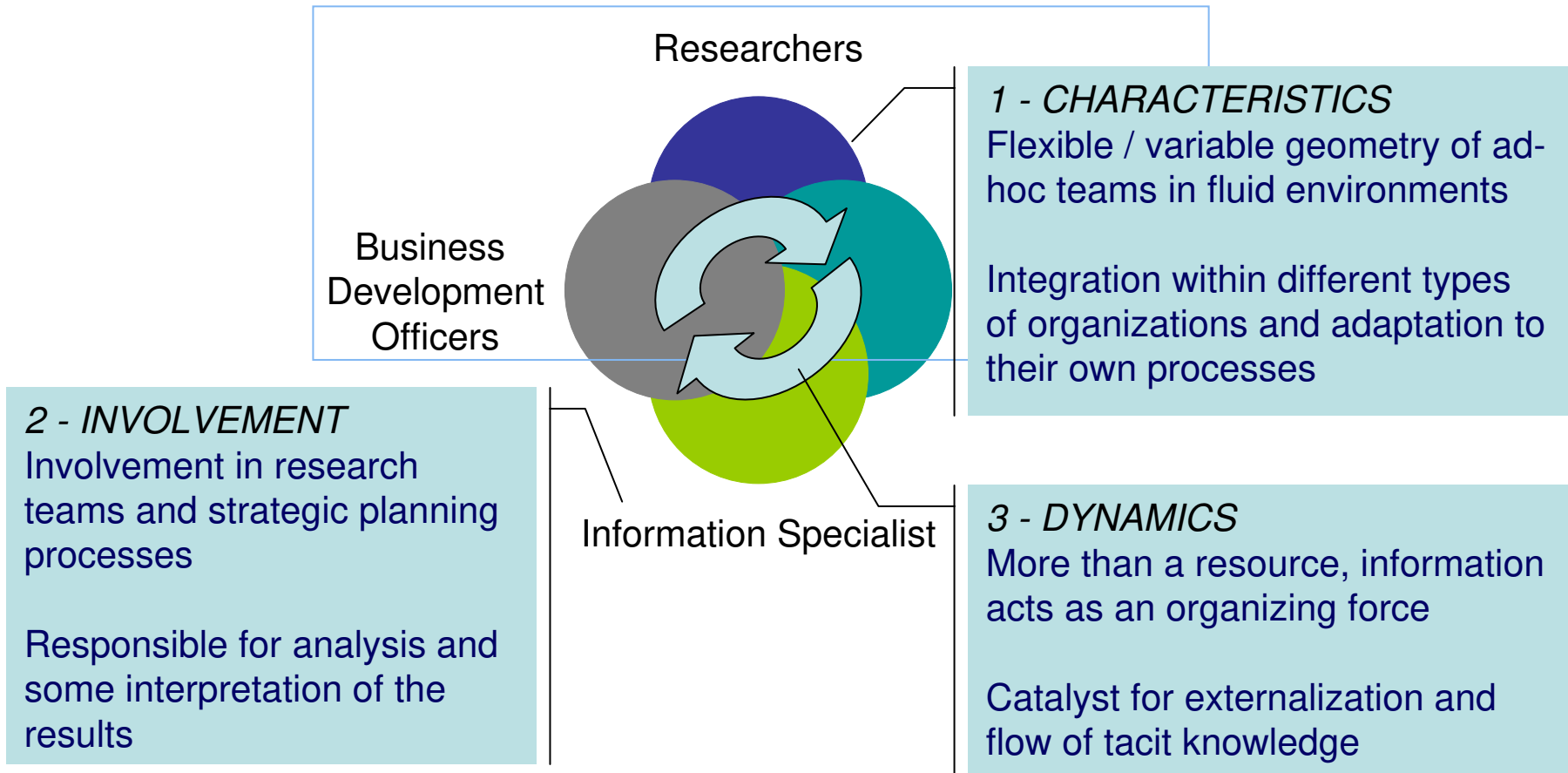
- Client is ITA-SME
- Product oriented

- Activated by a specific need
- Competitor oriented

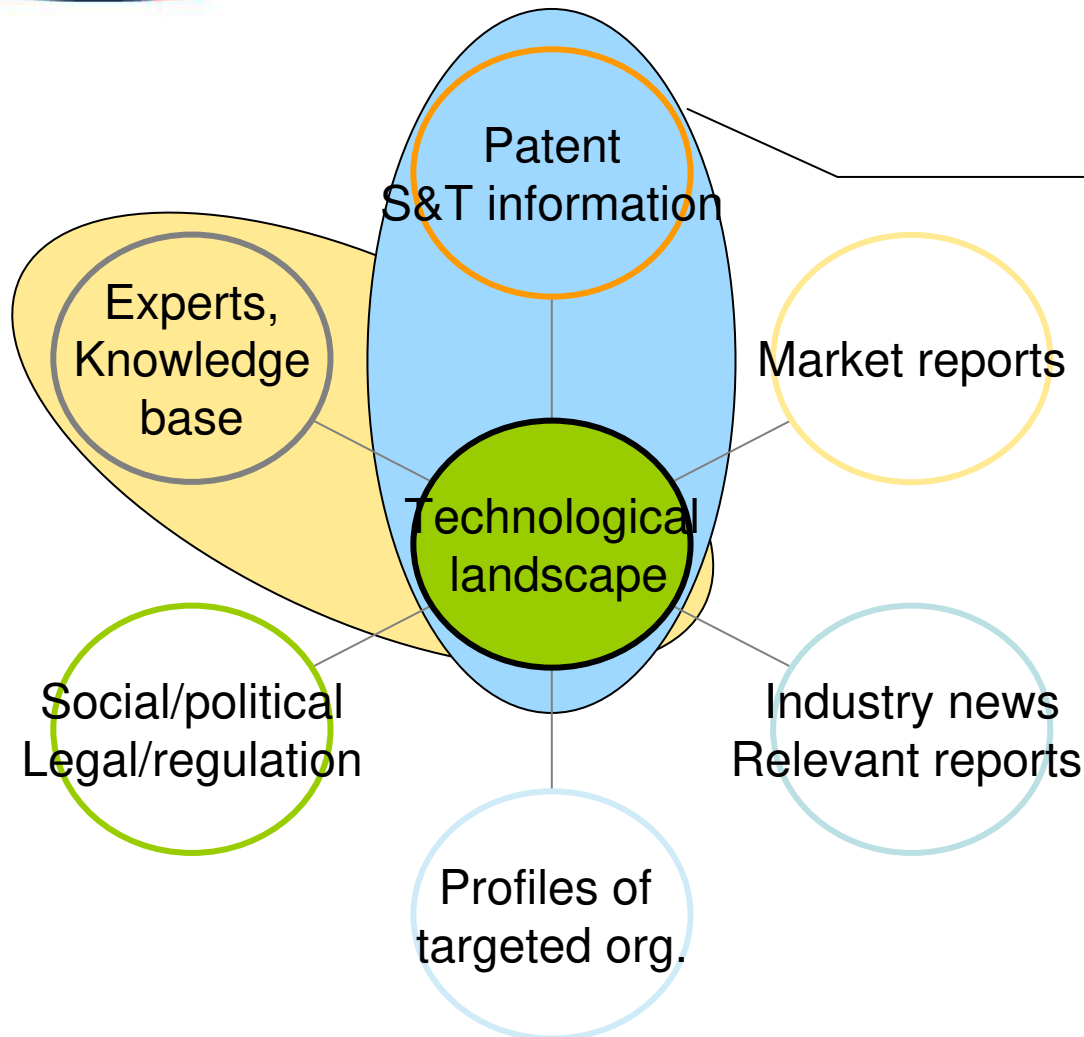
Alternative configuration with NRC institutes and external clients



Alternative configuration with NRC institutes and external clients



Technological Landscape Model



Metrics / analysis of patent and S&T information, and expert input are the core of the technological landscape

