cgee

Centro de Gestão e Estudos Estratégicos

Ciência, Tecnologia e Inovação

INTELLIGENCE IN SCIENCE, TECHNOLOGY, INNOVATION AND EDUCATION

Mapping and monitoring regional inequalities in Brazil with the ST&I Geography Indicators of the ST&I Observatory

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Center for Management and Strategic Studies (CGEE)

- Providing **qualified information** to the National Science,Technology and Innovation System
- +100 employees
- Attached to **Brazilian Ministries of ST&I and Education**
- +20 years
- +4 **Observatories** (Spatial Techonology oriented, Sustainable Cities, and others)

Observatory in Science, Technology and Innovation (OCTI)

PANORAMAS

Tem por objetivo monitorar o estado da arte, tendências e temas emergentes relacionadas ao ambiente de CT&I, para Identificação de desafios e oportunidade que apoiem a tomada de decisão, a formulação e avaliação de políticas e programas em ciência, tecnologia e inovação.

Veja mais

INDICADORES

Busca elaborar e analisar Indicadores de CT&I que sirvam de referências para elaboração de políticas públicas no Brasil e que também orientem a Política Nacional de Inovação (PNI). Também objetiva elaborar indicadores que permitam avaliar políticas públicas de CT&I no Brasil em relação ao contexto internacional.

Veja mais

OCTI

Observatory in Science, Technology and Innovation (OCTI)

- Mapping Science & Technology landscapes to support policy's decision making
- **Development of indicators to guide and monitor public ST&I policies in Brazil in comparison with international context**

Geography Indicators of ST&I of Brazil

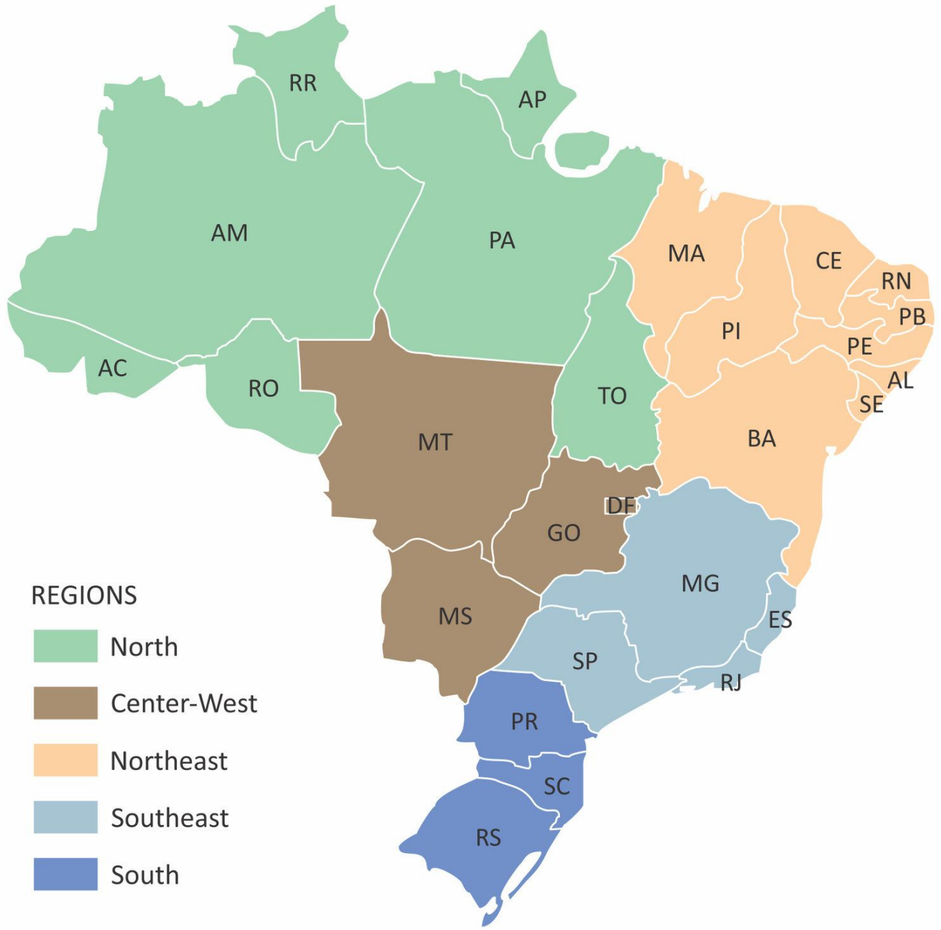
- An **initial set of 18 indicators**, which aims to assess the potential and risks related to ST&I in the **Brazilian Regions and Federation Units**.

- These indicators aim to assess the potential and limitations of the different Brazilian Regions and federation units with regard to the conditions of **key variables** that **condition the dynamics of their ST&I systems,** given their relevance to **regional** and **local development.**

- These indicators will be monitored by the Observatory, in order to have continuous information about the local ST&I systems. OCTI is also developing new indicators in different lines of action, such as gender inequality.

