Measuring impacts of ST&I investments

Information infrastructure and a few examples

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Guiding principles for the development of public information systems

System Mission

Operational (transactional to support public processes) **OR**
Strategic to create national spaces of information

Data requirements

Exclusively dedicated to the government needs **OR**
Systemic built to attend all ST&I players

Connectivity

Isolated to sponsor agency information needs **OR**
Strategic to create national spaces of information

Methodology

Ordinary Software Engineering methods **OR**
Include R&D in e-government and knowledge engineering

Pacheco, et. al. 2011

What types of information are required to facilitate the evaluation of research investment impacts?

Brazilian information space in ST&I

Types of information in a National ST&I System

Individuals

- CV´s
  - Publications
  - Competencies
  - Relationships
- Projects
  - Financed areas
  - Individual grants

ISTI – Institutions of ST&I

- Personnel
  - Professors, students, employees
- Organizational structural
  - Departments, Laboratories
- R&D Infrastructure
  - Equipments, facilities

Courses

- Undergraduate
  - students, professors, advisors
- duate
  - students, researchers, advisors
  - publications, thesis and dissertation

Firms

- Profile
  - economic sector, size, intellectual property
- Portfolios
  - products, services
- Demands
- Innovation
- Networking
  - suppliers, clients

R&D Network

ollective

- Project Teams
  - Financed areas
  - Team grants
- esearch Groups
  - R&D collective areas
  - R&D students
- R&D Networks
  - Themes of R&D
  - Network grants

Program

ublic agencies (federal and state)

- Plans
- Programs
- Instruments
- Grants

INCT (2008)

CNPq wanted to conduct a ***ex-ante*** evaluation of the networks that have submitted proposals to the **National Institute S&T Program (INCT)**, focusing on the networks intra relationships. This would also be the baseline for further ***ex-post*** evaluations.

INCT programatic objectives

To promote the articulation and integration, through the establishment of networks among the best research groups and individuals in the country, in priority areas;

To promote internationally competitive scientific research;

To promote high quality science and technology development associated with potential market applications in cooperation with the private sector;

Contribute to the improvement of education standards at all levels, mainly in the preparation of young scientists;

To promote the implementation of laboratories to be jointly used by universities and companies

Evaluation workflow

(articulation and integration or research groups - obj. 1)

27/10 External review panel	Funding Disbursement	CGEE	CGEE
2008	2009	2010	2011

Snapshot 1

Snapshot 2

Snapshot 3

National Institutes of Science and Technology

Data captured from the Lattes Platform CVs
Analysis done by services provided by Innovation Portal

		Knowledge network		Education network		Project network		Academic relationship	
Proposals	Team	Coauthorship		Advisoring		Project Team		Comittee	
		Total	Equipe	Total	Equipe	Total	Equipe	Total	Equipe
Project 1	25	122	6	4	5	21	10	12	2
...									
Project 261									