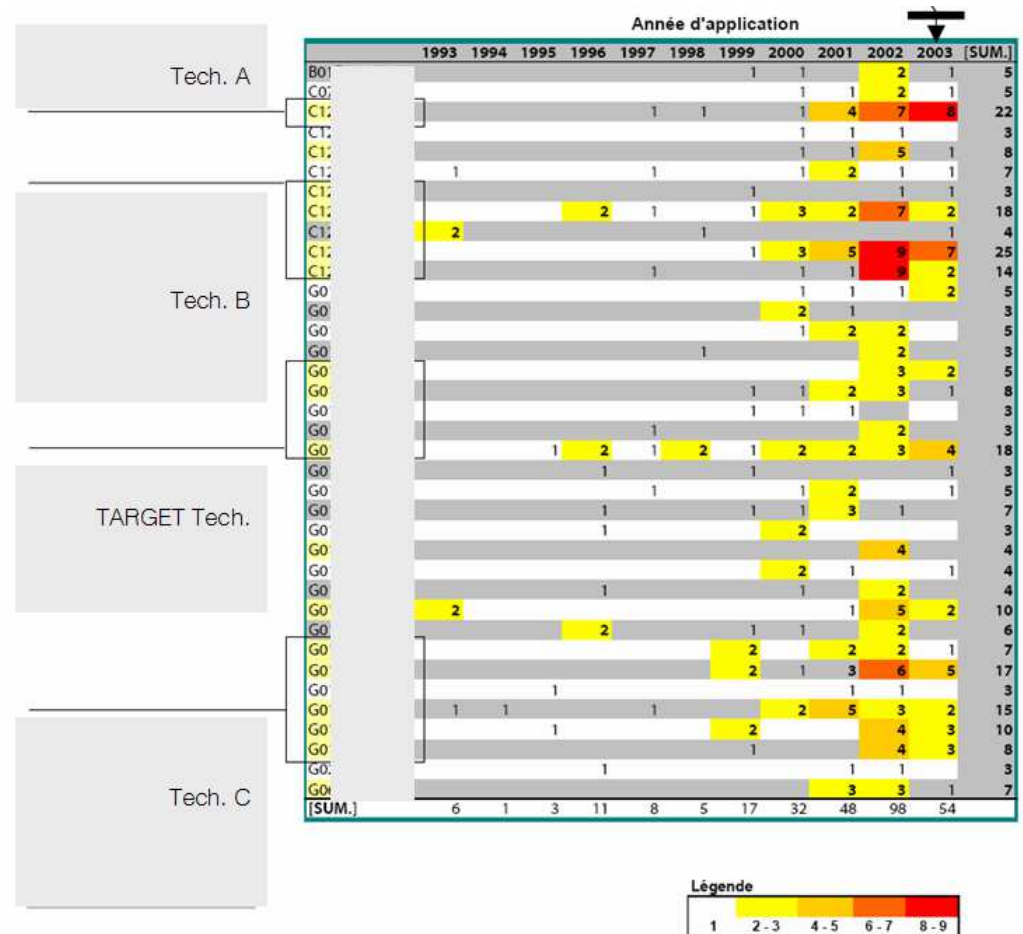
From this core, other types of information, signals from the environment, expand dimensions of the picture



