



To be Number One! China's strategy to rise to excellence in research.

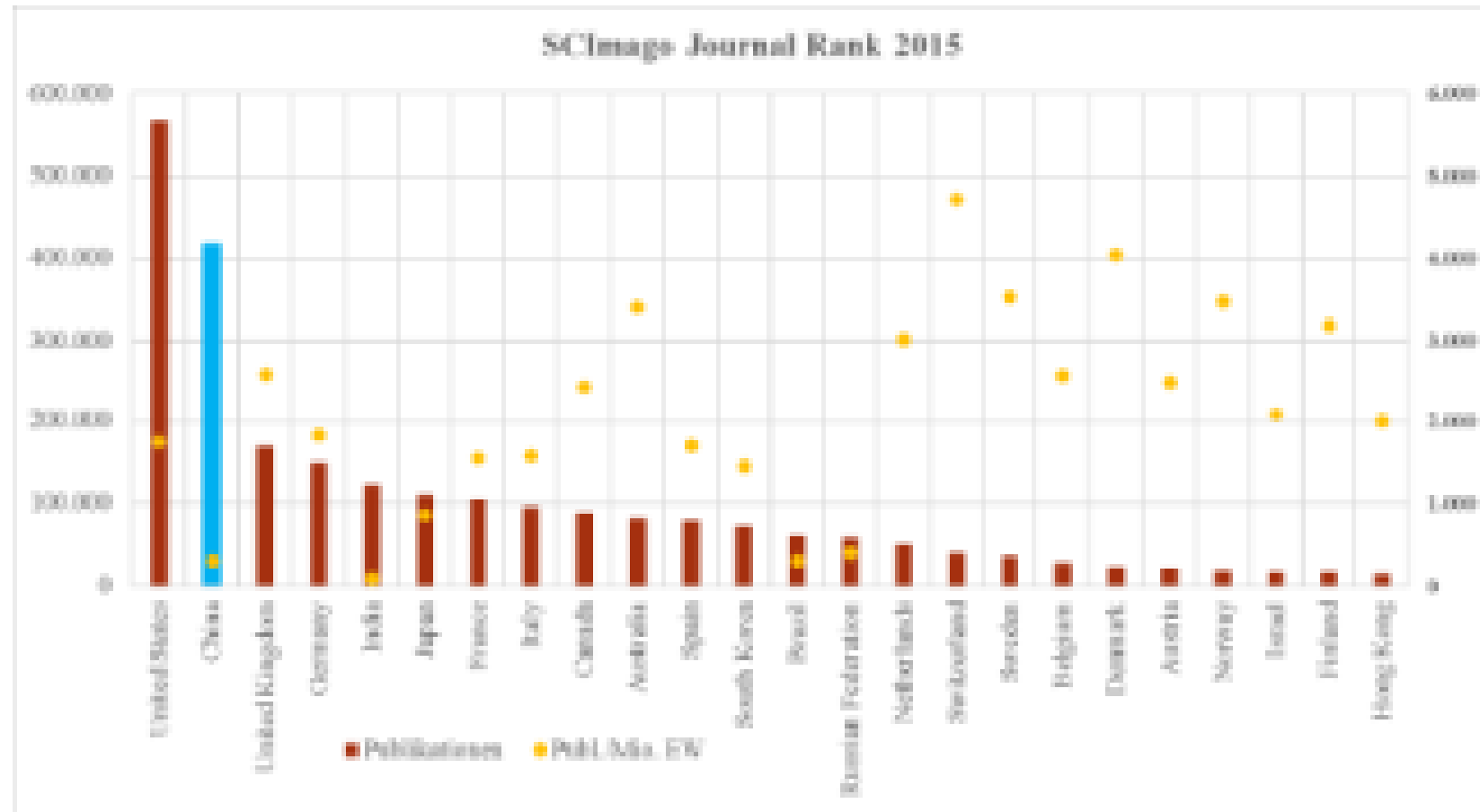
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Stratagem No. 1:

- Produce as many publications as possible!