Project 1 has 25 researchers

Out of 25 researchers:
6 are coauthors
in 122 articles

Out of 25 researchers:
5 have 4 advisoring relationships

Out of 25 researchers:
10 work together in 21 other projects

Out of 25 researchers:
2 were present in
12 commitees

National Institutes of Science and Technology

Data obtained from Lattes Platform CVs

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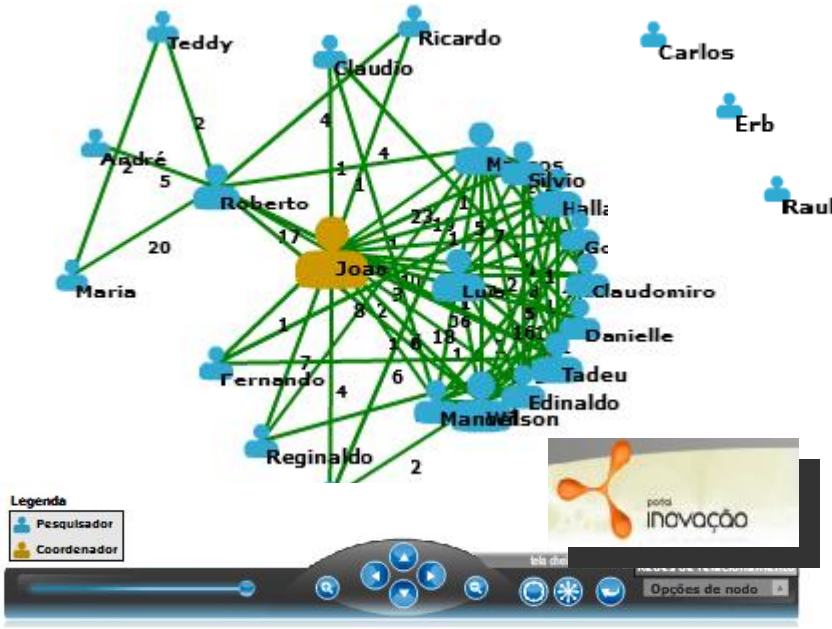
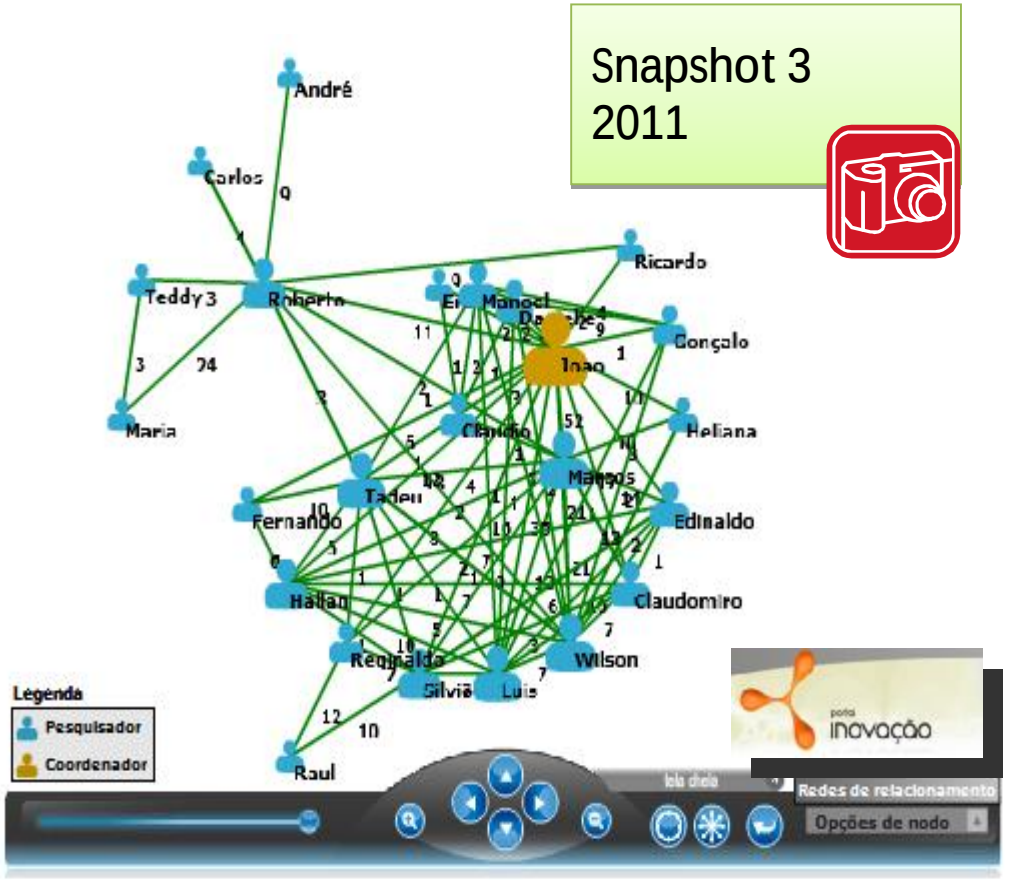


Snapshot 1
2008



Snapshot 3
2011

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portal inovação

ABCM Case (2007)

The Brazilian Academy of Mechanics Sciences and Engineering (MSE) – ABCM - wanted to show how Brazil is doing in this area at the 2007 International Engineering Conference.

Which MSE scientific domains are weak and how to evaluate the process of strengthen them?

