

# SCIENTIFIC RESEARCH AND ENTREPRENEURSHIP

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## KEYNOTE LECTURE

28<sup>th</sup> International Congress of Mechanical Engineering



COBEM 2025

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# Educational and Research Institutions Throughout the Centuries...

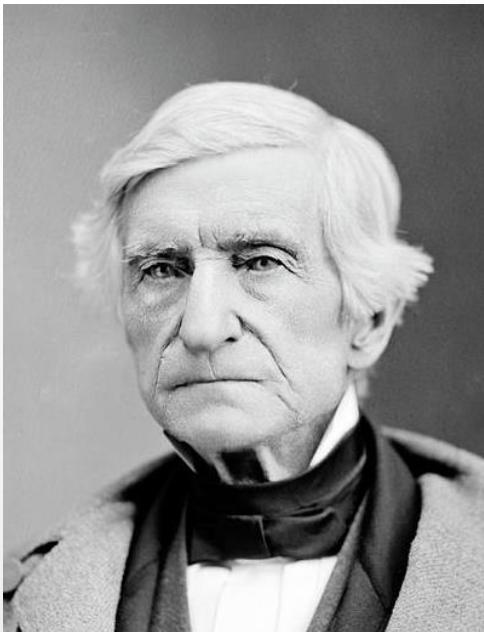
## Several Missions:

- ✓ Organize and Storage Knowledge (Aquinas 1225-1274);
- ✓ Serve the Nation (Napoleon 1769-1821);
- ✓ Research and Discover (Humbolt 1767-1835);
- ✓ Educate and Disseminate Knowledge (Newman 1801-1890).

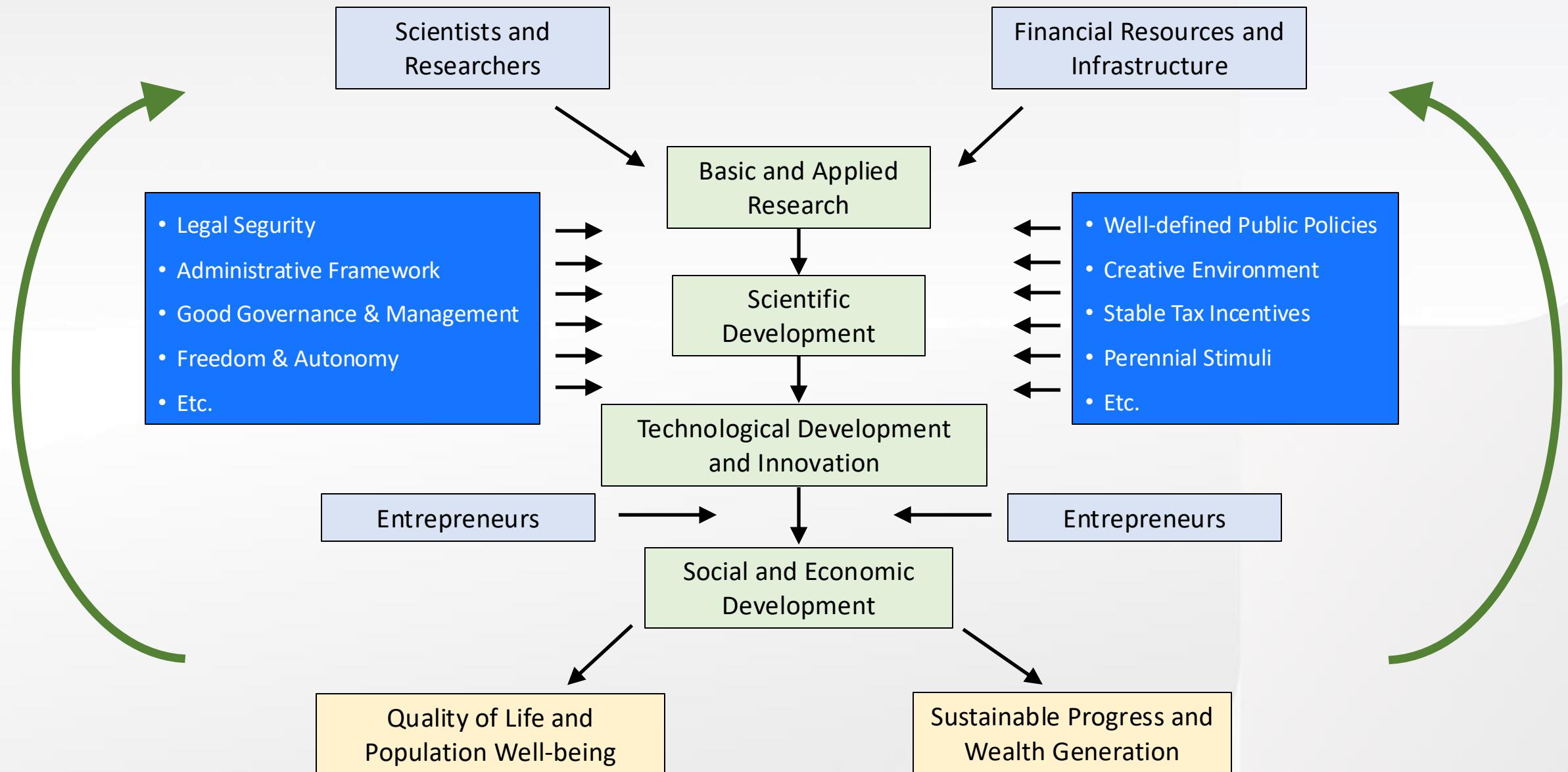


***“Our purpose is to educate individuals to a prominent degree, not solely to become scientists, but also to be practical, precisely because they are scientists.”***

*William Barton Rogers  
(MIT 1861)*



# SUCCESSFUL NATIONS



# ST&I in Brazil

1808 – Arrival of The Imperial Family

## FIRST EDUCATIONAL AND RESEARCH INSTITUTIONS - 1908



- ✓ Botanical Garden (Rio de Janeiro)
- ✓ National Museum (Rio de Janeiro)
- ✓ Fiocruz (Rio de Janeiro)
- ✓ Goeldi Museum (Belém)
- ✓ Imperial Agricultural School (Bahia)
- ✓ School of Minas (Ouro Preto)
- ✓ Butantan (São Paulo)

Early Educational and Research institutions

1900

1920

1940

1960

1980

2000

2020

University System / Brazilian Academy of Sciences / Brazilian Society for the Advancement of Science

Innovative state-owned enterprises / ST&I Management Systems / New National Research Institutions

National Graduate System

Legal Framework for ST&I

Sectorial Funds

Research Network – Internet

S&T Conferences

Restructuration and Expansion of the Federal Higher Education System

# IMPORTANT MILESTONES

- ✓ **CNPq (1951) - 74 years**
- ✓ **CAPES (1951) - 74 years**
- ✓ **BNDES (1952) - 73 years**
- ✓ **PETROBRÁS (1953) - 72 years**
- ✓ **FAPESP (1960) - 65 years**
- ✓ **FINEP (1967) - 58 years**
- ✓ **EMBRAER (1969) - 56 years**
- ✓ **EMBRAPA (1973) - 52 years**
- ✓ **MCTI (1985) - 40 years**
- ✓ **Innovation Law (2004) – 21 years**
- ✓ **FNDCT (2007) – 18 years**
- ✓ **EMBRAPII (2013) - 12 years**
- ✓ **Legal Framework of Innovation (2016) – 9 years**
- ✓ **FAPERR (2022) - 3 years**

**Regarding S&T we are a Very Young Nation!**

# BRAZIL – CURRENT SCENARIO

(Comparative performance with other countries)