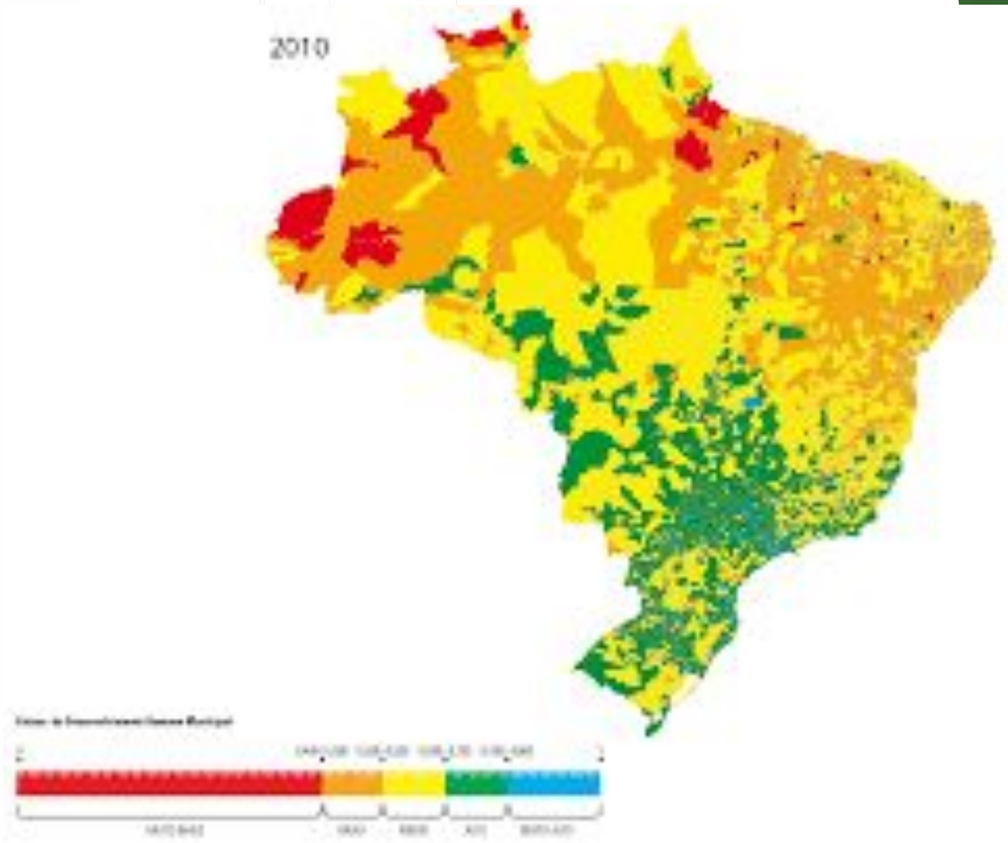
Geography Indicators of STI of Brazil

- These indicators are calculated on the scales of the **Brazilian Regions** (North, Northeast, Center-west, South and Southeast) and **Brazilian Federation Units**:

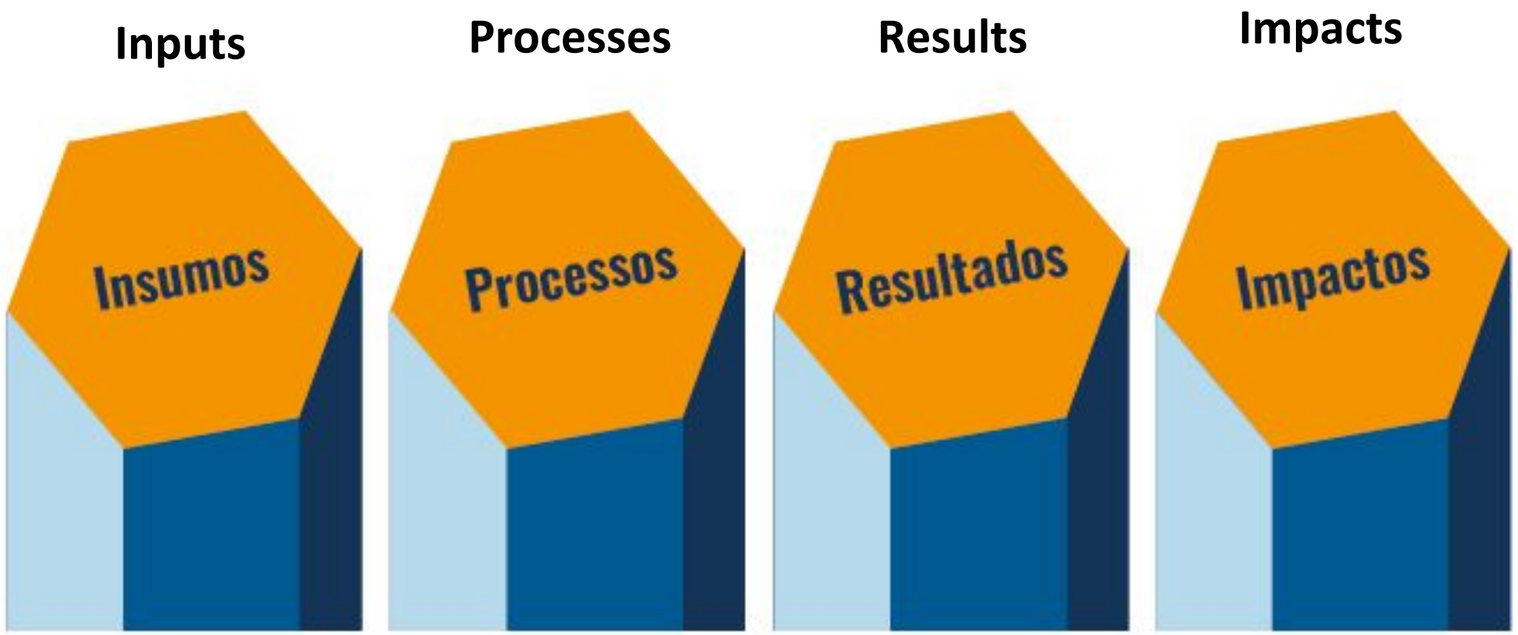


STATES

AC - Acre
AL - Alagoas
AP - Amapá
AM - Amazonas
BA - Bahia
CE - Ceará
DF - Distrito Federal
ES - Espírito Santo
GO - Goiás
MA - Maranhão
MT - Mato Grosso
MS - Mato Grosso do Sul
MG - Minas Gerais
PA - Pará
PB - Paraíba
PR - Paraná
PE - Pernambuco
PI - Piauí
RJ - Rio de Janeiro
RN - Rio Grande do Norte
RS - Rio Grande do Sul
RO - Rondônia
RR - Roraima
SC - Santa Catarina
SP - São Paulo
SE - Sergipe
TO - Tocantins



Geography Indicators of ST&I of Brazil



Natures and Dimensions of the Geography Indicators of STI of Brazil

- According to Gokhberg et al (2013), refers to the different types or natures that present vis a vis the dynamics of ST&I Systems: **inputs, processes, results and impacts.**

- Each of these types of indicators has different dimensions, as detailed below, indicating their sources of information:

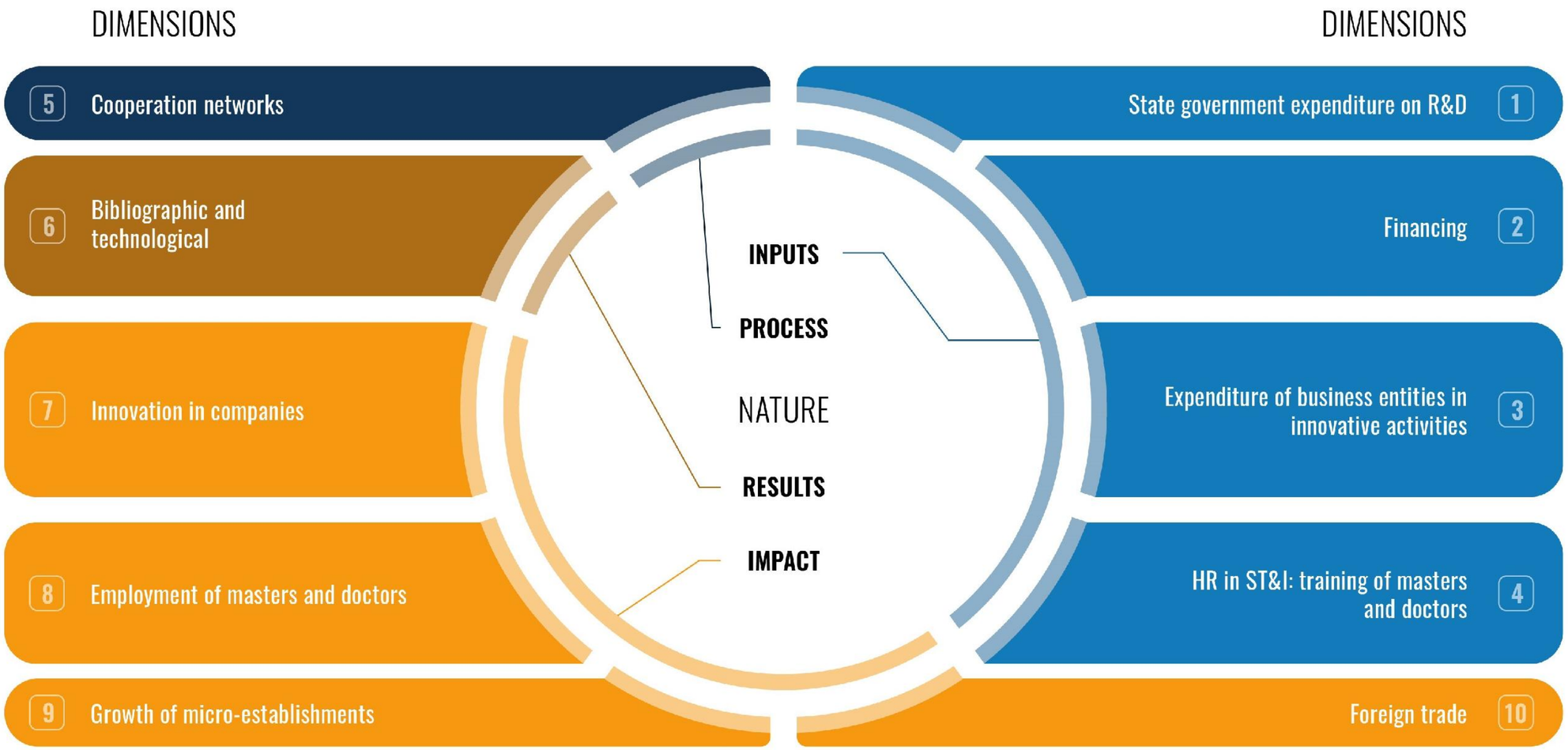
Input Indicators
- **State government expenditures on R&D (MCTI);**
- Financing (BNDES and FINEP);
- Expenditure by business entities in innovative activities (PINTEC);
- **Human Resources in ST&I: forming of Masters and Doctors (RAIS/ CGEE)**

Process Indicators
- Cooperation networks (PINTEC and CNPq: Research Groups/Companies).

Results Indicators
- **Bibliographic and technological production**.

Impact Indicators
- Innovation in companies (PINTEC);
- **Employment of Masters and Doctors;**
- Growth of micro-establishments;
- **Foreign Trade**

Natures and Dimensions of the Geography Indicators of STI of Brazil



Geography Indicators of STI of Brazil

INDICATORS

1.1 Average percentage of R&D expenditures by state governments, in relation to their total revenues, in the period 2016-2018

2.1 Percentage of the value of operations contracted by BNDES, in direct and non-automatic indirect forms, directed to innovation, by unit of the Federation, in relation to the total value of these operations in Brazil in the period 2002-2019

3.1 Expenditure of innovative companies in the industrial sector in internal activities and in external R&D acquisition, in relation to the net sales revenue of these companies, by unit of the Federation, in the year 2017

3.2 Expenditure of innovative companies in the industrial sector in other innovative activities, other than internal activities or external R&D acquisition, in relation to the net sales revenue of these companies, by unit of the Federation, in the year 2017

3.3 Technical-Scientific Personnel per thousand employees in business entities, per Federation unit, in 2017

4.1 Number of masters per one hundred thousand inhabitants, per unit of the Federation, in 2017

4.2 Number of PhD holders per one hundred thousand inhabitants, per unit of the Federation, in 2017

5.1 Rate of Cooperation for Innovation, per unit of the Federation, in 2017

5.2 Percentage of the average amount of disbursement with scholarships for researchers granted by CNPq and conditioned to some relationship with companies, in relation to the total value of these scholarships in Brazil, by unit of the Federation, in the period 2017-2019

5.3 Average percentage of the value of scholarships for researchers granted by CNPq and conditioned to some relationship with companies in relation to the total value of scholarships in the Federation unit in the period 2017-2019

6.1 Bibliographic production (books, articles in periodicals and works in annals) linked to the Graduate Programs by the number of professors and students of these programs in the units of the Federation, in the year 2017

6.2 Applications for invention patents filed with the National Institute of Industrial Property (INPI) per one hundred thousand inhabitants, by units of the Federation in the year 2017

7.1 Rate of Product and/or Process Innovation of companies in the extractive and manufacturing industries, by units of the Federation in the period 2015-2017

8.1 Percentage of masters and doctors employed in the manufacturing industry by groups of one thousand employees, by units of the Federation in 2017

8.2 Percentage of masters and doctors employed in services of greater knowledge intensity (Sections J, K, M, Q and R) by groups of one thousand employees, by units of the Federation in the year 2017

