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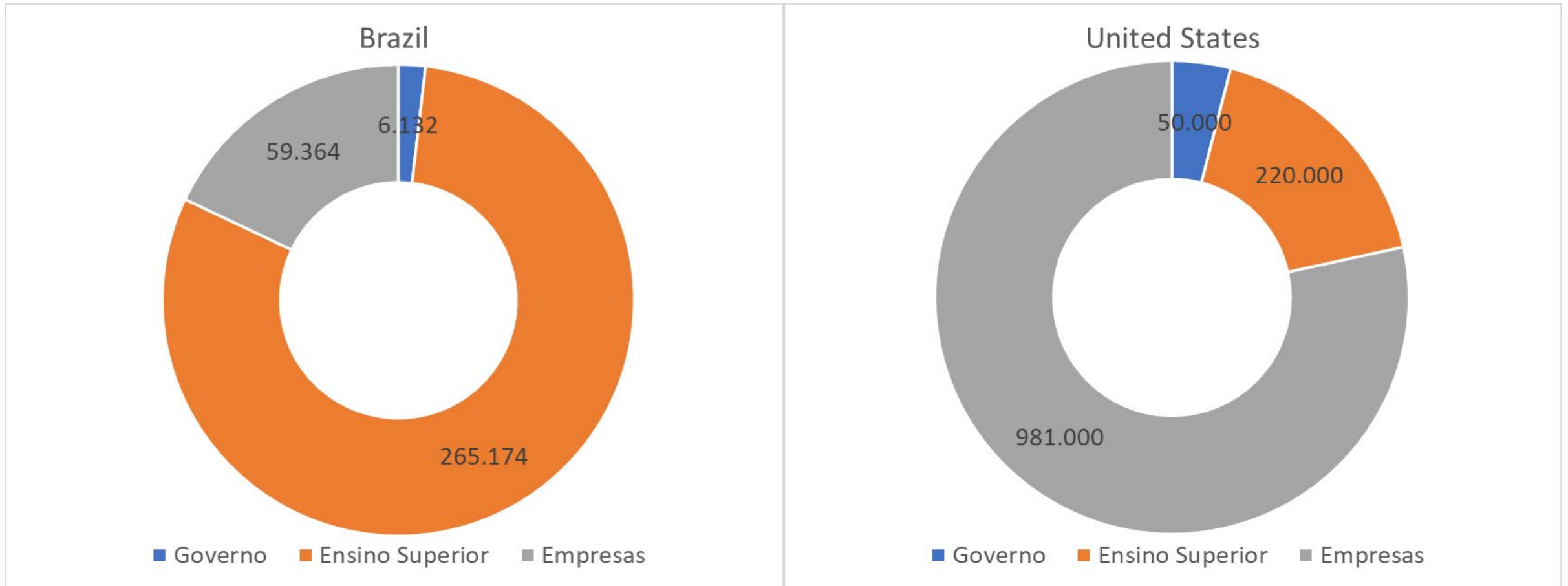
The places for research: benchmarking University-Business Research Collaboration in Brazil

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Prêmio INOVA UNICAMP, 20200708