By 2015 scientists from China produce 16,4% of international publications

Quelle: OSTA: Wissenschaft und Technologie in China 2016,9

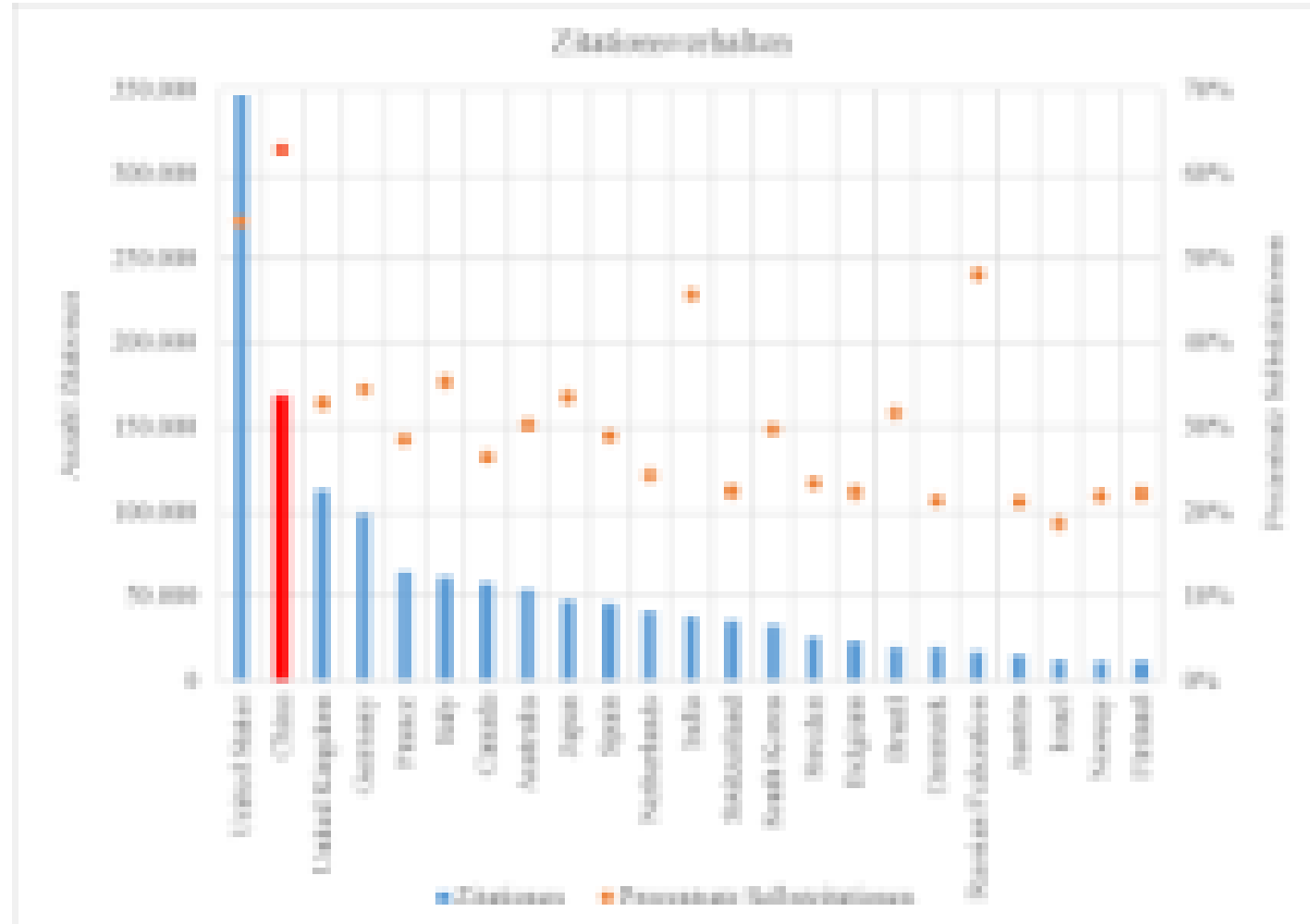


In 2016 China became the No 1 country in terms of the number of scientific publications

- The US based National Science Foundation declared in 2016 that China had overtaken the US in terms of the publications of scientific papers. 426.000 articles were published by authors from China while 409.000 papers were published by US based authors.
- These papers were published by authors from among 3,7 mill. academics in China in comparison to 7.8 mill. researchers in the US.
- Only 25% of all publications by China based authors are published internationally.
- Papers from Chinese authors create high impact only in one discipline: Chemistry.