A few examples

PATENT ANALYSIS

M.E.Mogee

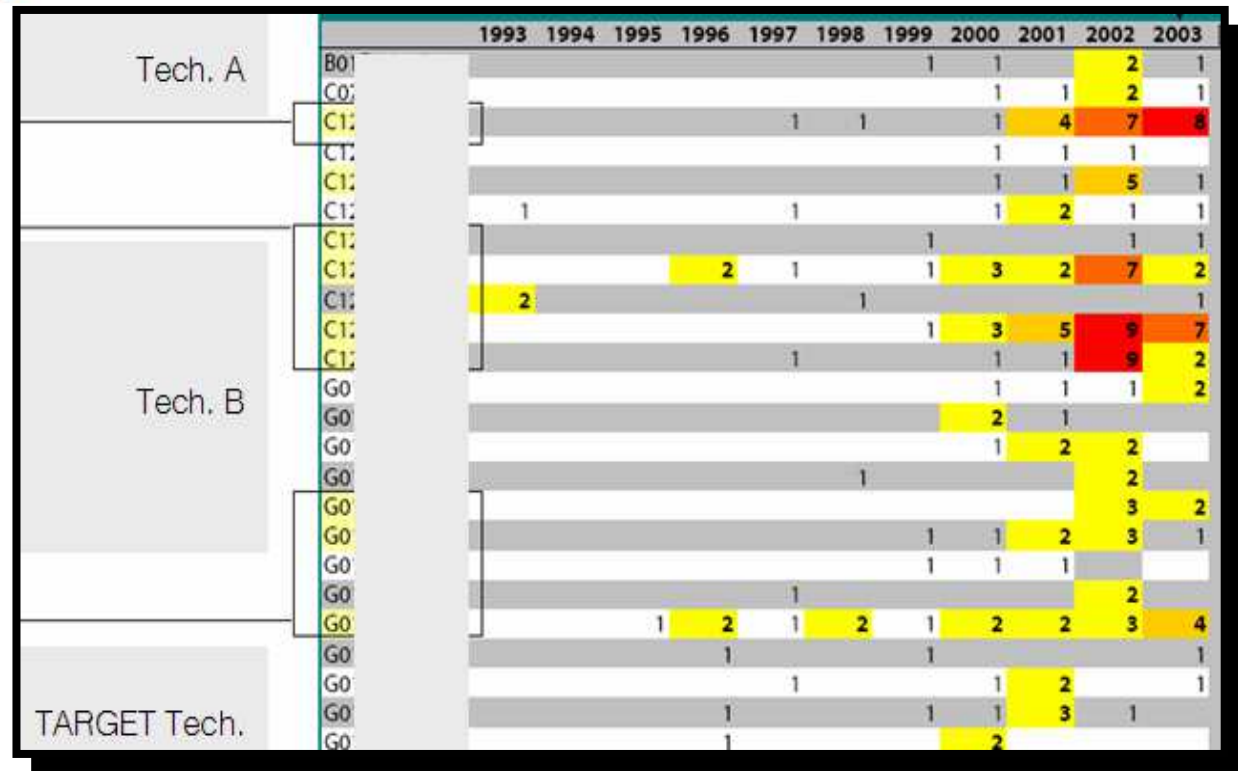


Technological activity

PATENT ANALYSIS

Statistical analysis of large numbers of patents to reveal patterns and trends in technological activity that have implications for management and strategy