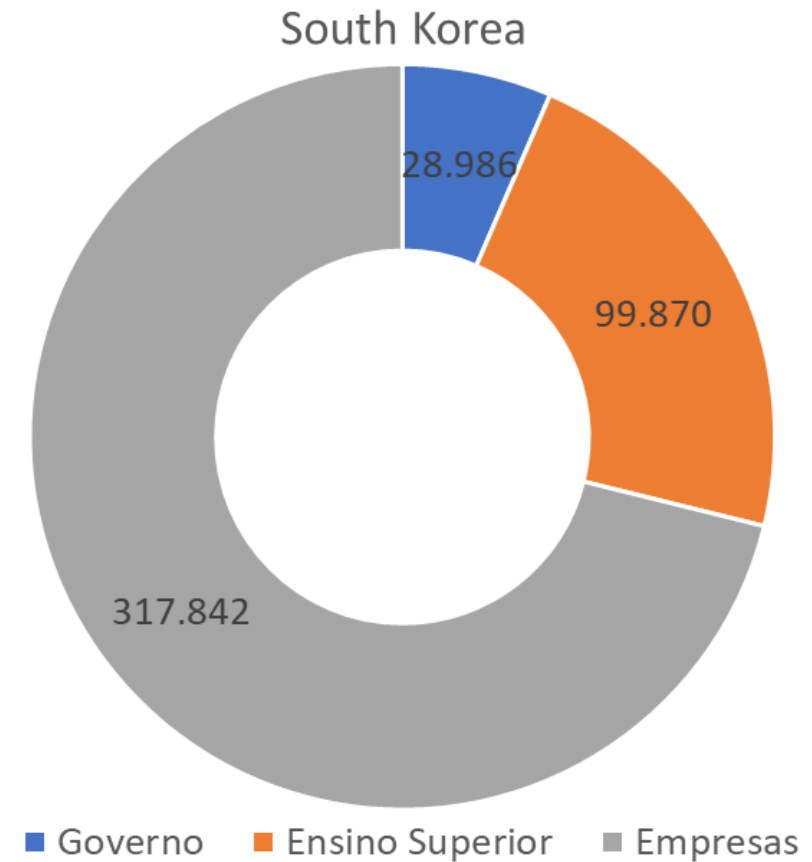
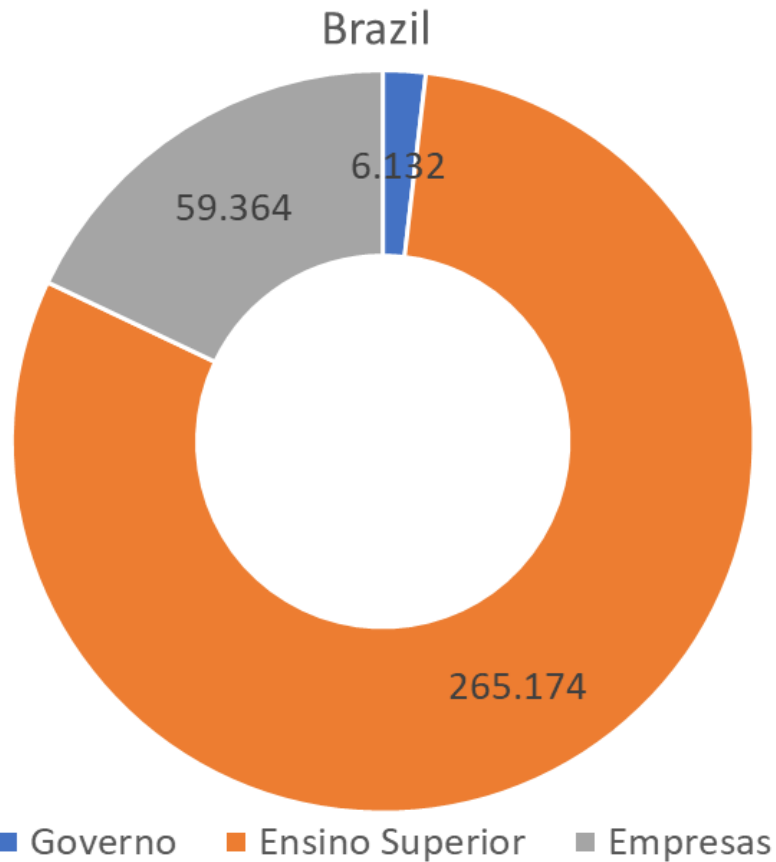
The places of research

- Universities
 - Basic (large), Applied (some), Development (small)
- Business (Industry)
 - Basic (small), Applied (some), Development (large)
- Mission oriented research institutes
 - Basic (small), Applied (more than some), Development (some)