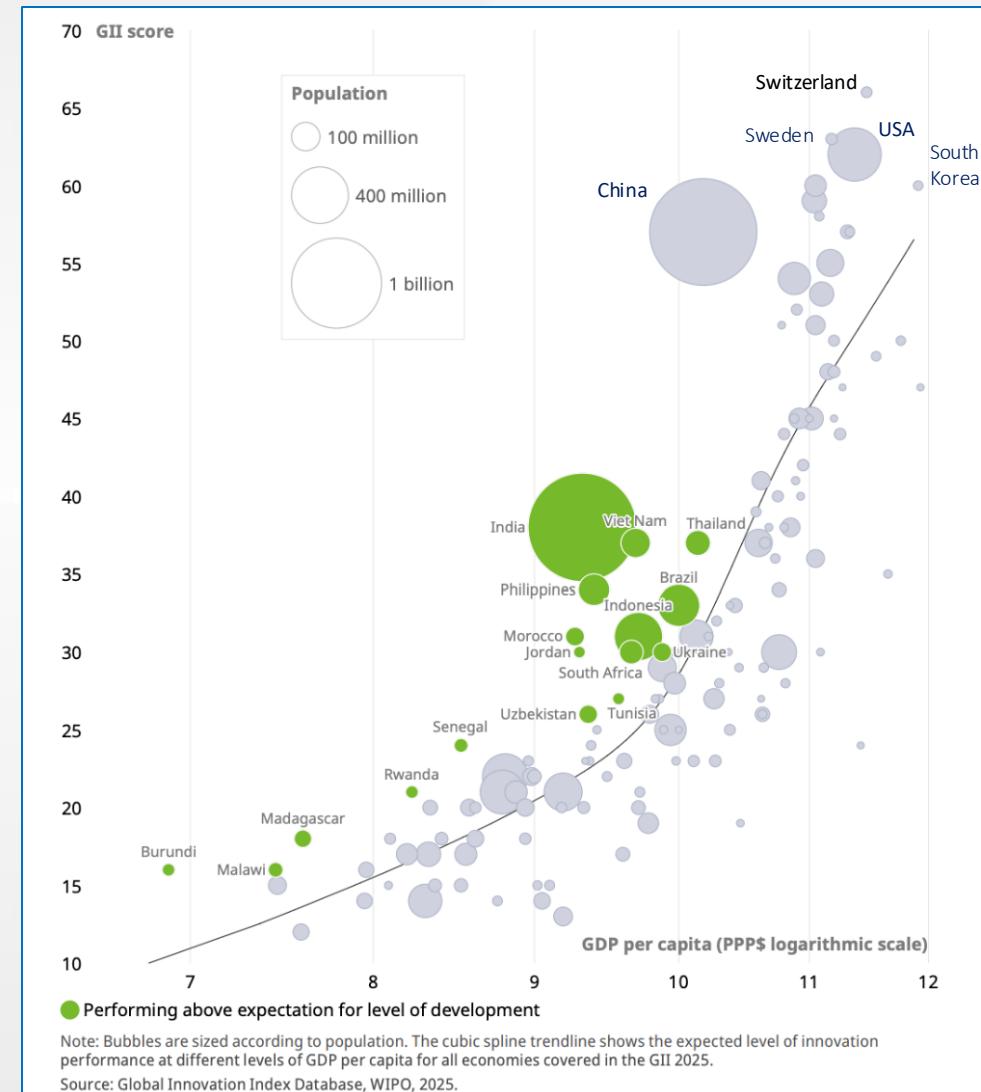
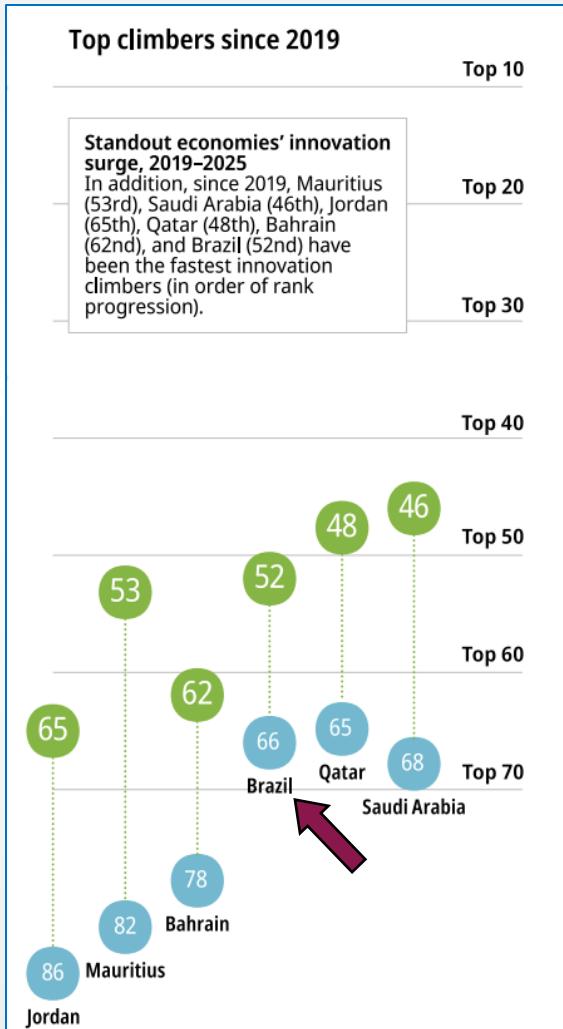
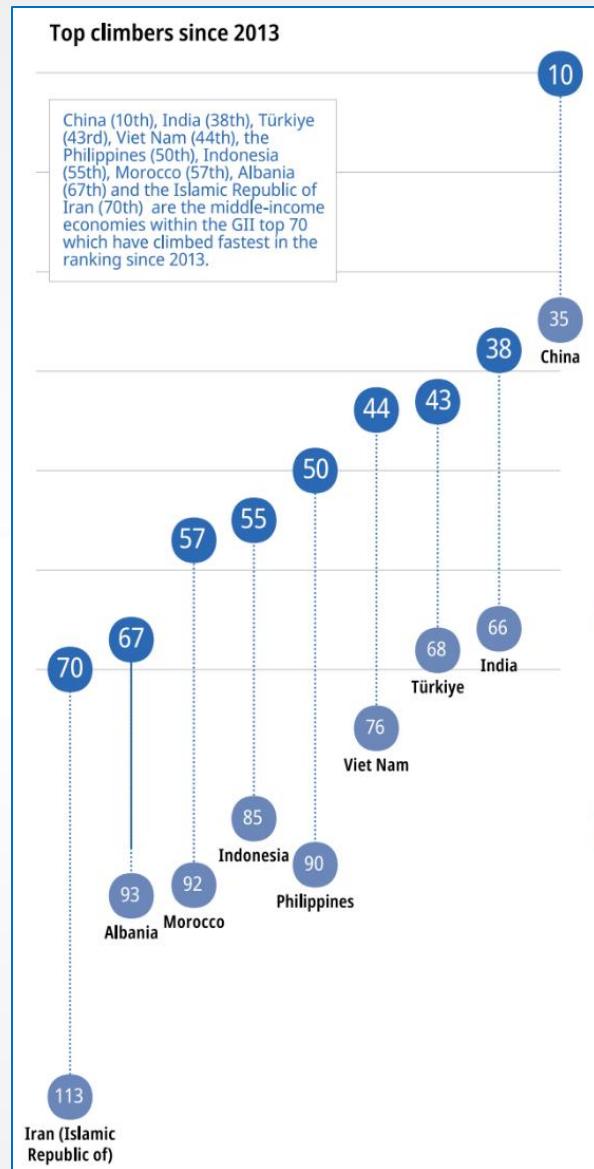
Results released in 2025

- ✓ **Global Innovation Index: 52<sup>nd</sup> position;**
- ✓ **Global Competitiveness Index: 58<sup>th</sup> position;**
- ✓ **Human Development Index: 84<sup>th</sup> position.**