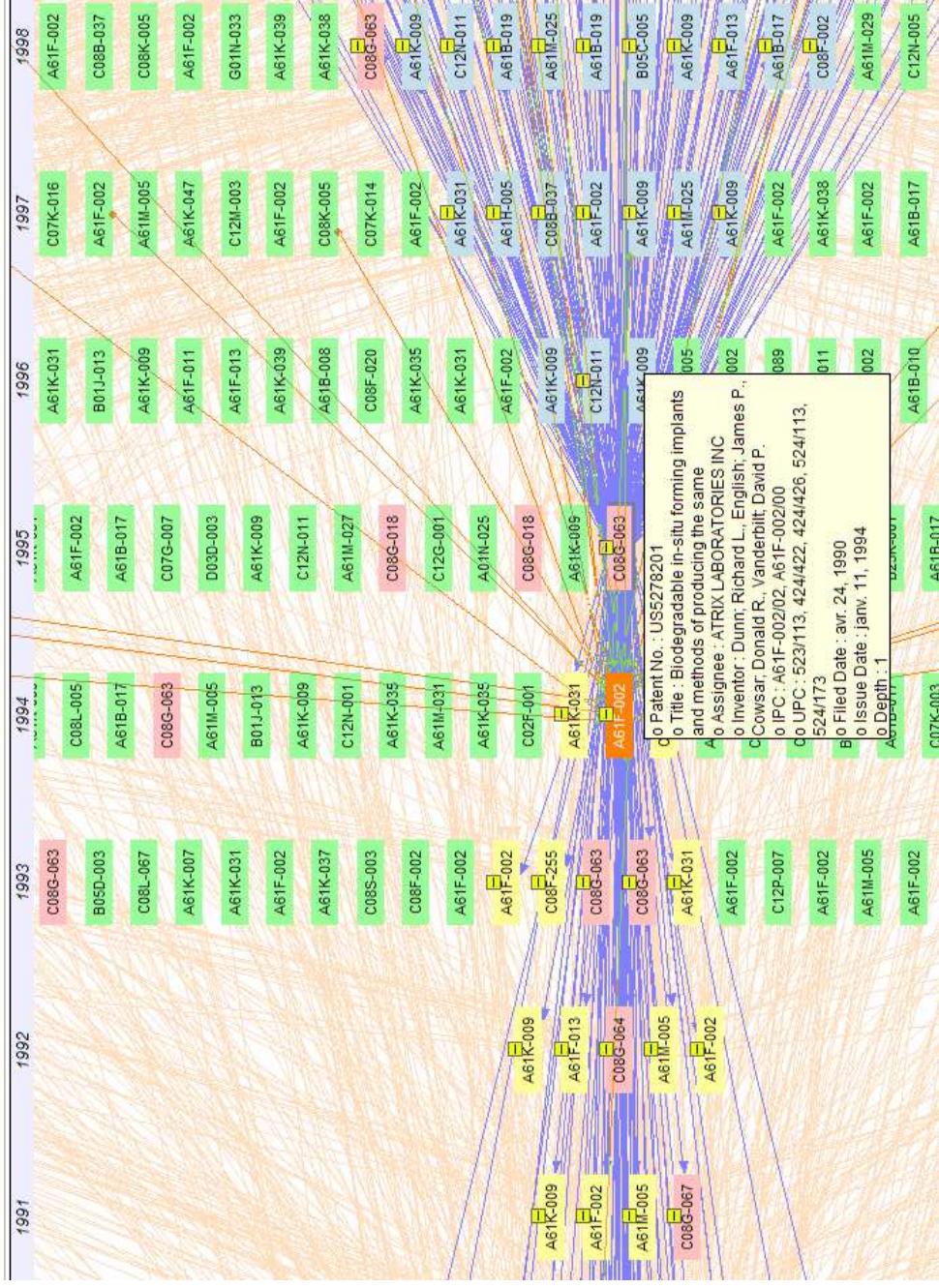
M.E.Mogee



IMPACTS AND CONTRIBUTIONS

- Identification of assignees, inventors activity and strategy development
- Technology development, parallel technologies
- Monitoring of trends, gaps, areas of opportunities