Number of researchers by sector Brazil, USA

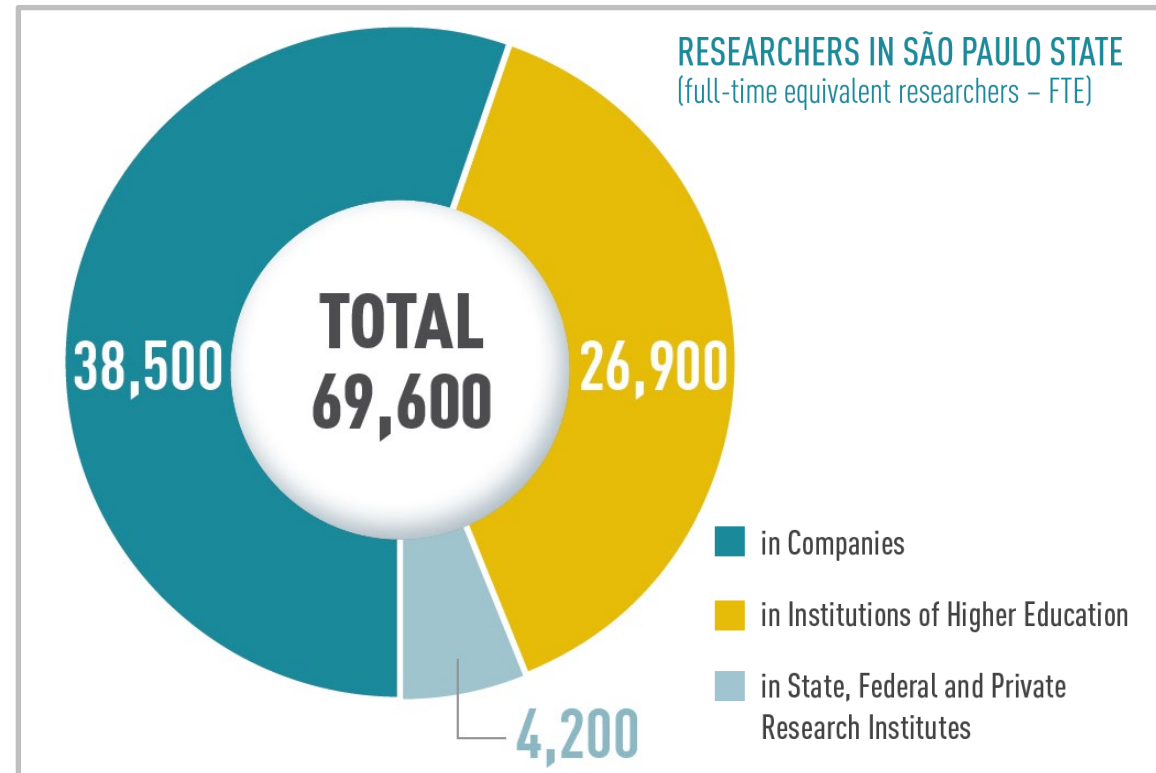
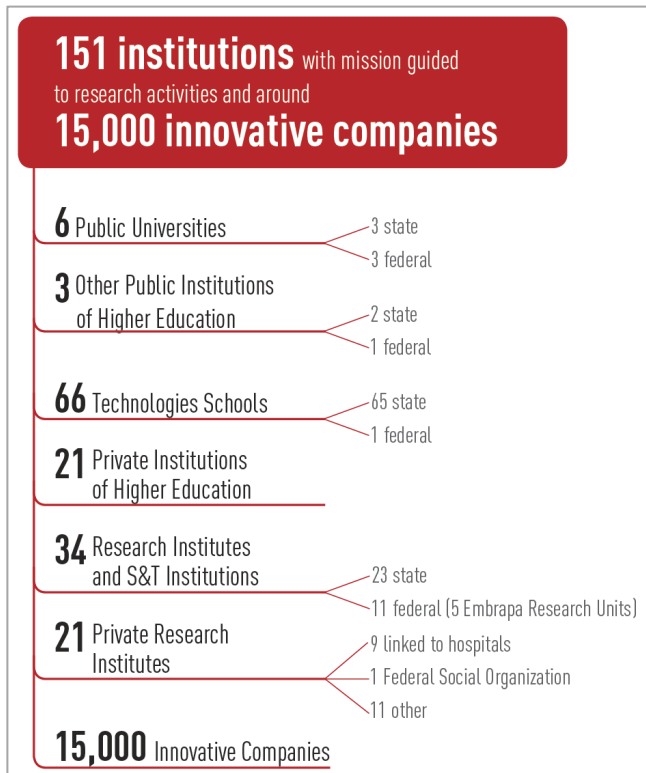