**Unacceptable performance for our  
potential as a Nation!**

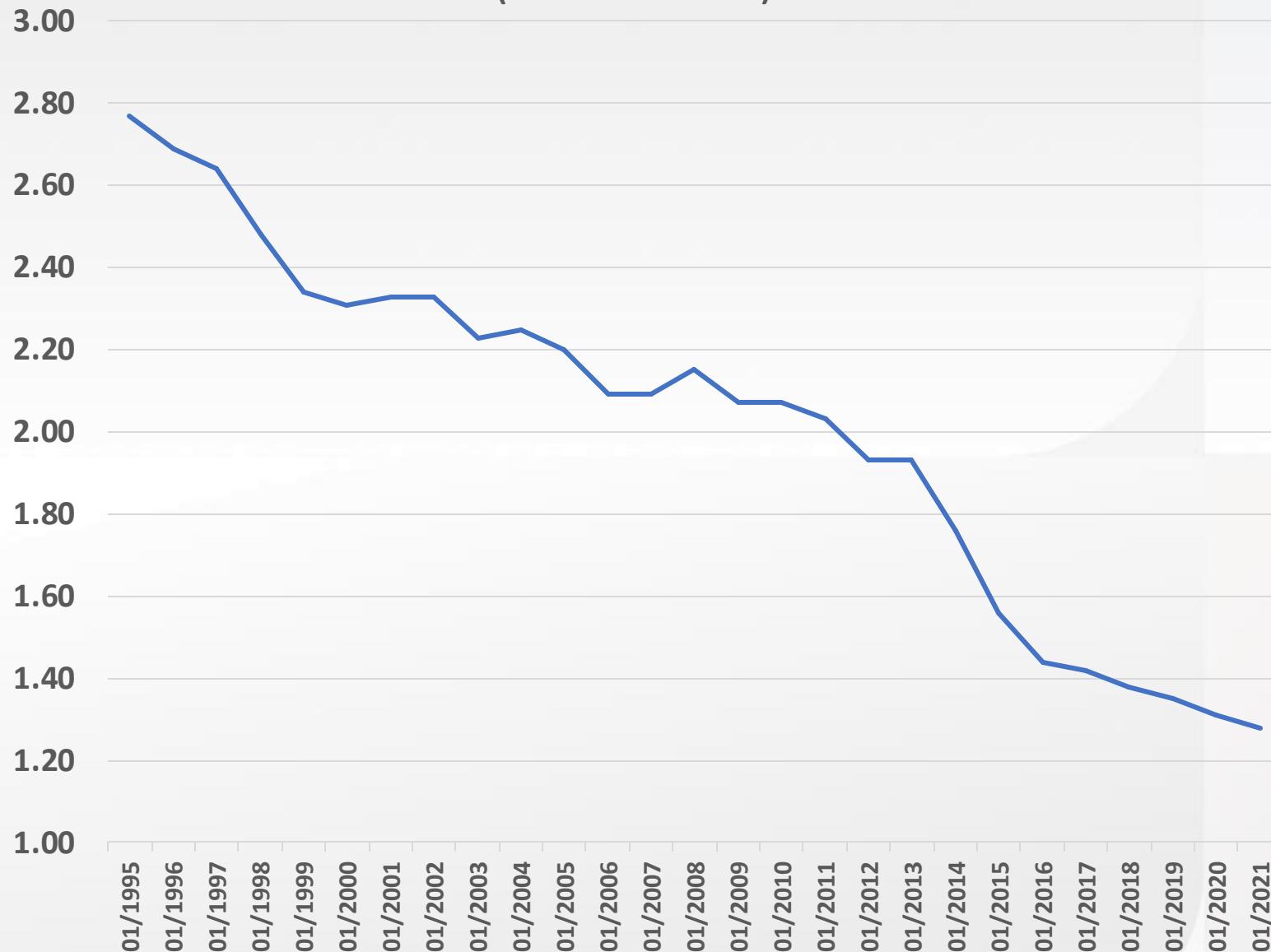
# GLOBAL INNOVATION INDEX

## (2025)

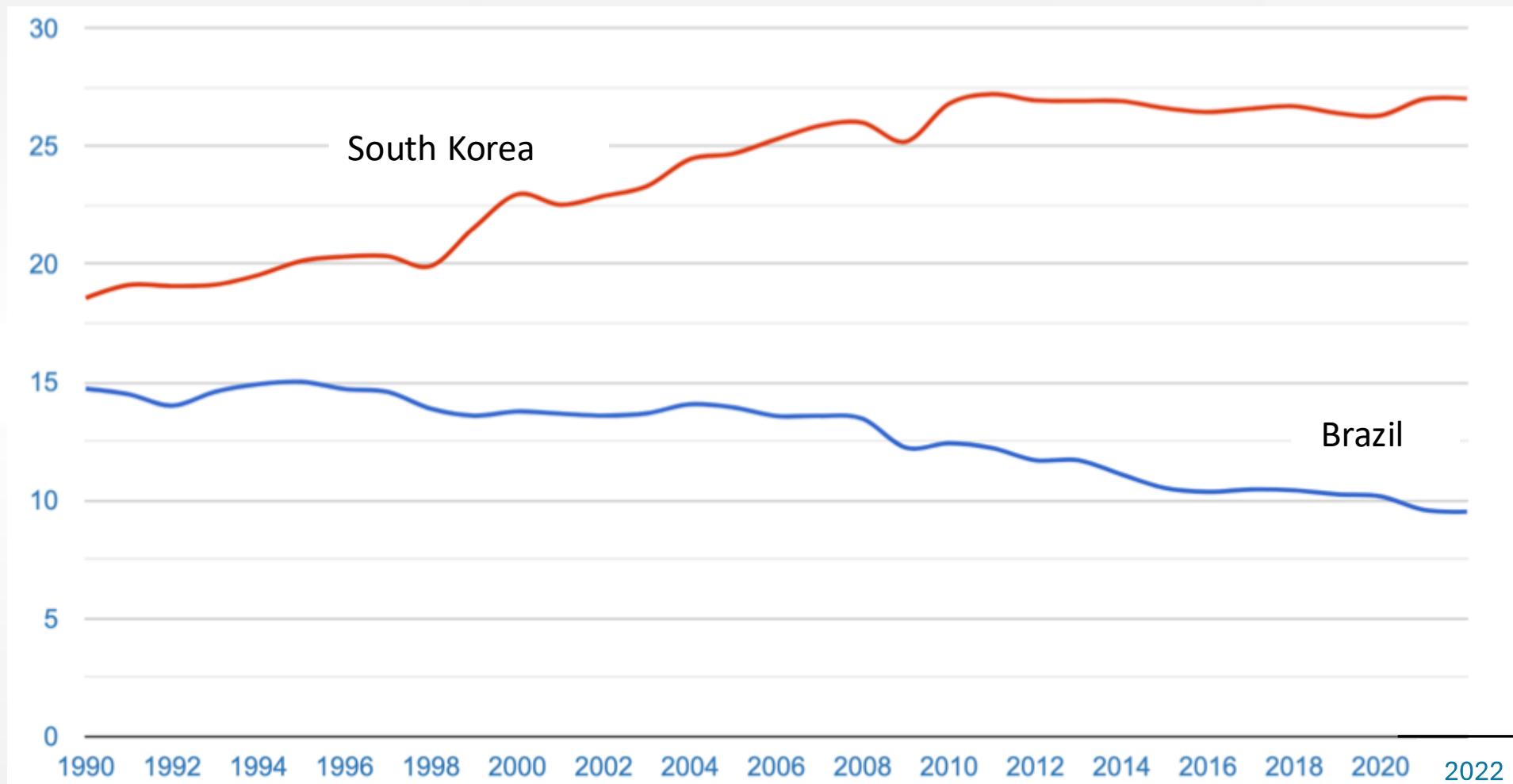


# Brazilian Industry's Participation in the World

(Value Added in %)



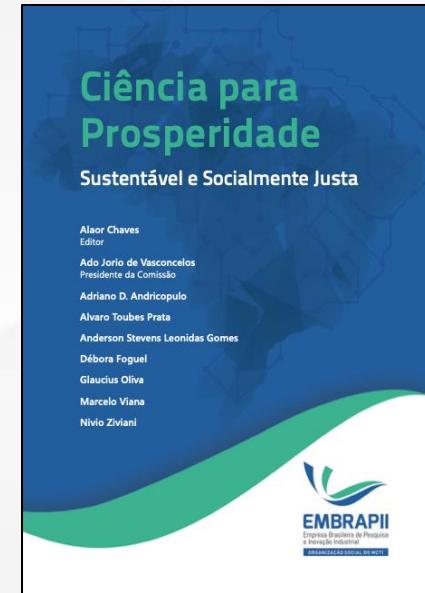
# Value Added to GDP by Manufacturing (in %)



# Brazilian Universities

- ✓ Teaching;
- ✓ Research;
- ✓ Outreach (extension);
- ✓ Strong Interaction with Society:
  - ✓ Quality of Life and Population Well-being
  - ✓ Sustainable Progress and Wealth Generation

Fourth mission is needed!



# Challenges of Faculty Generations

- ✓ **1<sup>st</sup> Generation (1960s to 1990s)**

- ✓ Academic Qualification;
- ✓ Institutionalization of Teaching and Research;
- ✓ Strengthening Graduate Studies

} Focus on People

- ✓ **2<sup>nd</sup> Generation (1990s to 2020):**

- ✓ Structuring Laboratories and Infrastructure;
- ✓ Internationalization;
- ✓ Partnerships with Companies.

} Focus on Institutions

- ✓ **3<sup>rd</sup> Generation (2020 to ...):**

- ✓ Solving National Problems;
- ✓ Wealth Generation;
- ✓ Sustainable Development.

} Focus on Nation

# Challenges and Opportunities for Science and Technology in Brazil

- ✓ To expand its influence in various sectors of the economy (**be present**);
- ✓ To work towards improving society's perception of the importance of Science and Technology (**S&T at the Service of Society**)
- ✓ To work towards solving national problems (**committing to solve them**)
- ✓ To incorporate the challenges of sustainable development (**to care about people and the environment**);
- ✓ To attract new talent (**be more attractive**);
- ✓ To explore our comparative advantages in order to **generate wealth and improve quality of life for the population**;
- ✓ To stimulate regional development.