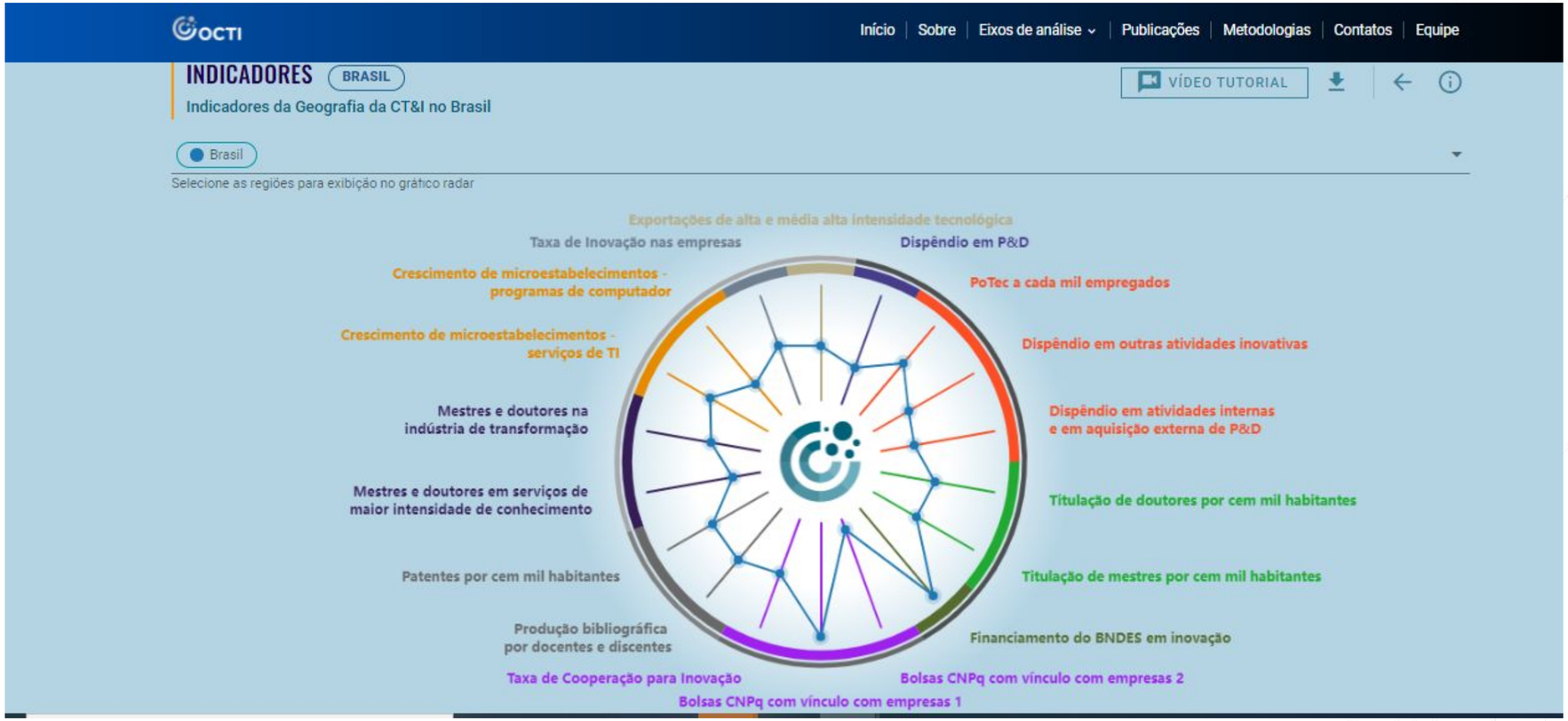
9.1 Variation in the participation of micro-establishments in the activities of development and licensing of customizable and non-customizable computer programs (Classes CNAE 2.0: 62.02-3 and 62.03-1) in relation to the total establishments of these activities, by units of the Federation in the period 2016-2017

9.2 Variation in the participation of micro-establishments in the activities of information technology services (except for Classes CNAE 2.1: 62.02-3 and 62.03-1) and in the provision of information services in relation to the total establishments of these services, by units of the Federation in the period 2016-2017

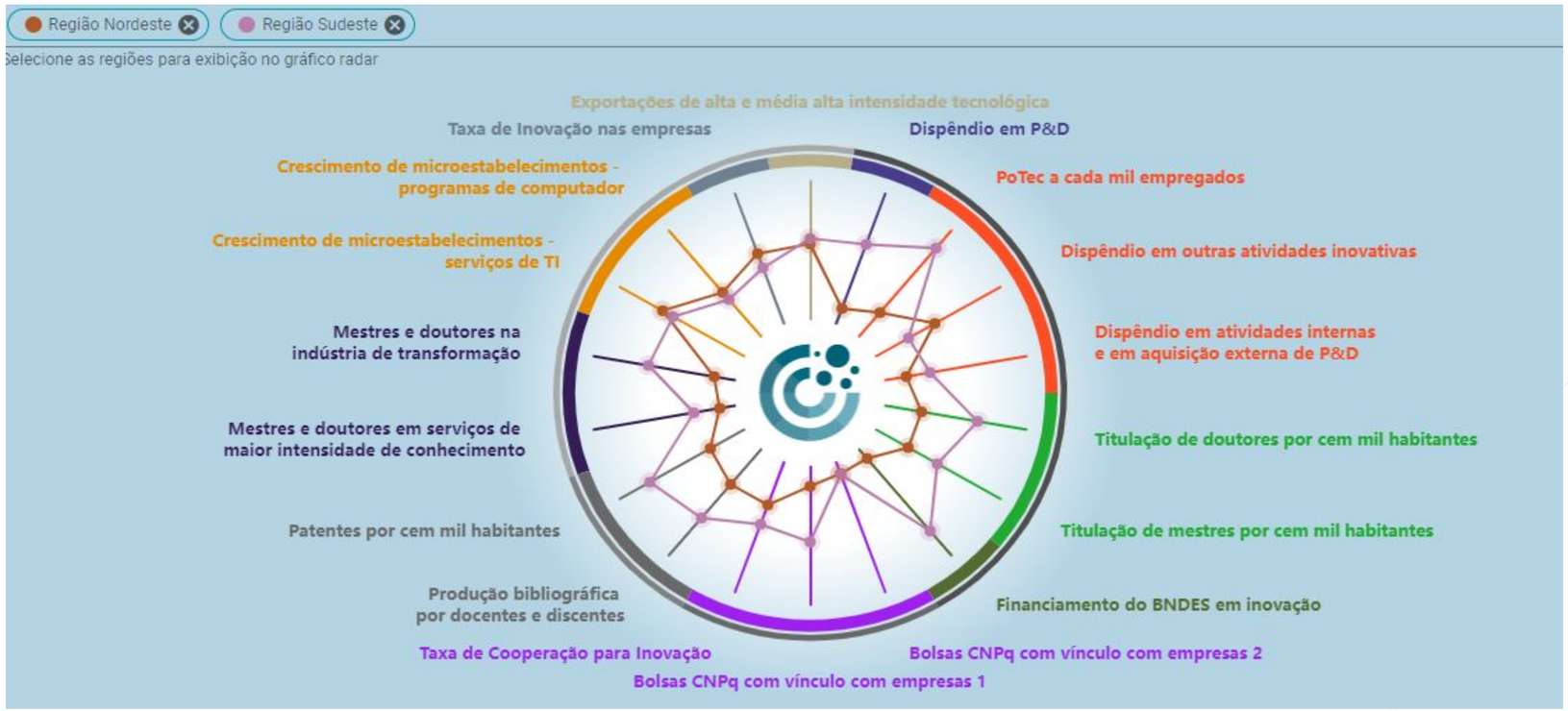
10.1 Average value of exports of goods by sectors of high and medium high technological intensity in the total exports of the Federation unit in the period 2015-2017

Geography Indicators of STI of Brazil

- In order to present and discuss these indicators, the Observatory **has an interactive digital platform**, in the form of a **radar chart**, articulating indicators of different types or natures, dimensions and geographic scales.