The US is still No 1 in terms of citations

Quelle: OSTA: Wissenschaft und Technologie in China 2016, 10



Small countries can create high impact!

Note: CH is Switzerland

Country ranking according to recognition of scientific publications

2009–2013

Research field	1	2	3	4	5
Life sciences	US	GB	IS	CH	NL
Physics, chemistry and earth sciences	US	CH	NL	GB	DK
Agriculture, biology and environmental sciences	GB	CH	NL	US	DK
Technological and engineering sciences, IT	DK	NL	CH	US	GB

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Source: Bibliometric evaluation of research in Switzerland 1981–2013, report of State Secretariat for Education, Research and Innovation, 2016.

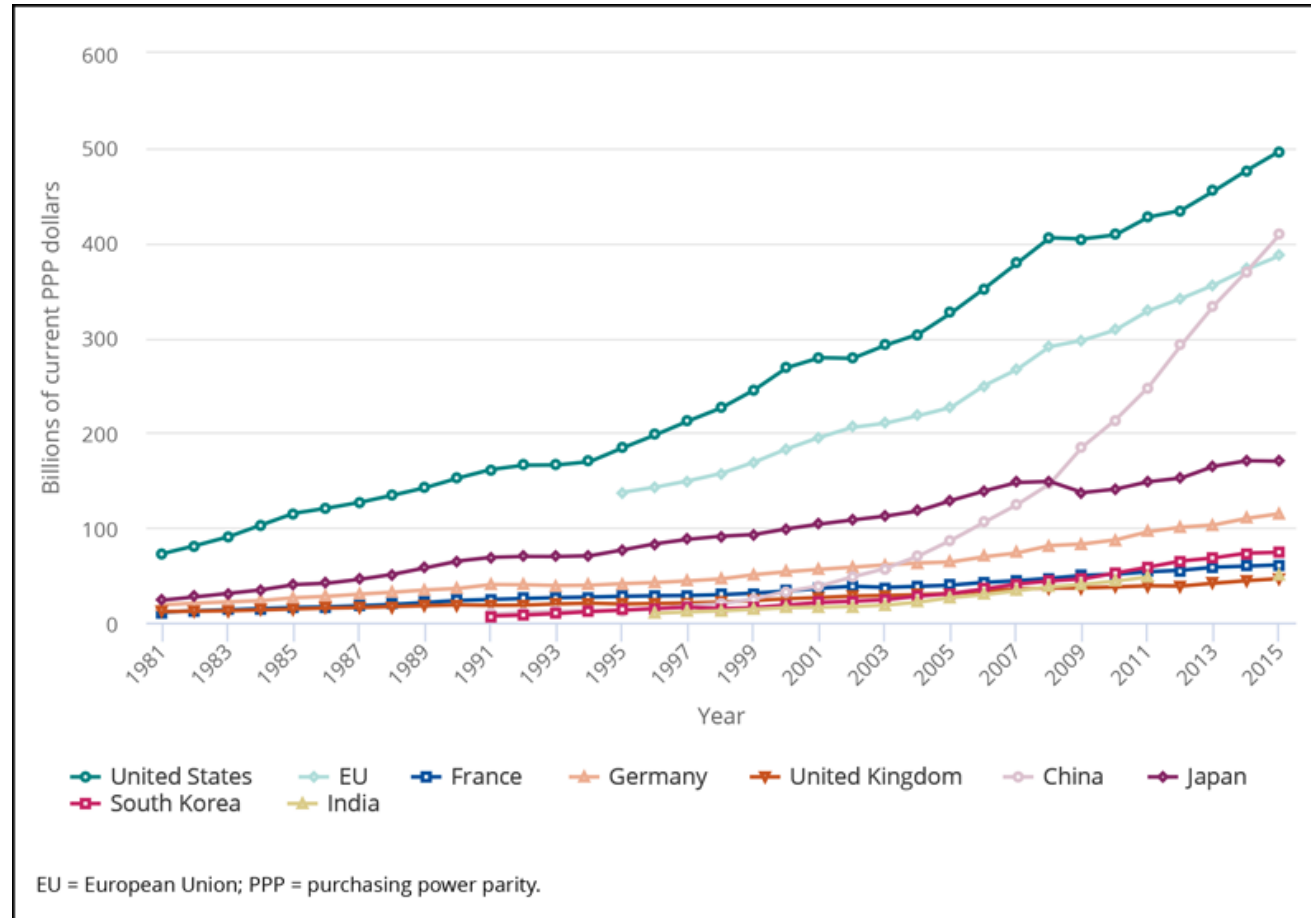
Stratagem 2:

- Raise the number of universities among the top 100!

6 Chinese universities among the top 100

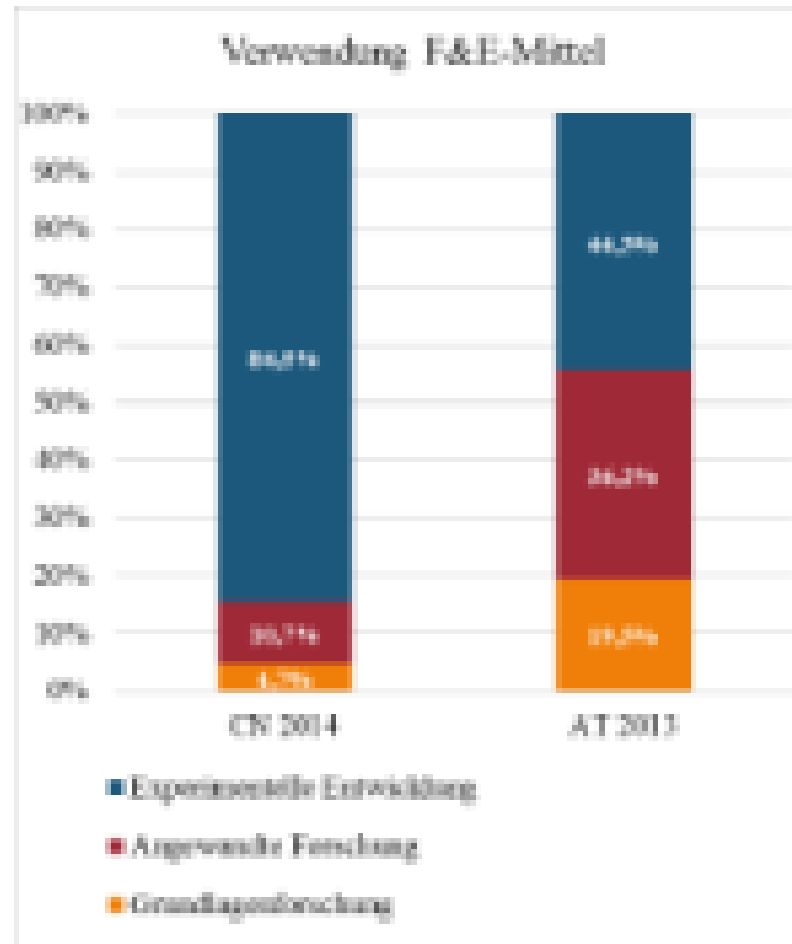
China Ranking	QS Ranking 2014	QS Ranking 2018
Tsinghua University	47	25
Peking University	57	38
Fudan University	71	40
Shanghai Jiaotong University	104	62
University of Science and Technology*	147	97
Zhejiang University*	144	87
Nanjing University	162	114
Beijing Normal University	240	256
*The position of these universities was exchanged recently		

China spends 2,1% of its GDP on R&D



Most of the R&D money is spent on applied and experimental research

Quelle: OSTA: Wissenschaft und Technologie in China 2016, 4



How do China's top universities reach the top?