**We need to innovate and be entrepreneurial !!!**

# How to Move Further ?

## Good Example to Follow: EMBRAPPII

MINISTÉRIO DO  
DESENVOLVIMENTO  
INDÚSTRIA, COMÉRCIO  
E SERVIÇOS

MINISTÉRIO DA  
SAÚDE

MINISTÉRIO DA  
EDUCAÇÃO

MINISTÉRIO DA  
CIÊNCIA, TECNOLOGIA  
E INOVAÇÃO

GOVERNO DO  
**BRASIL**  
DO LADO DO Povo Brasileiro

# EMBRAPII

Supporting

## INNOVATION IN INDUSTRY

through partnerships with the best  
Research and Technological  
Development Centers in the country.



# Projects Supported by EMBRAPII

Technological development initiative that relies on specialized technical support and non-refundable funding, made possible by EMBRAPII:

- ✓ The company contributes part of the investment, EMBRAPII covers up to  $\frac{1}{3}$  of the total costs, and the Research Unit - accredited by EMBRAPII, provides an economic counterpart;
- ✓ For small companies, EMBRAPII's contribution can be even greater.

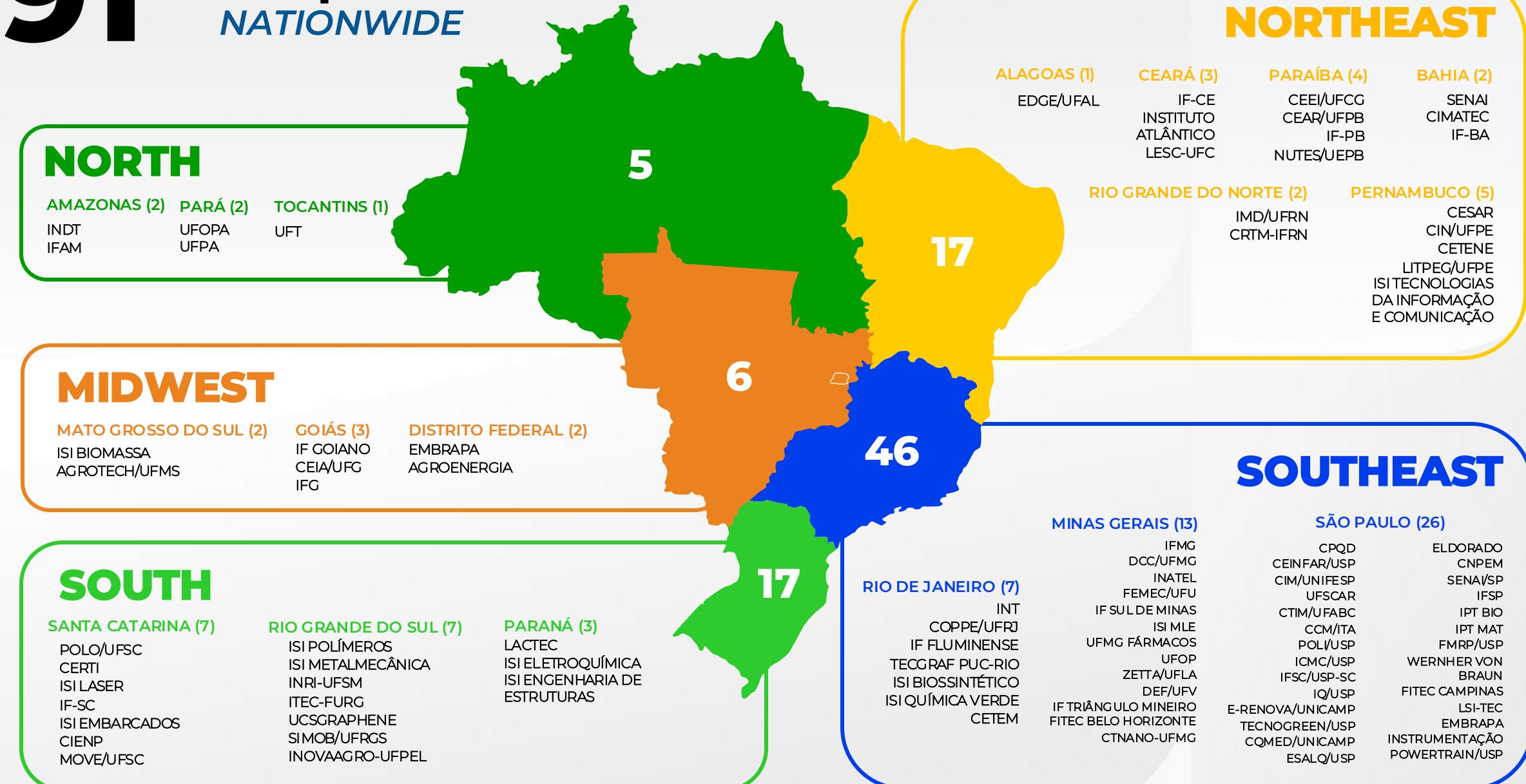
The advantage lies in direct contracting, without Public Call, which makes the process faster and less bureaucratic!

# Why is a project supported by EMBRAPII attractive to companies?

- ✓ Significant reduction in development costs;
- ✓ Lower risk exposure with continuous technical support;
- ✓ Greater agility in contracting and project initiation;
- ✓ Access to researchers and cutting-edge laboratories;
- ✓ R&D infrastructure ready to use;
- ✓ Greater predictability in deliveries and results.

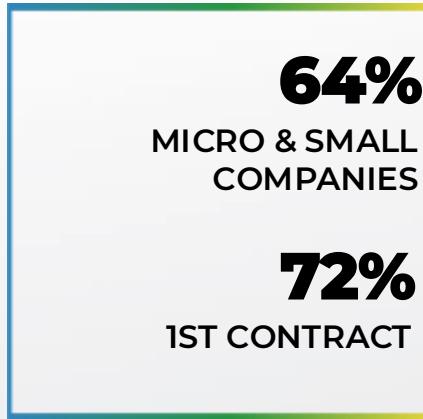
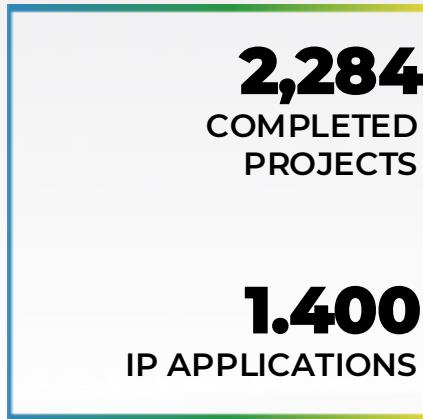
# 91