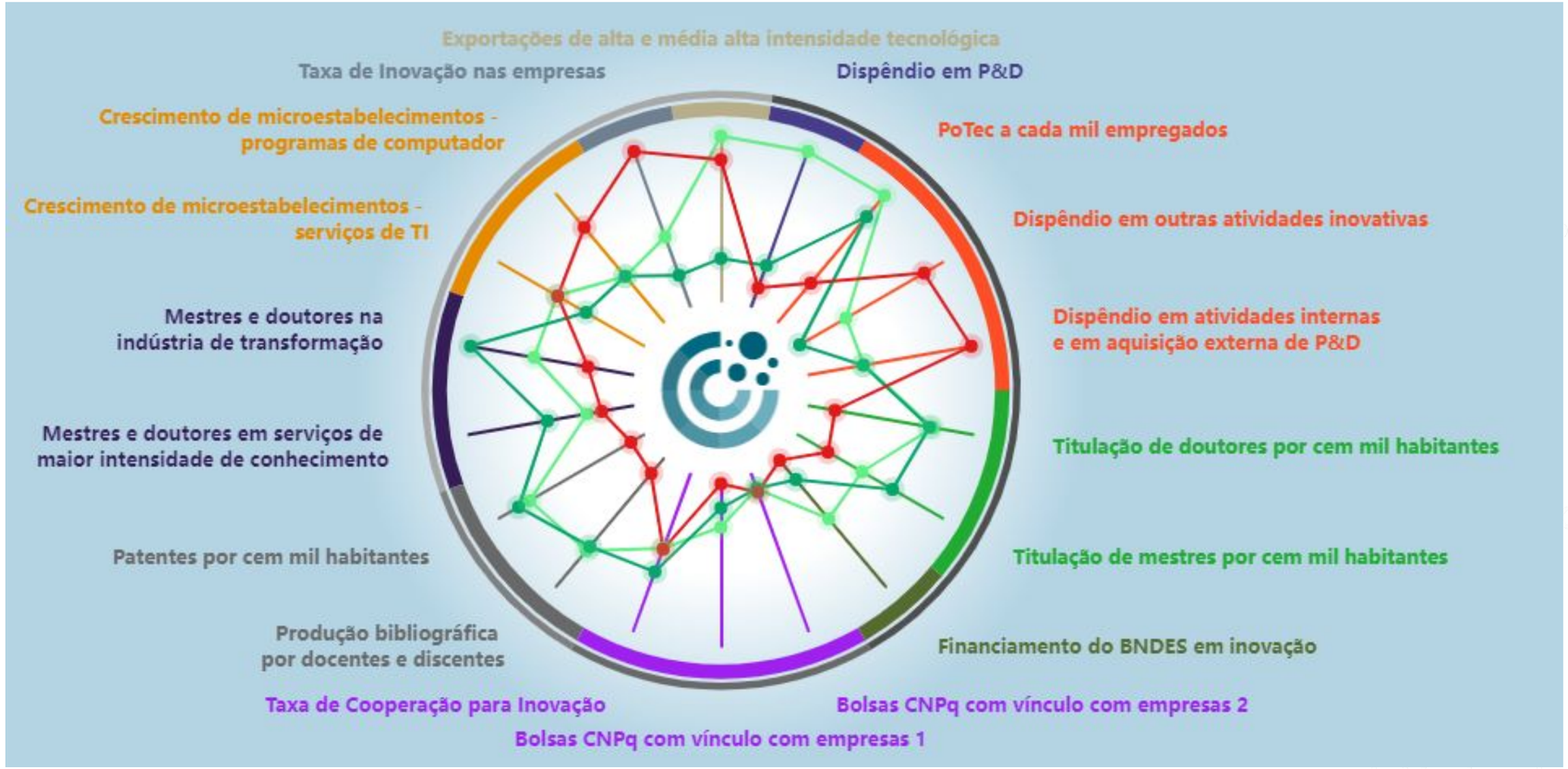


Radar Chart – Northeast (red) and Southeast (purple) regions



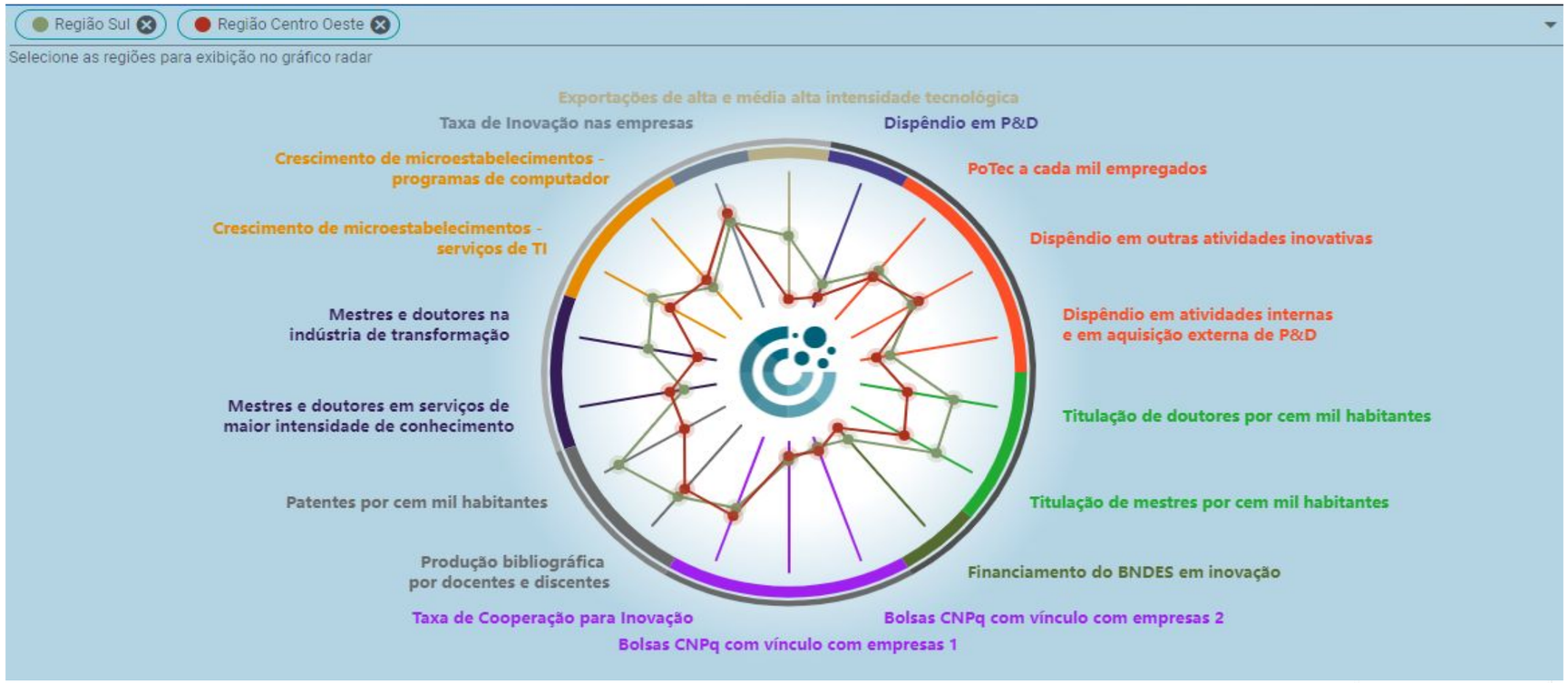
- The **two regions present historical distances in the development of their ST&I systems** that result in the inequalities that can be observed in their radar charts.
- Some of the indicators with values similar to the Southeast Region, however, may indicate results of public policies and programs conducted in recent decades for the development of the Northeast Region