Number of researchers by sector Brazil, S. Korea



The S&T system in the state of São Paulo, 2017

151 entities, 15,000 companies, 69,600 researchers



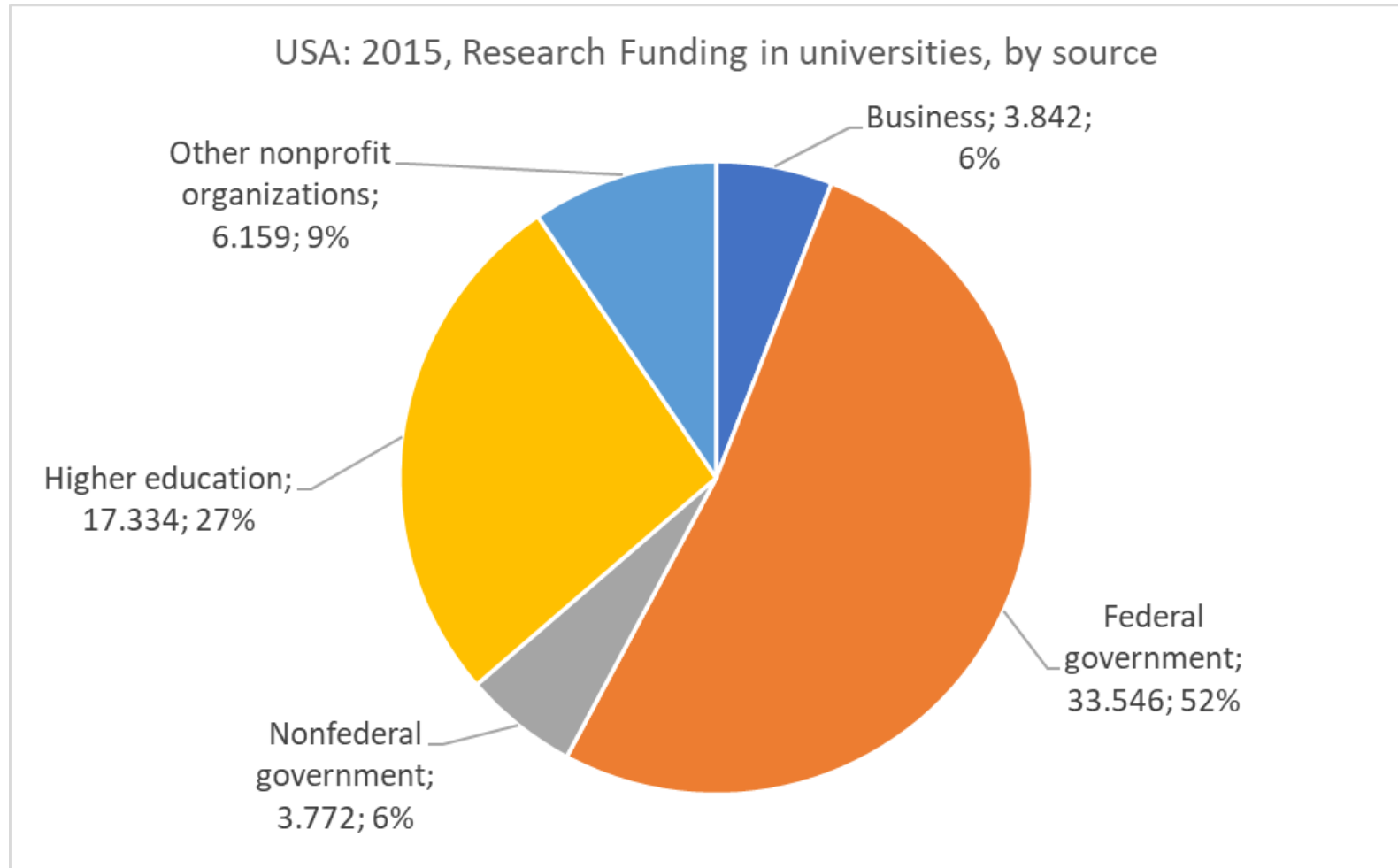
Some indicators of university-business interaction

1. Value of expenditures of a university with industry funds for sponsored research.
2. Intensity of industry researcher's co-authorship in scientific articles published by universities.
3. Patent portfolio, intensity of industry and universities co-titleship in patents, and licensing.
4. Quantity of start-ups created by students and faculty from a university.