## Embrapii Units NATIONWIDE



## R&amp;D&amp;I PROJECTS - CONTRACTED

2014 - 2025



**USD\* 1.24 billion**

TOTAL VALUE OF R&D&I PROJECTS

**34%** **EMBRAPII**

**50%** **COMPANIES**

**16%** **EMBRAPII UNITS**

\* Exchange rate: 1 USD = 5.5 BRL

Source: Embrapii SRInfo. Data retrieved on October 24th, 2025

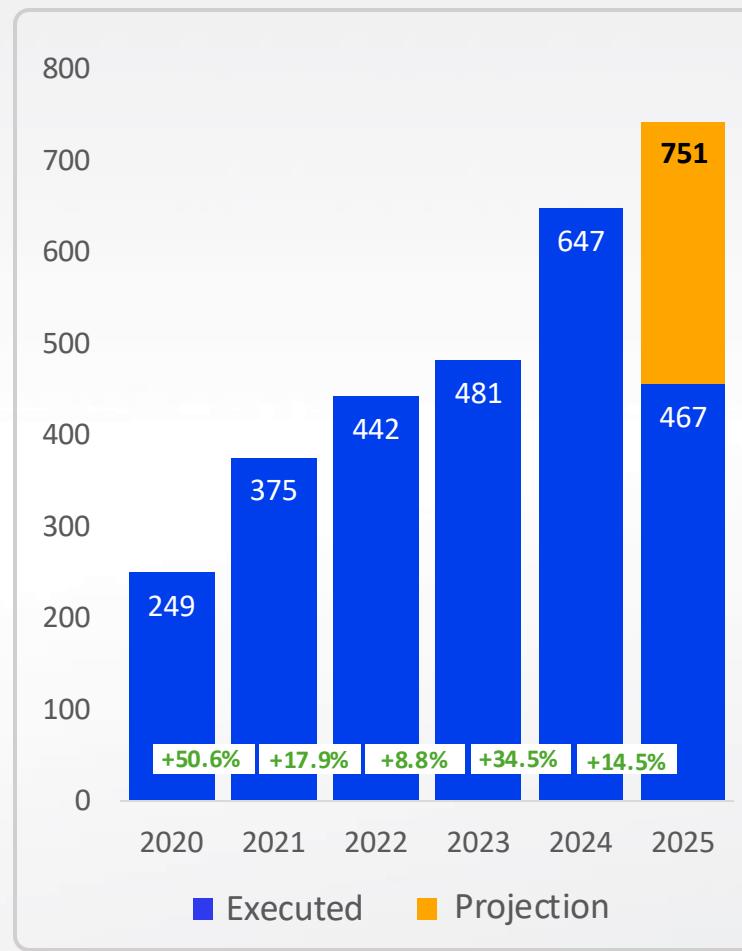
# R&D&I PROJECT GROWTH

Average investment growth by  
**2020-2024: 35 % per year**

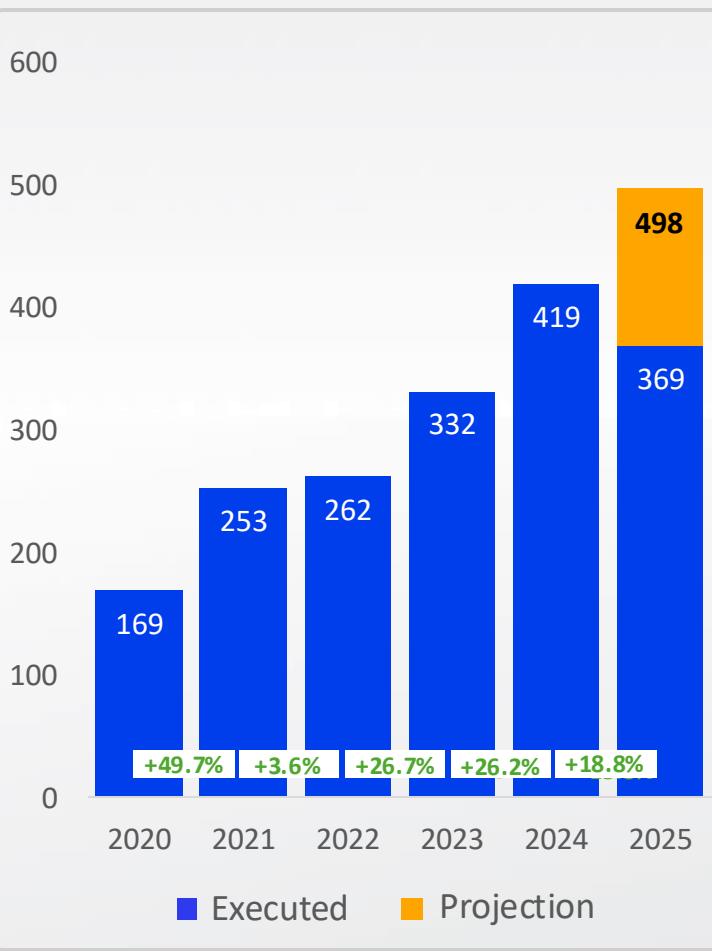


# OVERALL FIGURES 2025

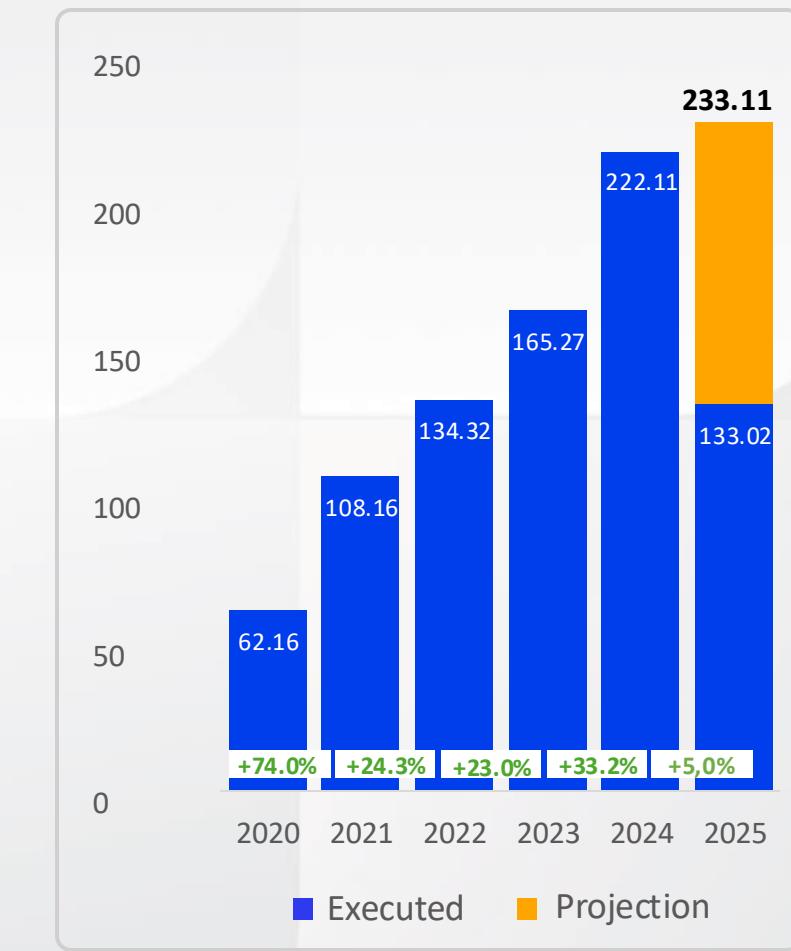
NUMBER OF PROJECTS - CONTRACTED



NUMBER OF PROJECTS - COMPLETED



TOTAL VALUE OF PROJECTS - CONTRACTED (USD\* mil.)

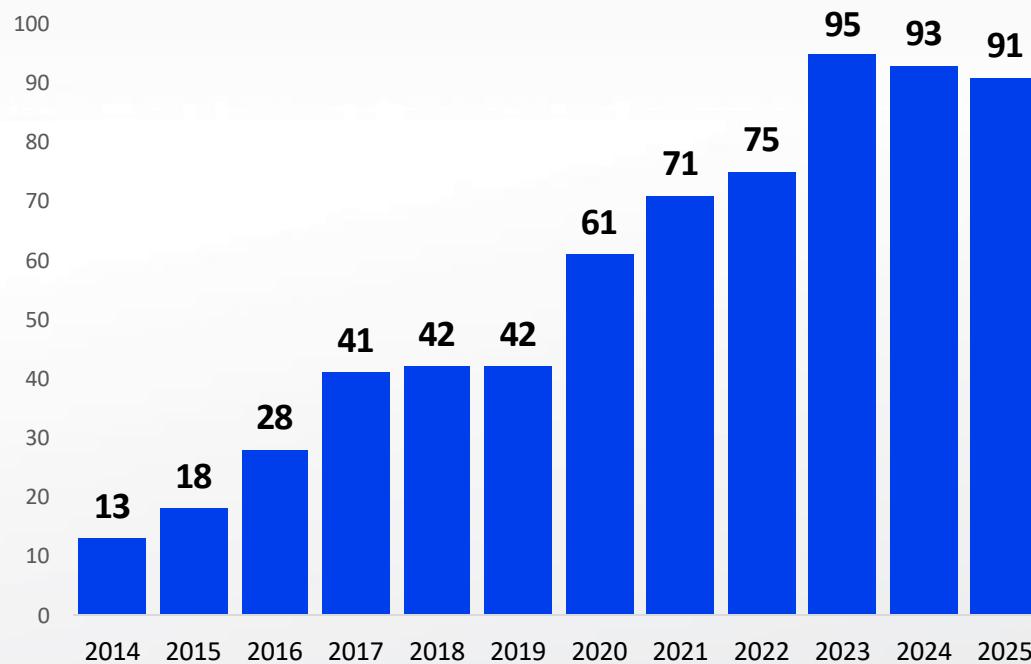


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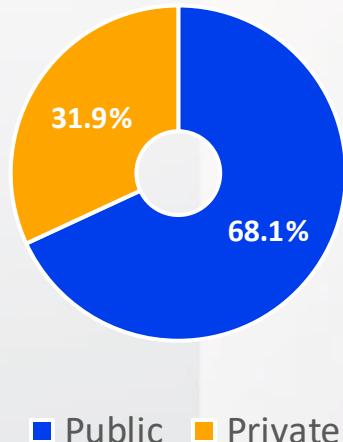
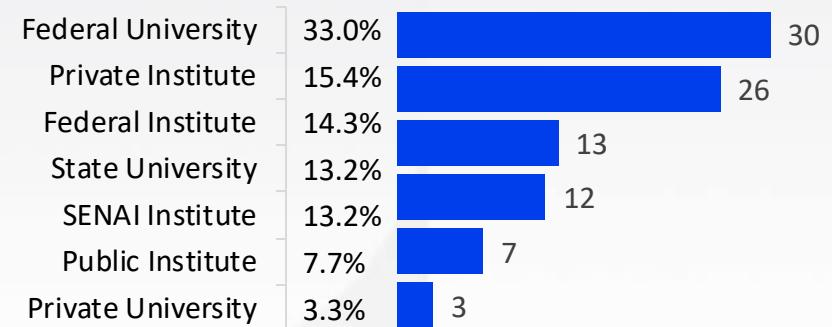
# EMBRAPII UNITS