Radar chart – São Paulo (light green), Rio de Janeiro (dark green) and Amazonas (red)



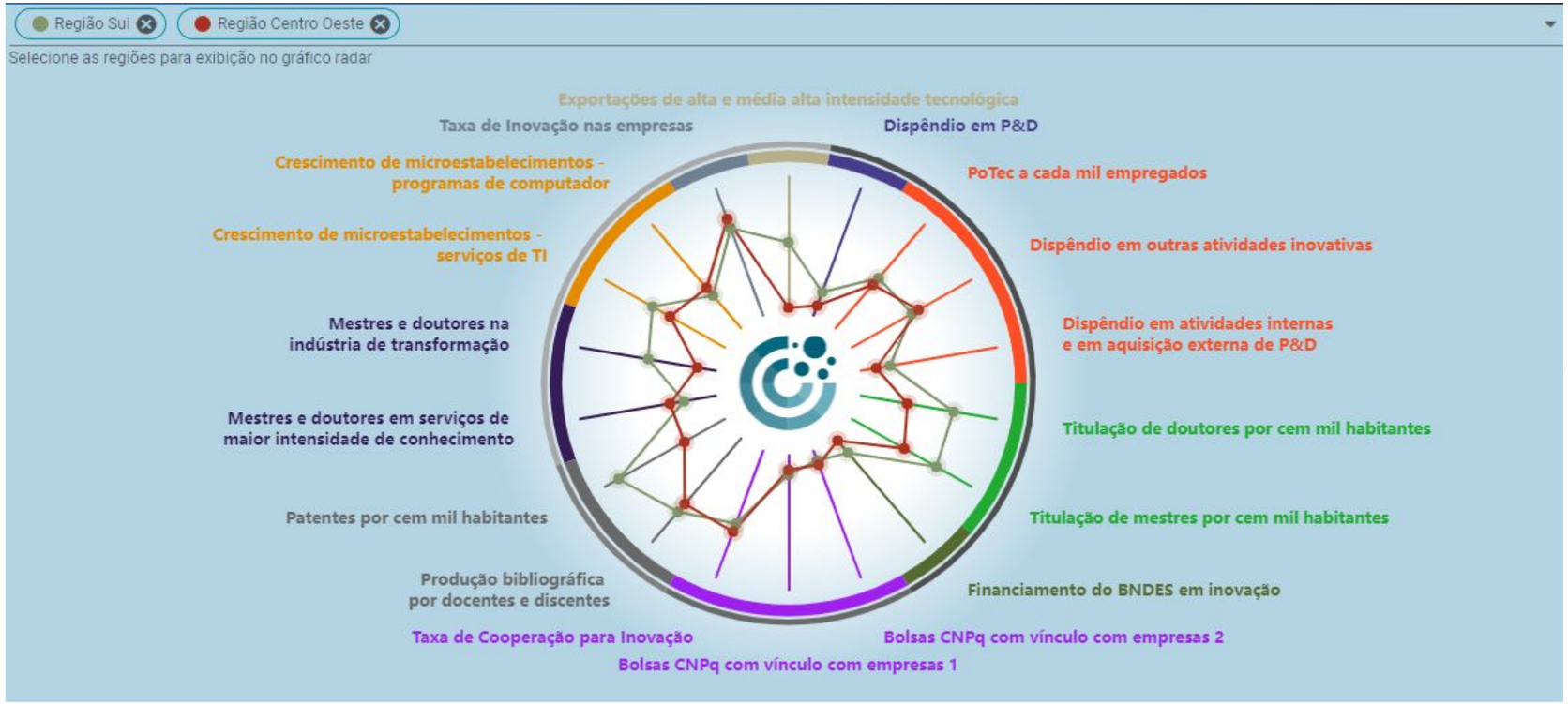
- São Paulo presents high values for some indicators about, **funding to applied projects, exportations and spending R&D**
- The **petrochemical chain in Rio de Janeiro** and its **attraction of masters and doctors for the industrial and service sectors** involved can be connected with the relatively higher values of these indicators.

Radar chart – South and Center-West regions



- In general terms, there is a greater historical presence of **manufacturing industries in the South Region**. While the Center-west Region is marked by **innovation in sectors linked to agribusiness**.
- There is also a comparatively greater tradition of science and technology institutions in the southern states, a characteristic indicated by relatively higher values of **indicators about the training of masters and doctors.**

Radar chart – Amazonas State (red) and North Region (grey)