Some indicators of university-business interaction

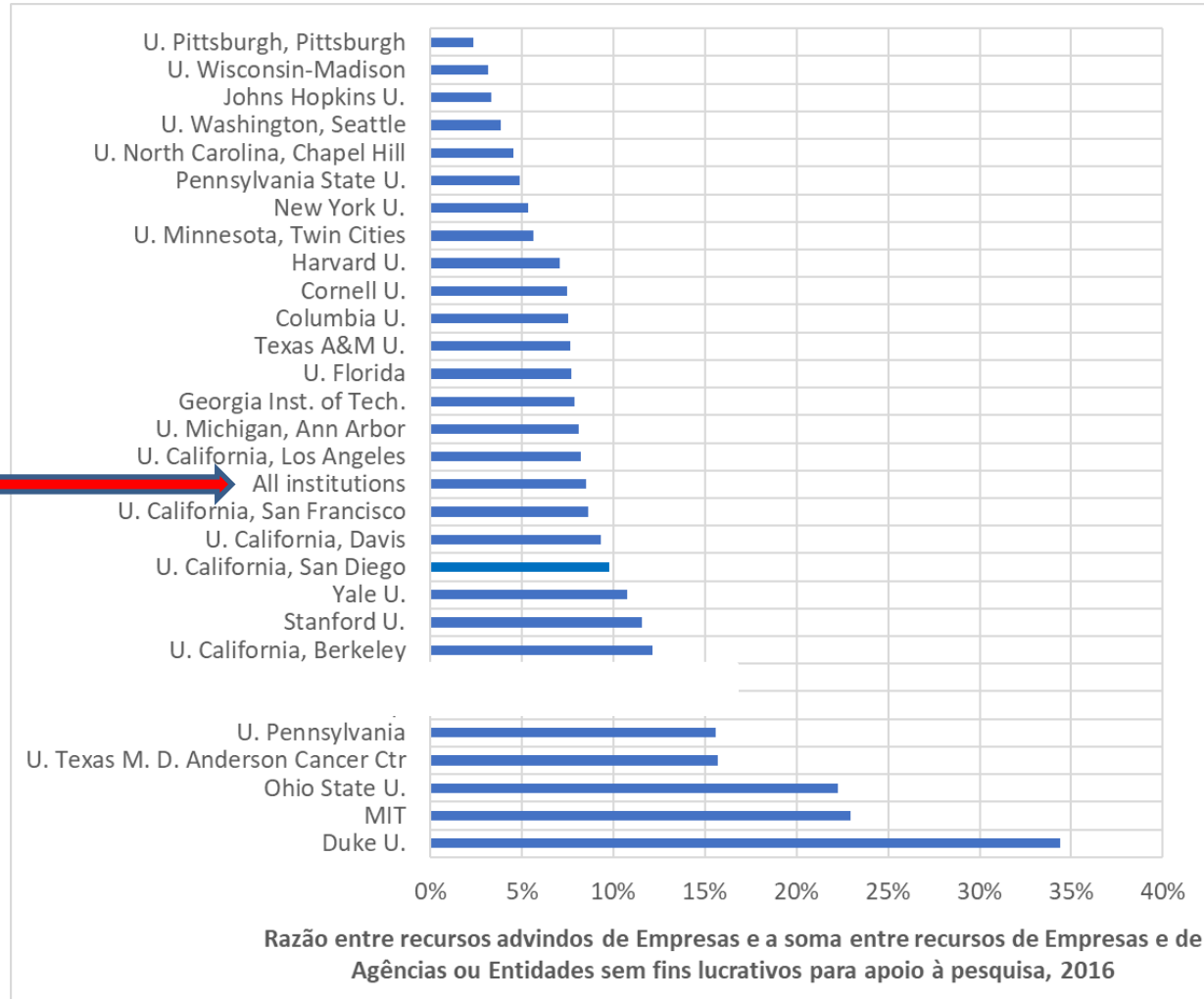
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Sources of Funding for Research in Higher Education Institutions, U.S., 2015