Technology trails Knowledge domains



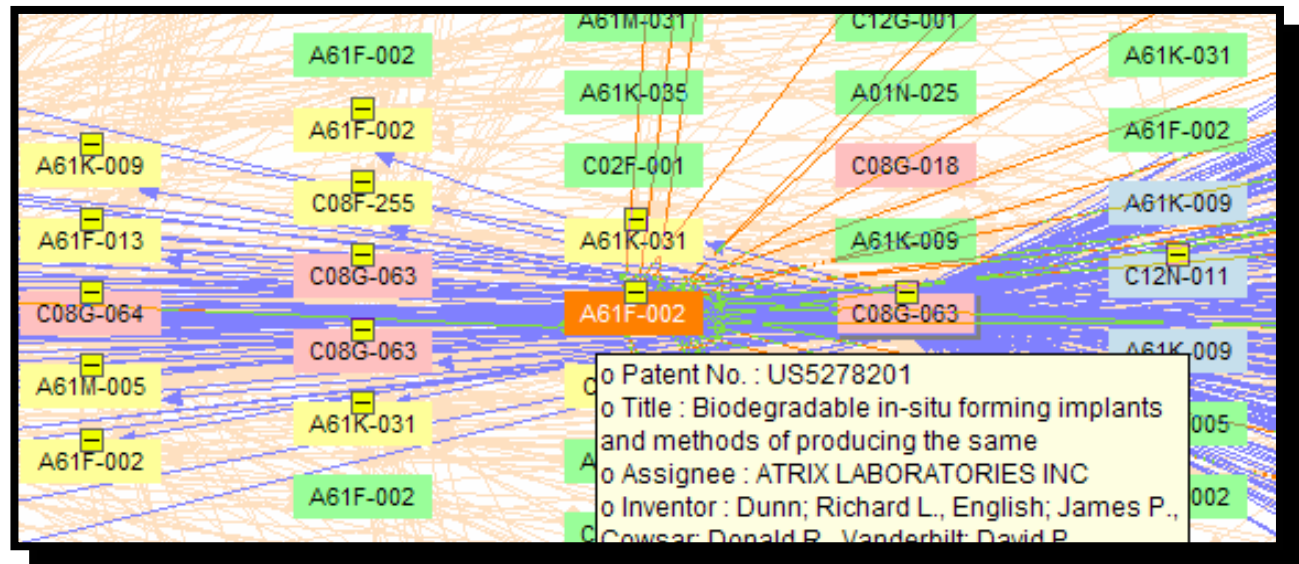
CITATION ANALYSIS

Use of citation
information from
patents or S&T
publications

Technology trails Knowledge domains

CITATION ANALYSIS

Use of citation
information from
patents or S&T
publications



IMPACTS AND CONTRIBUTIONS

- Mapping knowledge domains (S&T Publications)
- Create insights by following technology trails (from process to applications)
- Reveal corporate strategies, assignees assessment (who cites who ; innovators, followers,...)
- Identify new trends, track technology development, increase retrieval

COLLABORATION ANALYSIS

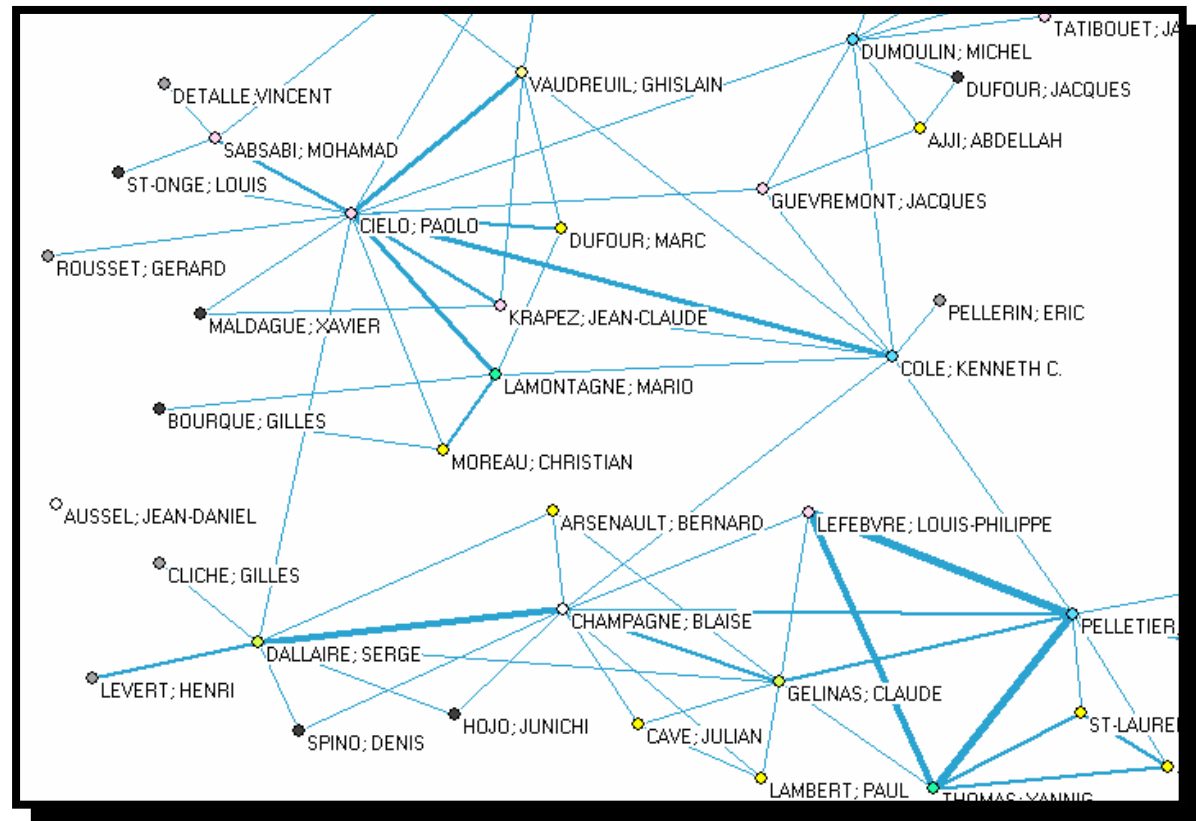
Structure of collaboration
within and between
research groups,
organizations, industry,
S&T fields