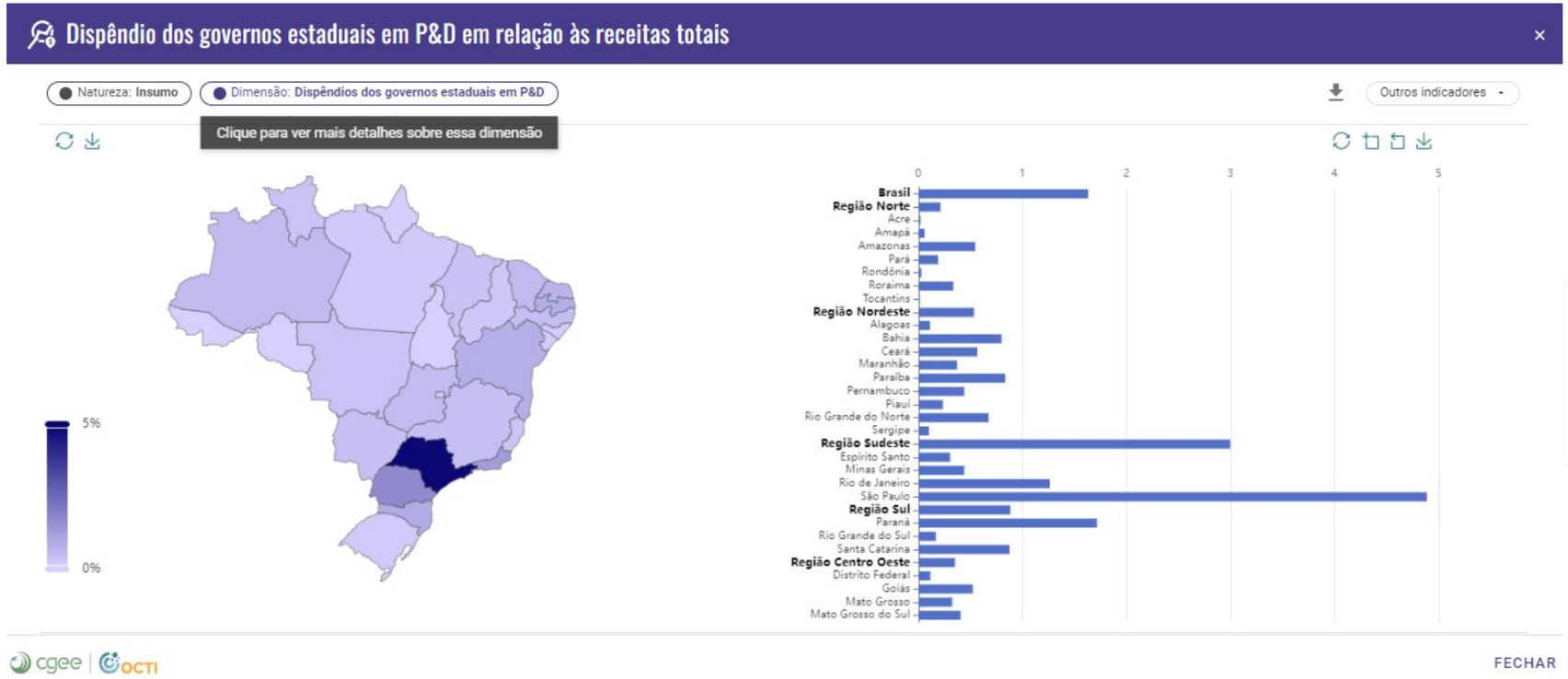


- The data indicates the leadership of the state of **Amazonas**, the largest Brazilian state and with a strong socioeconomic importance, within the North Region.

- The results can also mean impacts from the implementation of the Manaus Free Trade Zone.

OCTI Platform

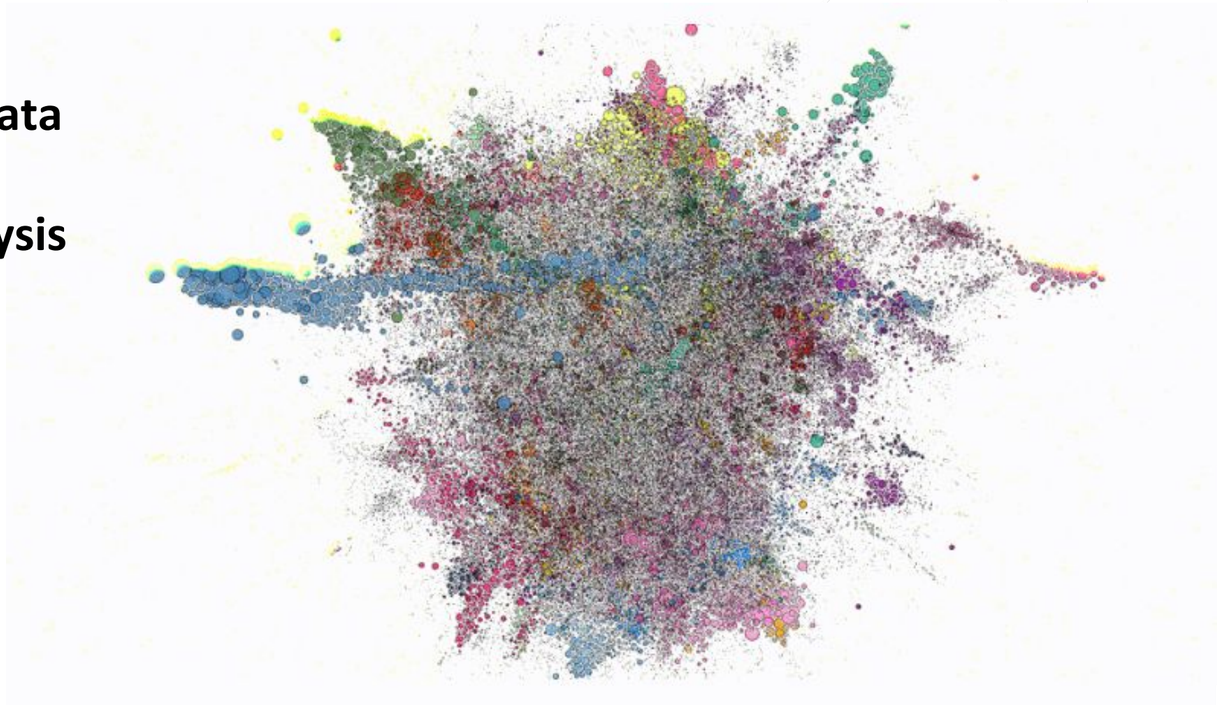
- Besides the radar charts presented, there are **other forms of visualization** of the Indicators at our Platform, available for free.
- Some examples map and line charts for the indicator Average percentage of R&D expenditures by stat governments, in the relation to their total revenues