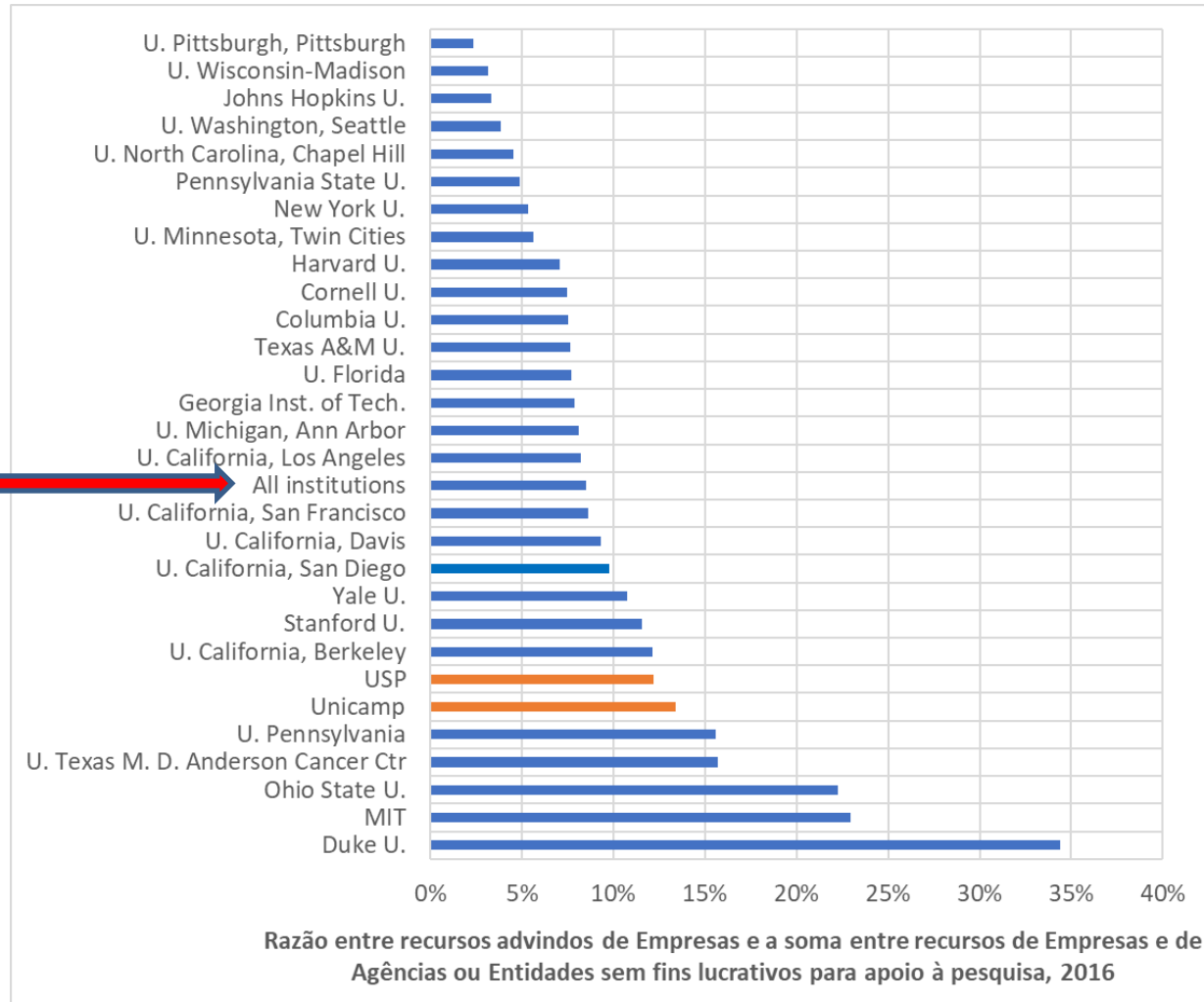
In the U.S. 8% of external funding to university research comes from business sector

**Média
nos EUA**



In the U.S. 8% of external funding to university research comes from business sector; in SP more than 10%