Collaboration Networks

COLLABORATION ANALYSIS

Structure of collaboration
within and between
research groups,
organizations, industry,
S&T fields

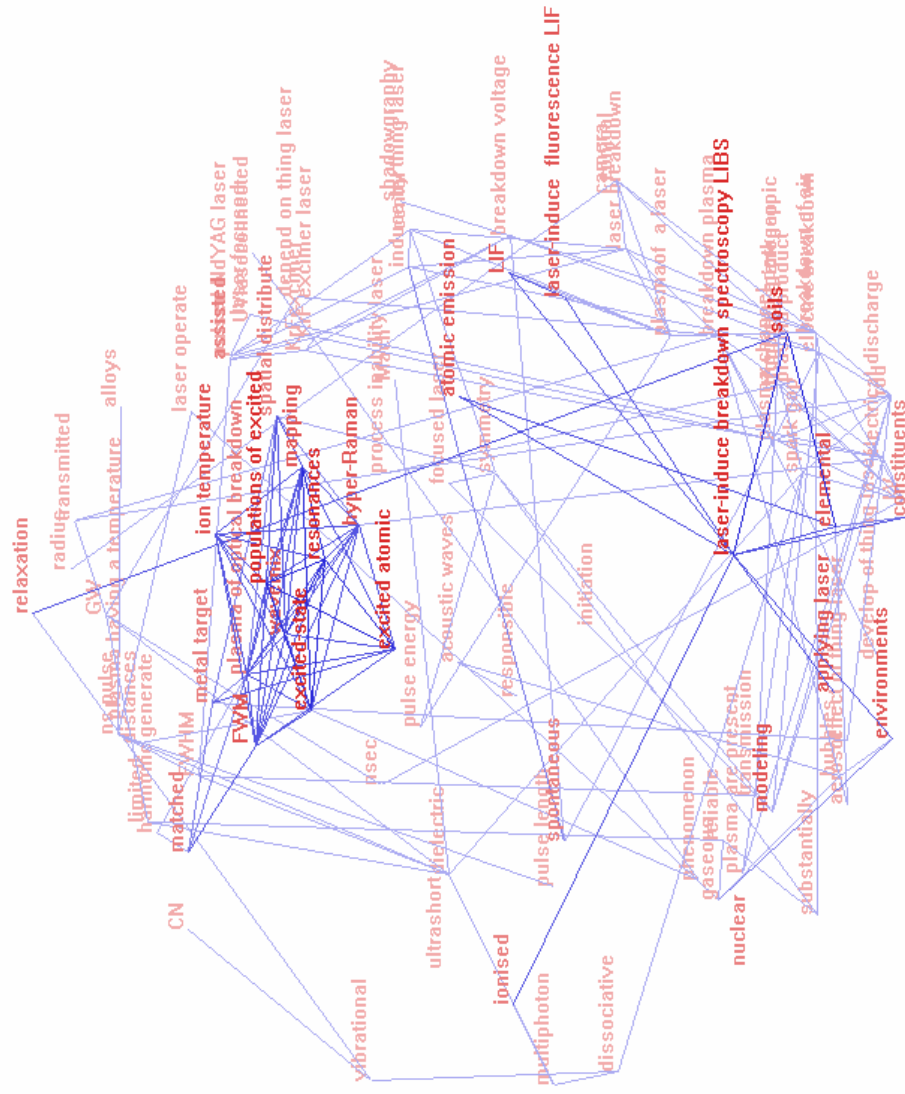


IMPACTS AND CONTRIBUTIONS

- Identify potential collaborators and experts
- Identify collaboration between entities
- Disclose structure of organizations