## Evolution of the Number of Accredited EMBRAPII Units

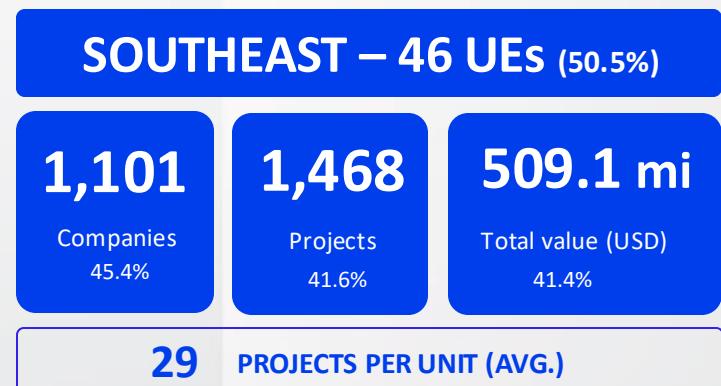
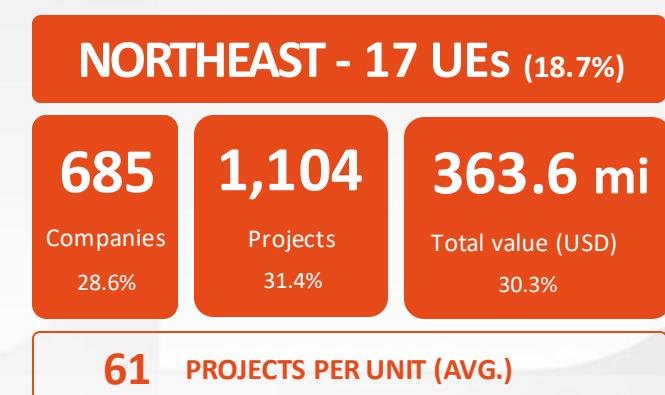
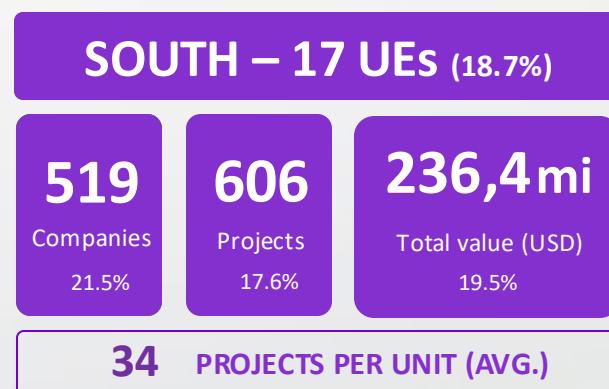
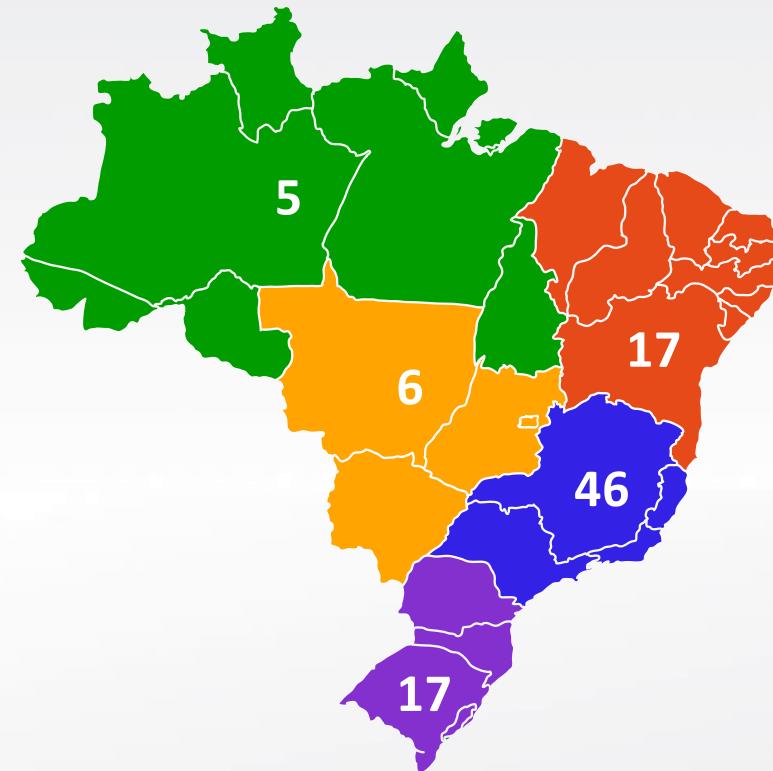
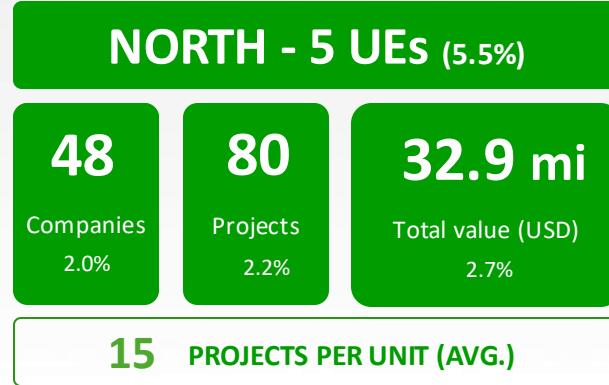


## Embrapii Unit by Type of Institution

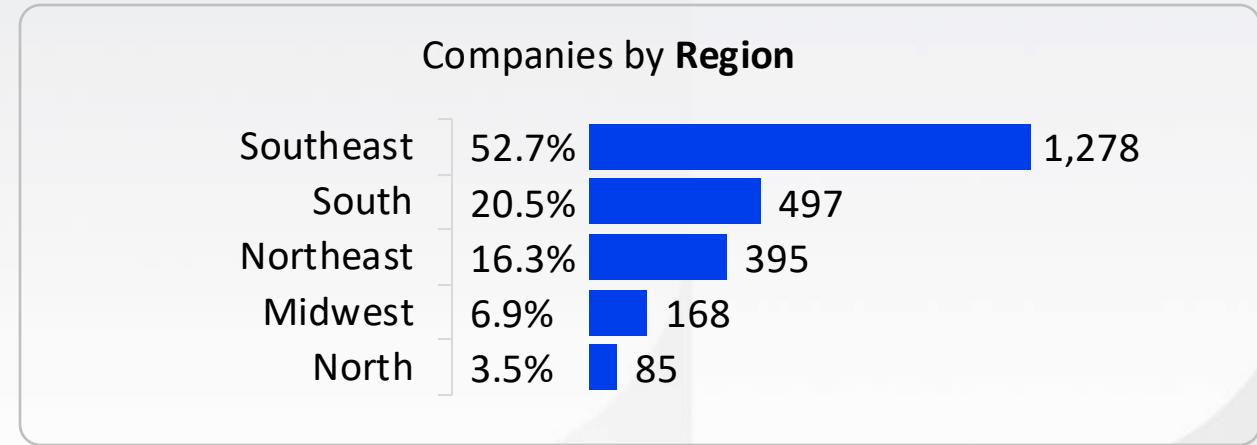
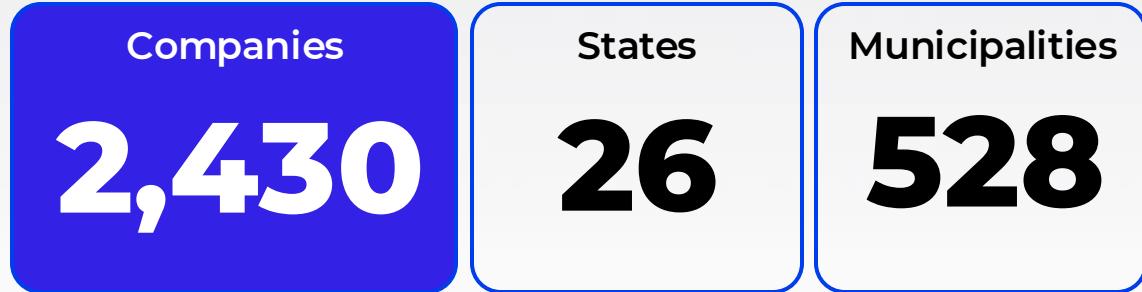


# REGIONAL BREAKDOWN BY EMBRAPII UNIT 2014-2025

INovação em rede  
para o futuro  
da indústria.