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CV Analysis

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Collective
- Project Teams
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- Research Groups
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Public agencies (federal and state)
- Plans
- Programs
- Instruments
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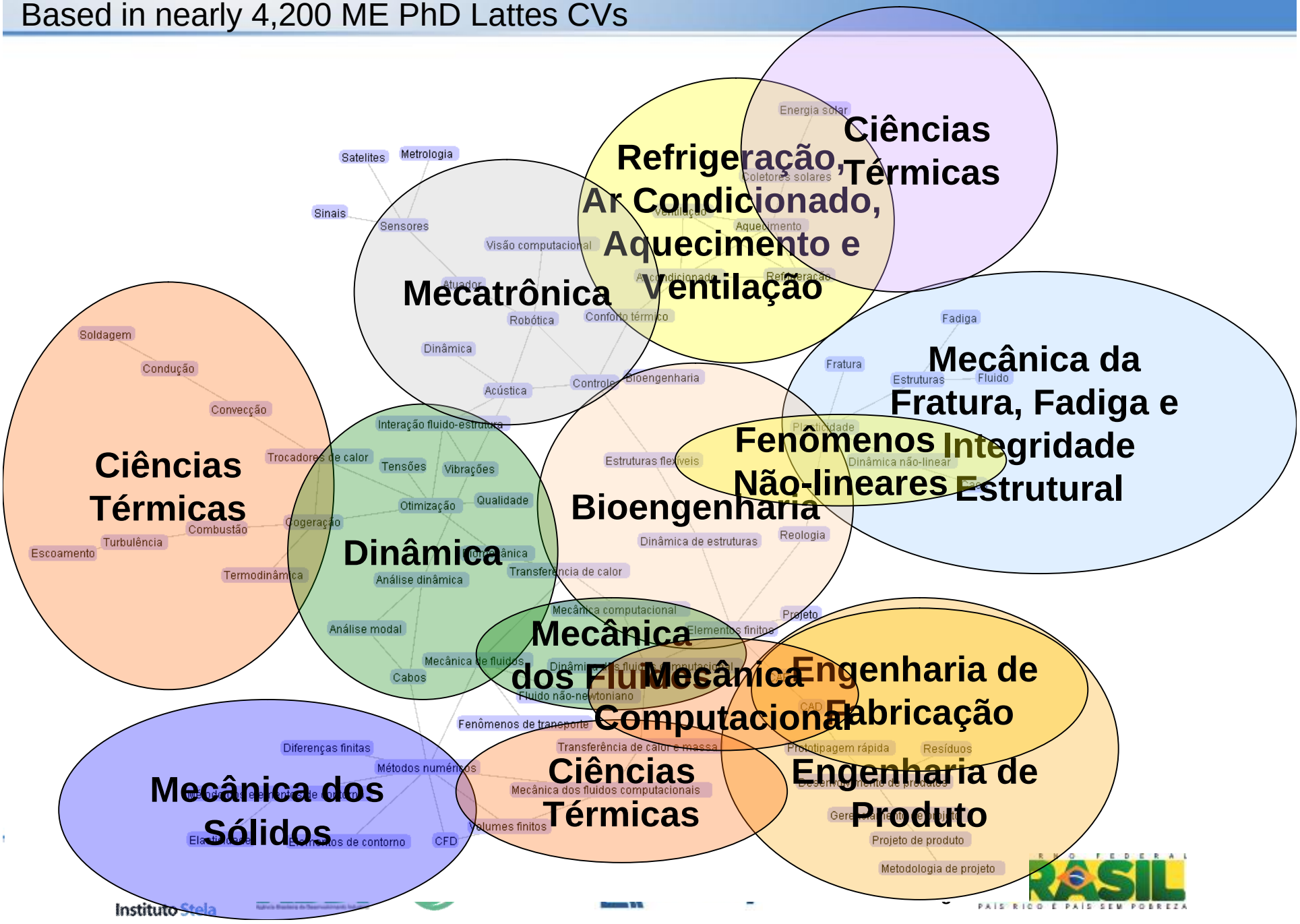
Methodology steps

1. Collect the CVs related to the selected priority area
2. Define a taxonomy for each priority subdomain
3. Find the knowledge clusters
4. Set decision making goals

   In this case: identify weak subdomains
   (low density clusters)