TEXT ANALYSIS / MINING

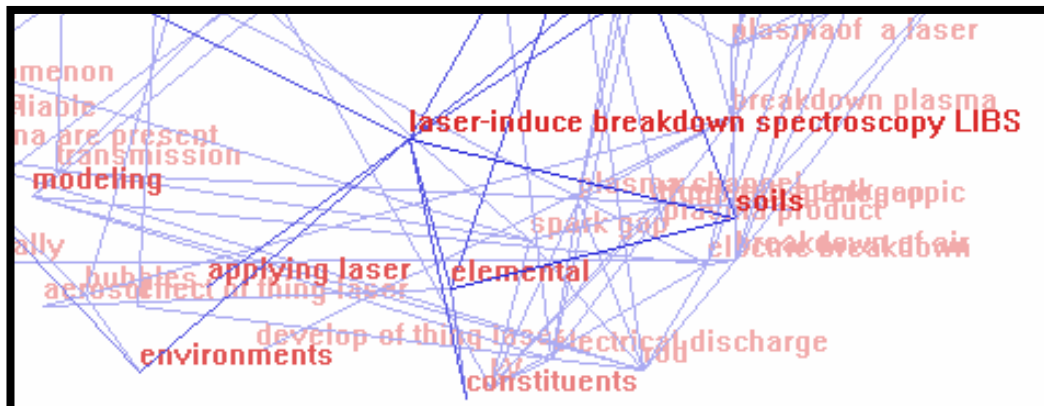
Quantitative analysis of words in documents



Text analysis

TEXT ANALYSIS / MINING

Quantitative analysis of
words in documents



IMPACTS AND CONTRIBUTIONS

- Monitoring the evolution of scientific domains / technology
- Insights generation, prospecting for undiscovered links between concepts / technology
- Classification of documents (patents / pubs)
- Knowledge discovery : (bioinformatics; gene vs.diseases, proteins
i.e. Litminer and EurekaSeek at NRC)

Knowledge base

- Library and Information Sciences , but also other disciplines :
 - Social studies of science (history, sociology, philosophy of science, policy studies), Economy, Management of technology and forecasting / foresight...
- Ongoing monitoring and evaluation of new information analysis tools and methods :
 - Bibliometrics / Scientometrics / Informetrics
 - S&T info analysis software / systems (Patents and Pubs)
 - Text analysis
 - Social Network Analysis
 - Multidimensional statistics / Visualization
 - CTI methods and techniques

Distributed knowledge / Collaborative approach

- Extensive knowledge and skills required could be distributed among IS
 - Reduce pressure on IS to have full expertise on all aspects
 - Expand flexibility, diversity and richness of the representation
 - Knowledge sharing and transfer
- Traditional discipline or functional divisions; new workflow models could be implemented
 - Set of skills / knowledge not necessarily based on the association to a specific institute or S&T domain
 - Innovation : S&T and business environment
 - Increasing multidisciplinary of research projects (i.e. bio-nano)

- **« Information Specialists:**

Technical librarians and search specialists need to adapt to TM (Tech Mining). In particular, we see strong prospects for them to become gatekeepers, training others in how TM software can add value. We foresee information specialists increasingly also becoming TM analysts and participating as such in research teams. »

Alan L.Porter and Nils C. Newman

» (2004) in « *Handbook of Quantitative Science and Technology Research : The Use of Publication and Patent Statistics in Studies of S&T system.* »



NRC-CNRC

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