Média nos EUA



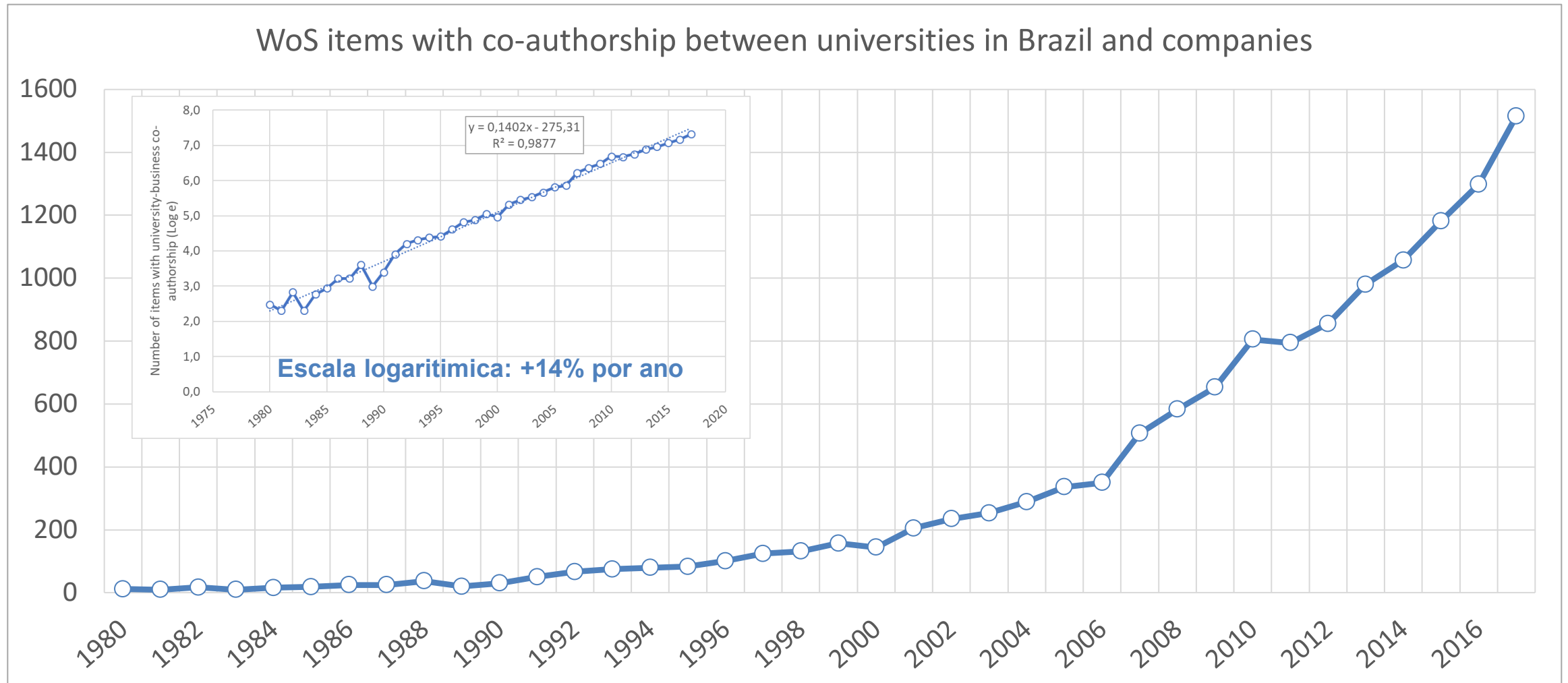
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[Mas precisa contar direito – a maior parte das bases cobre mal as empresas no Brasil]

***PODE-SE CONTAR QUANTOS ARTIGOS TEM CO-
AUTORES DE UNIVERSIDADES NO BRASIL E EM
EMPRESAS NO BRASIL OU FORA***

University-Business co-authorship in Brazil – exponential growth



Co-autoria universidade-empresa: fotônica avançada

Uncertainty relation for the optimization of optical-fiber transmission systems simulations

A. A. Rieznik^{1,2}, T. Tolisano¹, F. A. Callegari¹, D. F. Grosz³, and H.L. Fragnito¹

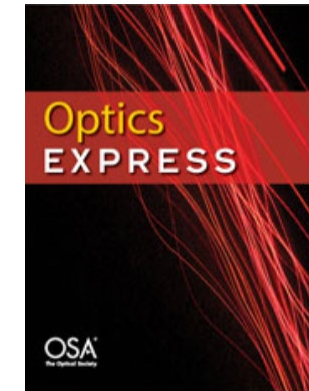
1. Centro de Pesquisa em Óptica e Fotônica, Instituto de Física Gleb Wataghin, Unicamp, cep 13083-970, Campinas, São Paulo, Brazil