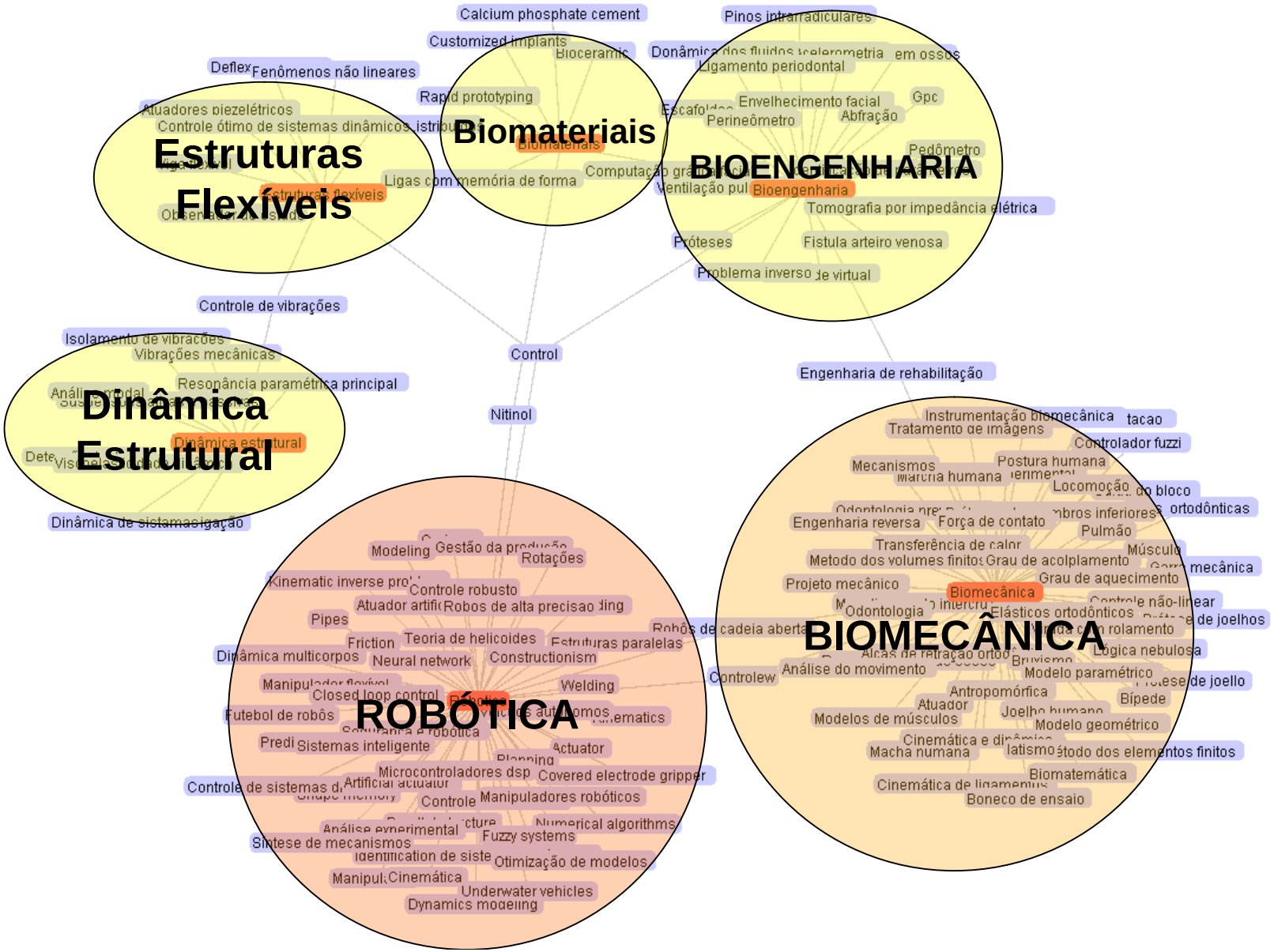
MSE Knowledge Map descriptors

Based in nearly 4,200 ME PhD Lattes CVs



Biomechanical Engineering Knowledge Map descriptors

Based in nearly 4,200 ME PhD Lattes CVs



What this methodology allows for

By means of this, public decision makers are able to:

Identify weak scientific areas that need further support

Measure the evolution of knowledge creation over time by re-visiting Lattes database (say, every other two years);

Measure the impact of research investments by visiting the same group of individuals CVs and look for publications and other indicators (ex. patents)

Derive courses of actions

General Conclusions

The importance of having a national integrated CV platform (not necessarily one CV format);

More efficiency in evaluation processes (both *ex-ante* and *ex-post*);

More transparent evaluation processes;

Facilitates the participation of the scientific community (electronic platforms are not intended to replace people's participation);

Important gaps to be filled (private sector databases).

Thank you

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