- By 2020, China wants to spend 2,5% of its GDP on R&D, however, recently we observe less government spending and more spending of companies in R&D.
- While the increase of spending for R&D is prominent, government spending is not the main reason for Chinese universities gaining better positions in international rankings.
- The **internationalization** of China's leading universities is of major importance. Chinese universities are making big efforts in attracting international students and researchers knowing that internationalization can make a big difference in ranking. Chinese top universities focus on collaborating with top US universities. Thus they raise their visibility.
- In China's top universities, the **student professor ratio** is theoretically speaking very good. In everyday student life, this might be quite different.

Stratagem 3:

- Build lighthouses!

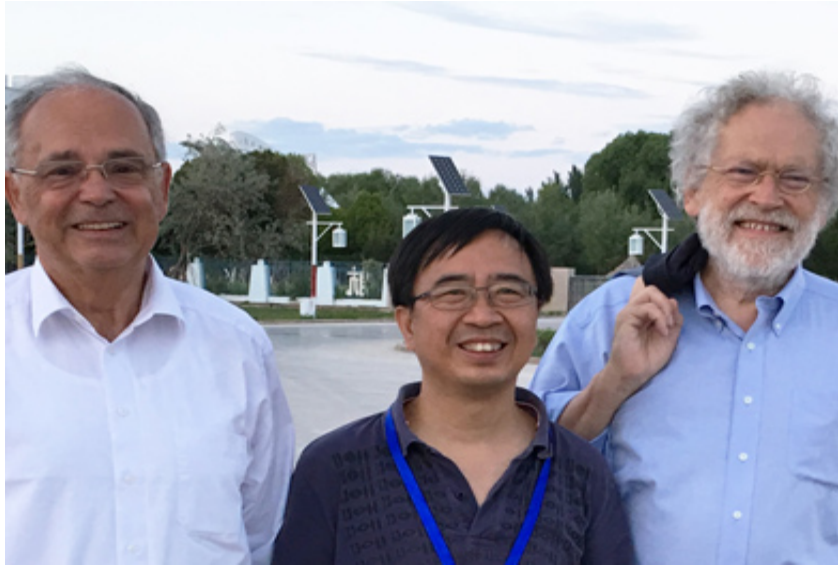
Building lighthouses in fundamental science is a good soft power strategy. While western researchers deplore a lack of budget and legal constraints in their research, China provides opportunities.



The recent use of CRISPR-technology shows that this is a risky business.



Collaboration is the
award winning
strategy!



- Quantum physicist Anton Zeilinger from Austria was Pan Jianwei's doctoral supervisor at the University of Vienna. Today, Pan Jianwei is called the „father of quantum physics“ in China and instrumental in supplying quantum communication with the budget which so far neither the EU nor the US have given to this field. The collaboration resulted in 2015 in the launching of a first quantum communication satellite and in 2016 in first successful quantum communication across 5000 km between China and Austria! In 2018 Pan Jianwei was awarded the prize for the best Nature paper, however was not allowed to enter the US to assist in the awarding ceremony!

Stratagem 4:

- Make China attractive for top scientists!

China is interested in commodifying scientific outcomes!

- As boosting science is part of the economic development strategy, the Chinese government is especially interested in turning scientific outcomes into products or in using science to develop new products or better products.
- For scientists, this means that they have ample opportunity to found start-ups and spin-offs and to earn additional money from their companies. To be rich means to be beautiful in China!
- Among the **5 mill. Chinese students** who graduated from a non-Chinese university, **80%** returned to China, the majority of them since 2012. Making China an attractive place for researchers means incentivizing Chinese top researchers to return to China.

Stratagem 5:

- Be international in the sciences and claim discourse dominance on China issues!

Science is international, the humanities are Chinese!

- “Generally speaking, though, little of what natural scientists in China have been doing has been deemed politically sensitive and, as a result, they have been able to work to international standards much more than their counterparts in the humanities.” (Michel Hockx 2014)
- Since 2012, more than 60% of all publications on China have been written by Chinese authors.
- Whoever wants to make a career at a Chinese university in the humanities and the social sciences has to proof that he or she can publish internationally.
- Co-authorships are the preferred pathway towards international publications.
- The aim is to build a consensus on how to understand China which is created by researchers from China.

Stratagem 6:

- Use science to make China great again!

Thank you for your attention!

