A quantitative perspective on the leading role of top universities in China

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Presentation Outline

- Background of China university system, 985 project
- Objective of this study
- Data and Methodology
- Results
- Conclusion
Introduction: China research output

![Graph showing research output trends from 1982 to 2008. The graph indicates a significant increase in research output over the years, with China's share reaching 9.74% of the world by 2008. The data is sourced from National Science Indicators.]

Introduction

Two main types of science and technology research systems in China:

- University system
- Independent research institution system

740 general undergraduate universities in mainland China in 2007.

Higher education sector: universities’ roles from that of a teaching college to that of a research university
“985” Project

“In 1999, Ministry of Education invested about 27 billion RMB to support the 34 most important universities. Top9 universities received about 42% of the total funding. Goal of the Top9 universities was to build world-class universities. In Oct 2009, Ministry of Education supports formation China’s “Ivy League”.

The Top9 universities:
- Peking University
- Tsinghua University
- Shanghai Jiao Tong University
- University of Science and Technology of China
- Fudan University
- Nanjing University
- Zhejiang University
- Xian Jiao Tong University
- Harbin Institution of Technology
“985” Project

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Objective of this study

To evaluate the research performance of the Top9 research universities and to examine their leading role in Chinese research system from a scientometrics perspective.
Data and methodology

Top9 universities of the “985 Project” are the sample of our study.

Key input data:

R&D expenditures; R&D personnel; PhD students from China Science and Technology Statistics, Statistics of Universities.

Research output data:

Publications, citations, citation impact, percent cited, highly cited papers from Web of Science.

Document type: articles, notes, and reviews

R&D expenditures of Top9 universities: about 10% of national R&D expenditures
R&D personnel of Top9 universities: less than 3% of that of the nation

Share of the PhD students of top9 universities declined from 24.3% to 18.3%
Research output of each Top9 universities

Research output of Top9 universities: continuously higher than 20% in last 10 years
Research impact of each Top9 universities

attracts nearly 30% citations of the nation
Average citation impact of Top9 universities

Average citation impact of Top9 universities: surpassed that of entire country since 1996
Highly cited papers of Top9 universities

Highly cited papers: top 1% most cited papers in each field in each year.

1,184 highly cited papers for the Top9 universities in the period of January 1, 1999-June 30, 2009. Its share to that of china is 30%.

Comparison among Top9 universities

Peking University is the only one which not only has a larger research output, but also has higher overall citation influence and average citation impact.

University of Science and Technology of China is outstanding in terms of the average citation impact although its research output is moderate.

Contribution of individual university in cumulative 28 year period:

- Research output: Tsing Hua Univ - Materials science
- Total citations: USTC – Physics; Tsing Hua Univ - Materials science
- Average citation impact: Xian Jiao Jong Univ – Plant sciences
Conclusion

An increase both in quantity and in impact of Top 9 universities' research output.

Top9 universities input data:
- Share of R&D expenditures: 10% in recent years.
- Share of R&D personnel: under 3%
- Share of PhD students: approximately 18.3%.

Top9 universities output data:
produced about 25% of papers published by China and earned about 30% of the total citations and highly cited papers.
Conclusion

- Top 9 universities are the core of China university system.
- 985 Project” indeed promoted the development of the research performance of the Top9 universities.
- Top9 universities are still far from becoming world-class universities, although they have become the major actors of the Chinese basic research.

Future study

- Deep analysis on each university performance
- Use Chinese Science Citation Database (CSCD)

Thank you!