2. Padtec S.A., Rodovia Campinas -Mogi -Mirim (SP 340), km 118.5, cep 13086-902, Campinas, São Paulo, Brazil

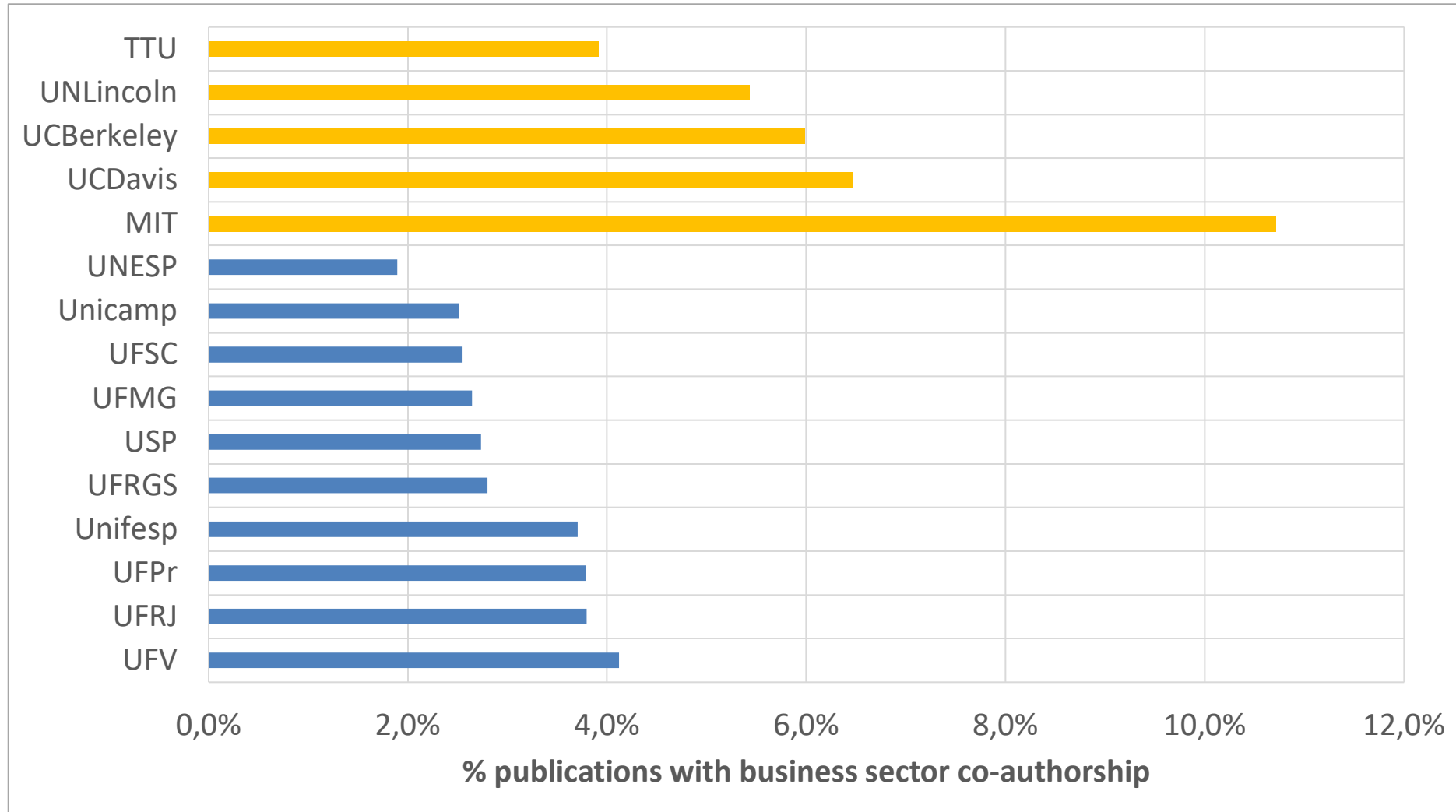
3. Instituto Tecnológico de Buenos Aires (ITBA), Eduardo Madero 399 (1116), Buenos Aires, Argentina

anibal@ifi.unicamp.br

Abstract: The mathematical inequality which in quantum mechanics gives rise to the uncertainty principle between two non commuting operators is used to develop a spatial step-size selection algorithm for the Split-Step Fourier Method (SSFM) for solving Generalized Non-Linear Schrödinger Equations (G-NLSEs). Numerical experiments are performed to analyze the efficiency of the method in modeling optical-fiber communications systems, showing its advantages relative to other algorithms.



University-Industry co-authorship: universities in Brazil and in the U.S.



Pesquisa na Universidade e Pesquisa na Empresa

Complementaridade virtuosa

Pesquisa na universidade

- Descobrir e Educar
- Tempo flexível
 - Competição
 - Educação
- Comunicar muito, esconder pouco
 - Pesquisa básica precisa de comunicação para avançar
 - Educação requer comunicação
- Custo do fracasso na descoberta é mitigado pela educação

Pesquisa na Empresa

- Inovar e Melhorar
- Tempo inflexível
 - Competição
 - Competição
- Esconder mais, comunicar pouco
 - Inovação para competitividade requer algum grau de confidencialidade
- Custo do fracasso no projeto é alto

Colaboração entre universidades e empresas enfrenta obstáculos – em todo lugar

20 May 2008 Physics Today

Universities and industry find roadblocks to R&D partnering

Academic red tape, bickering over rights to inventions, and attractive terms abroad are limiting growth in industry-sponsored research at US universities.

...the parties involved.

US. But as a share of total research funding for universities, industry support has declined from its peak of 7% in 1999 to 5% in 2006, according to NSF statistics. In that year