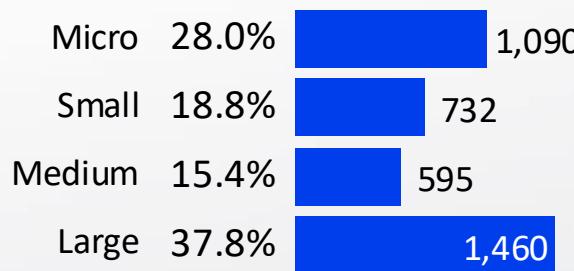


# PROFILE OF SUPPORTED COMPANIES (2014-2025)

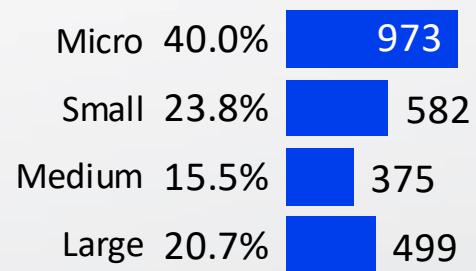


## Companies by Size

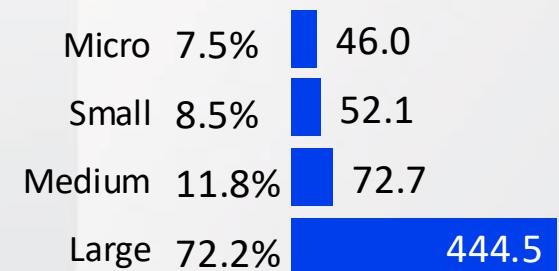
### Number of Projects



### Number of companies



### Total investment – companies share (USD million)

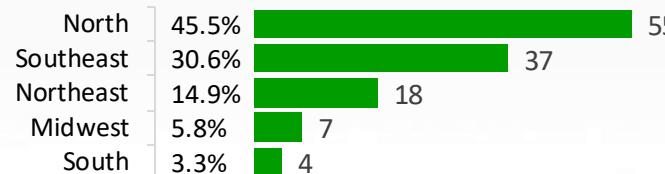


# OVERALL COMPANY NUMBERS BY REGION\*

## NORTH (85)

85 Companies 121 Projects 40,3 mi Total value (USD)  
3,5% 3,3% 2,5%

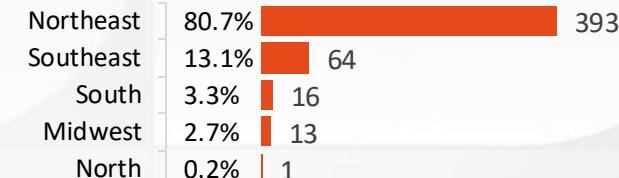
### Number of Projects with Regional Embrapii Units:



## NORTHEAST (395)

395 Companies 487 Projects 790,9 mi Total value (USD)  
16,3% 13,1% 9,0%

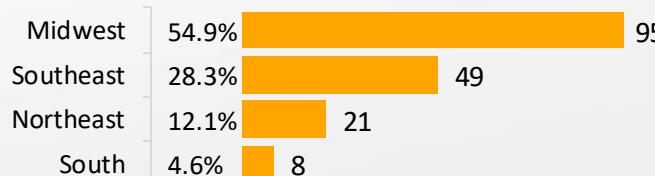
### Number of Projects with Regional Embrapii Units:



## MIDWEST (168)

168 Companies 173 Projects 62,5 mi Total value (USD)  
6,9% 4,7% 3,9%

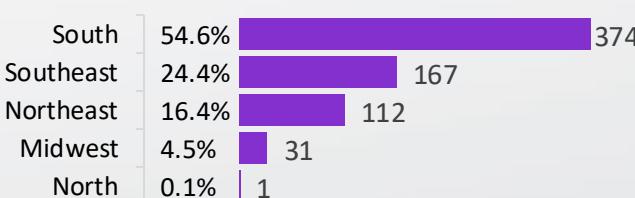
### Number of Projects with Regional Embrapii Units:



## SOUTH (497)

497 Companies 685 Projects 263,3 bi Total value (USD)  
20,5% 18,4% 16,5%

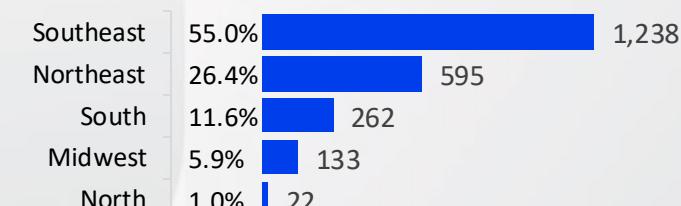
### Number of Projects with Regional Embrapii Units:



## SOUTHEAST (1,278)

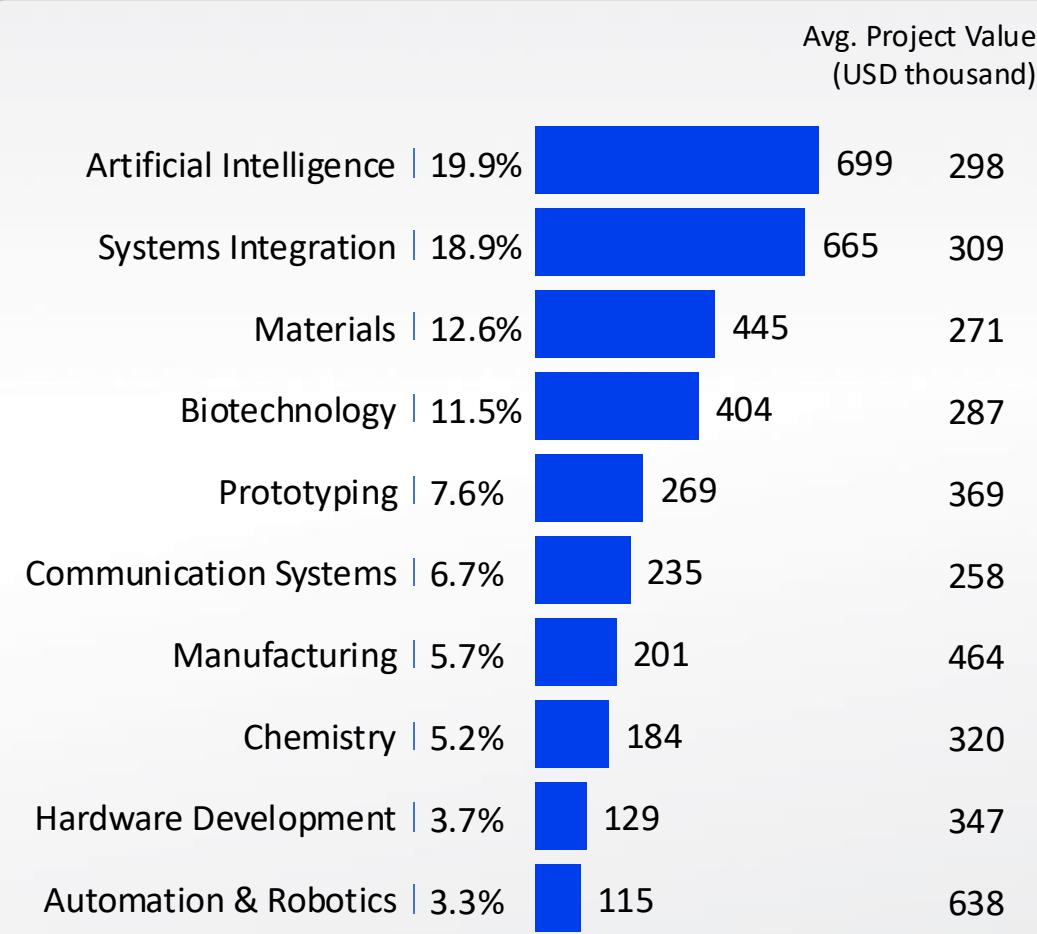
1.278 Companies 2.250 Projects 1,08 bi Total value (USD)  
52,7% 60,5% 68,0%