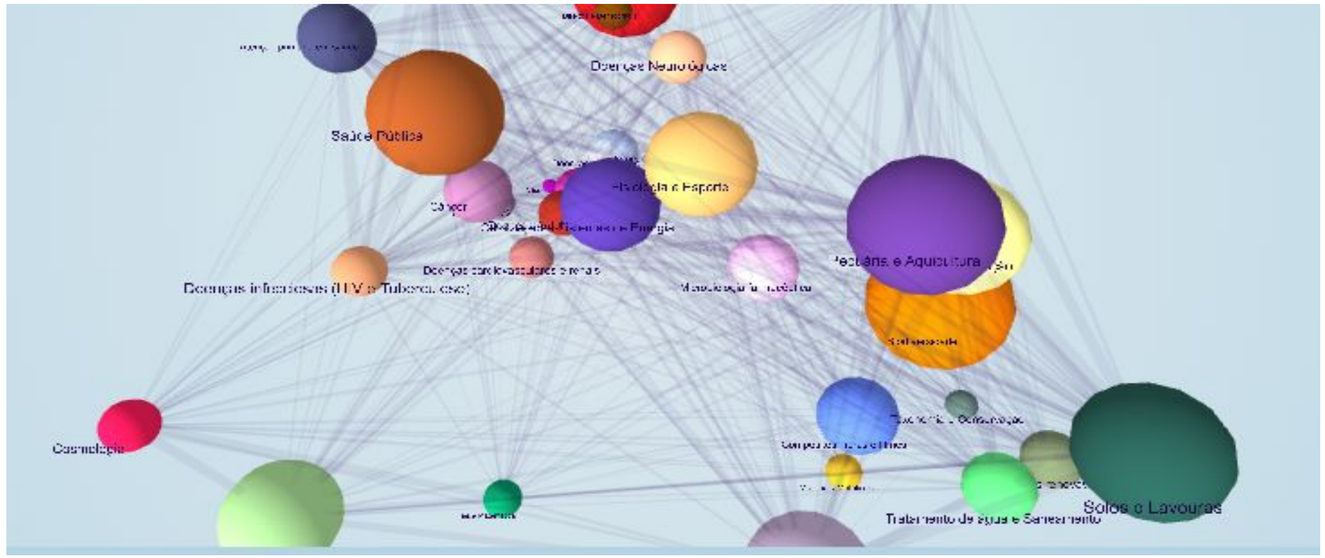
- We invite you to visit and explore our Plataform and publications: **octi.cgee.org.br**

OCTI Platform

- Two large collections of **papers metadata**
- Application of **Complex Network Analysis with semantics similarity**
- Mapping diferentes groups on **Science brazilian Community**
- **Annualy** updates



OCTI Platform



+30 Brazilian clusters
+35 worldwide clusters

- Cooperation informations
- Prospections and Opportunity Assessments
- Areas Analysis

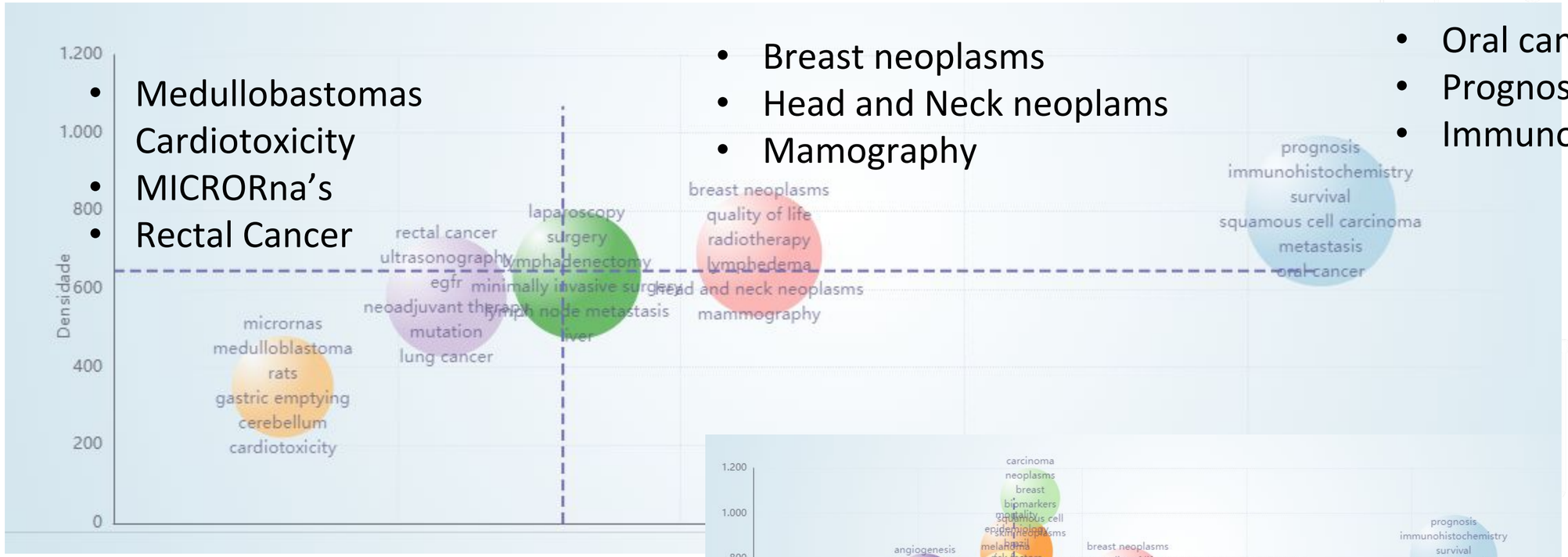
OCTI Platform

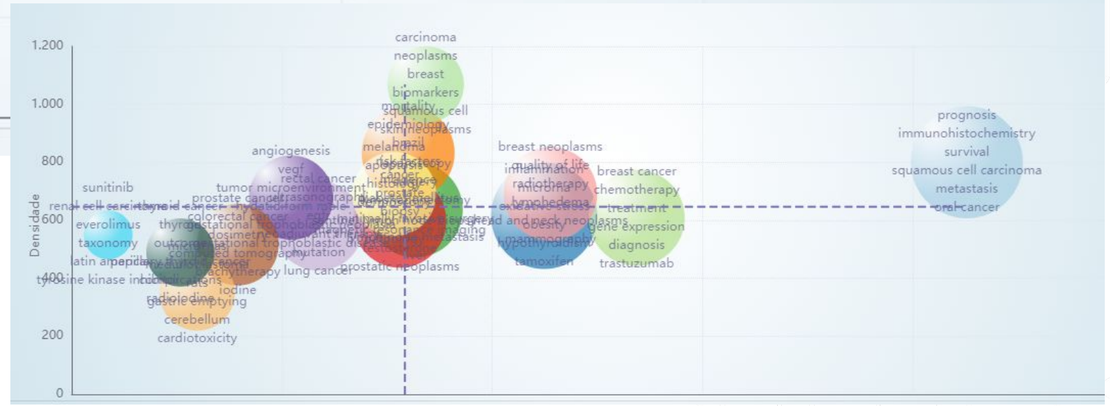
Applied Strategic Diagrams (Cobo, López-Herrera, Herrera-Viedma e Herrera (2011) [1]

- Medullobastomas
- Cardiotoxicity
- MICRORna’s
- Rectal Cancer

- Breast neoplasms
- Head and Neck neoplams
- Mamography

- Oral cancer
- Prognosis
- Immunochistochemistry





HOW TO WORK WITH OCTI

We are constantly seeking for partnership

OCTI establishes constant contact with partners for the development of new projects and new methodologies

Development of special projects

Carry out thematic studies on demand, customizing the format according to the needs of each project.

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E-mail: octi@cgee.org.br

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Thank you!

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