### Number of Projects with Regional Embrapii Units:

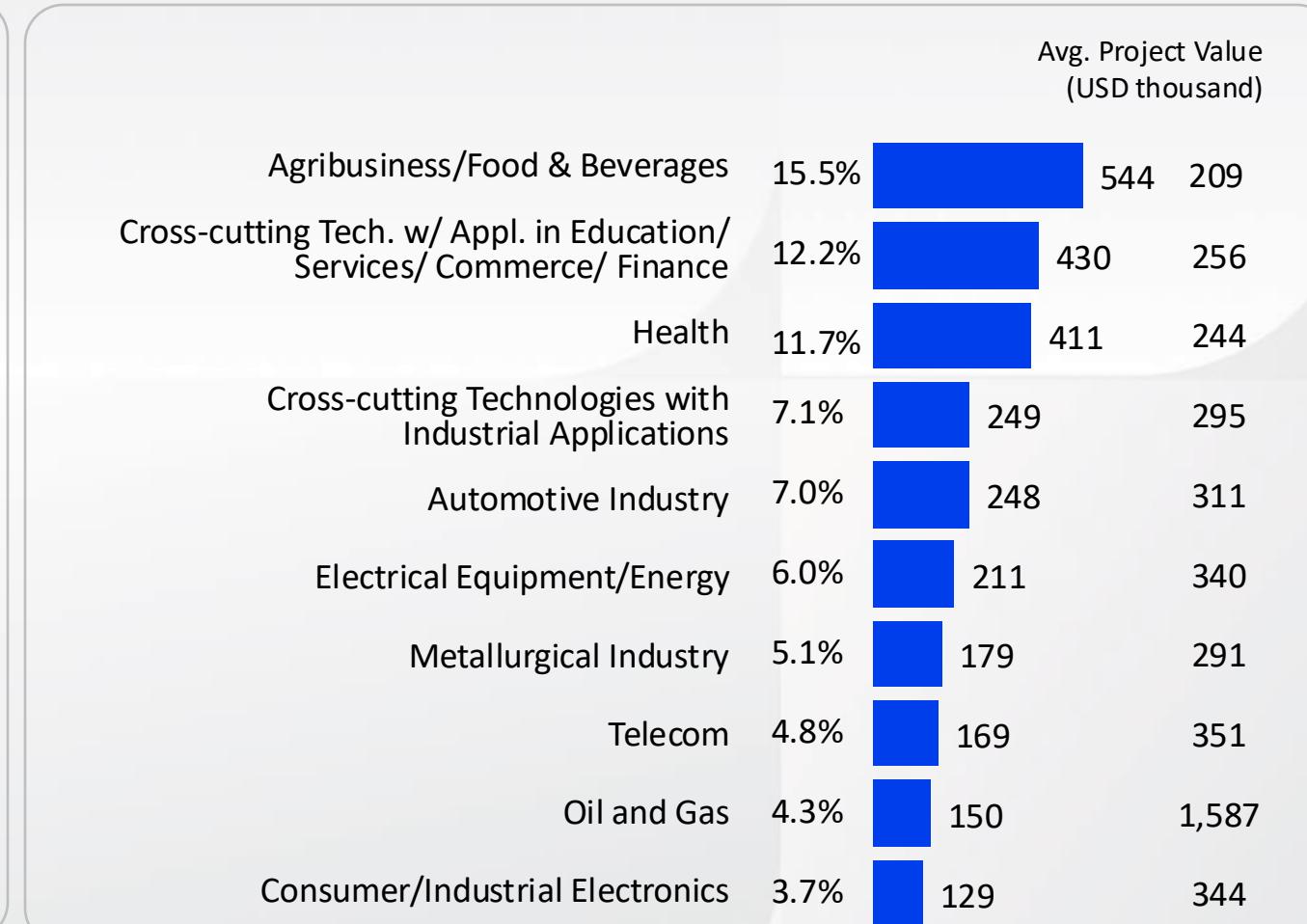


# PROJECTS PROFILE (2014-2025)

## Number of projects by Enabling Technology (top10)

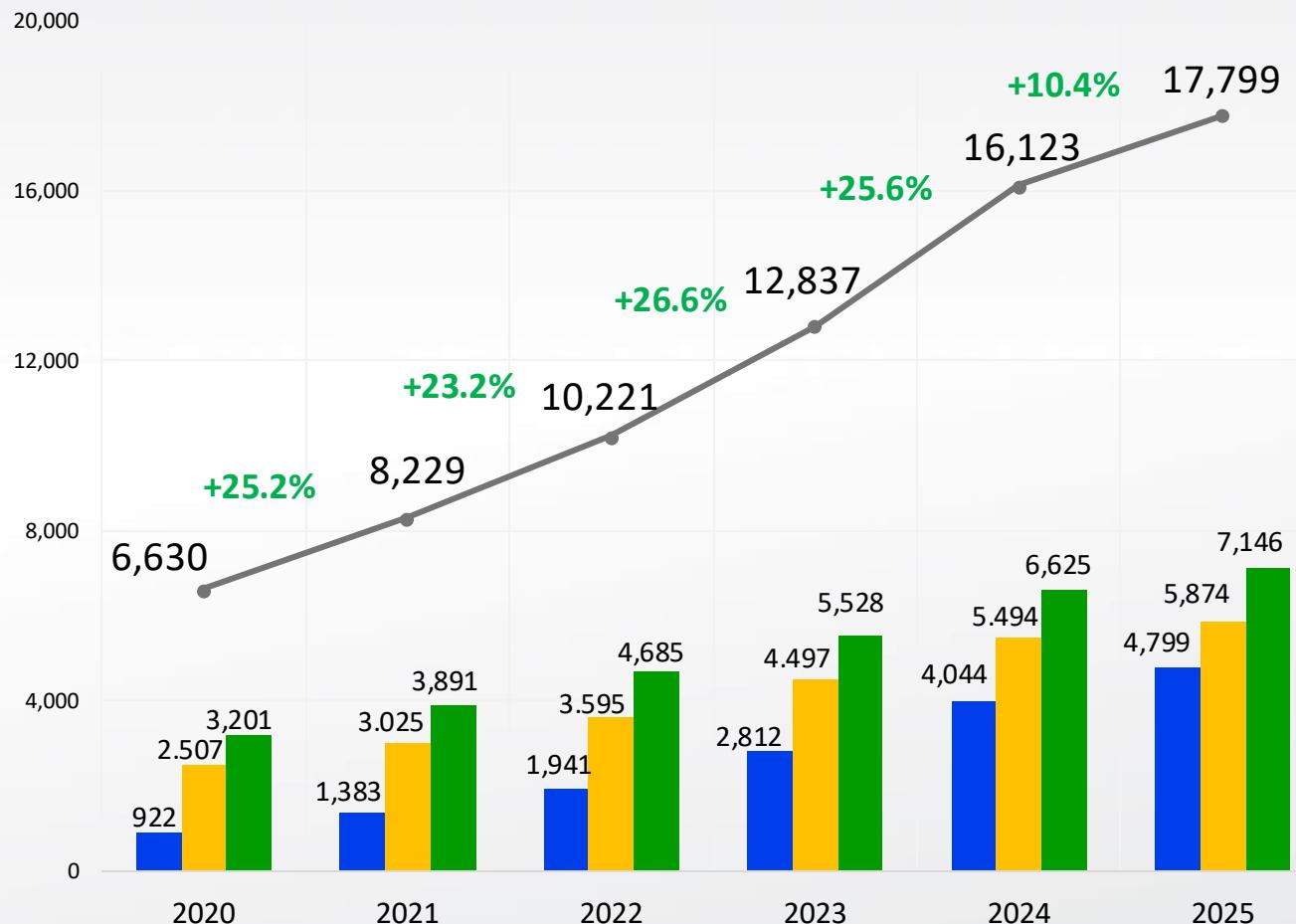


## Number of projects by Application Area\* (top10)



# EMBRAPII UNITS: STAFF

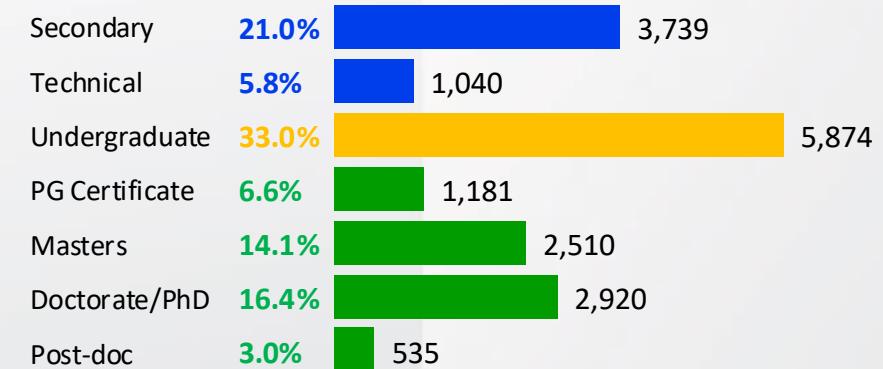
■ Secondary/ technical ■ Undergraduate ■ Postgraduate — Total



**17,799** ACTIVE STAFF IN EMBRAPII UNITS

**7,146**  
40.1% POSTGRADUATE STAFF

## Current employed staff by level of education



Join EMBRAPAI and  
contribute to making our  
industry stronger !



# Thank you !

