



A CHANGING MARKET OF SCHOLARLY PUBLISHING IN CHINA

WILEY EDITOR SYMPOSIUM

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- The scholarly publishing market is influenced by many factors. In recent decades, some key trends have emerged behind concerns over book and journal models. Among them, the following are particularly apparent:
 - An increase in research investment, especially by the government
 - An increase in the number of researchers
 - An increase in the means of access to scholarly materials, e.g., open access
 - An increase in the number of low-quality or unethical publications
 - An increase in the efforts of globalization

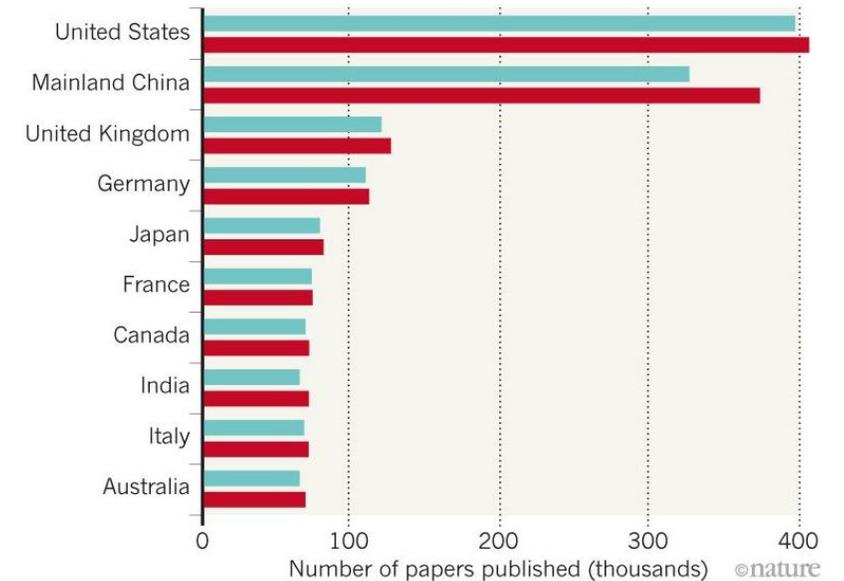
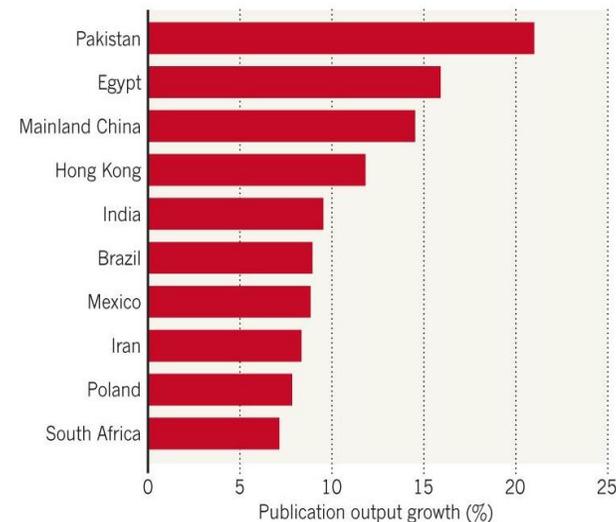
GLOBAL TRENDS IN RESEARCH

In the past two to three decades, there has been a dramatic change in research investment and output around the world. Many developing countries started joining the global “elite” club and making great contributions to scholarly publications both in proportion and absolute number.

Cross-country collaborations have also been increasing.

COUNTRIES WITH BIGGEST RISES IN RESEARCH OUTPUT

Emerging economies top the list for percentage increase in publications from 2017 to 2018.

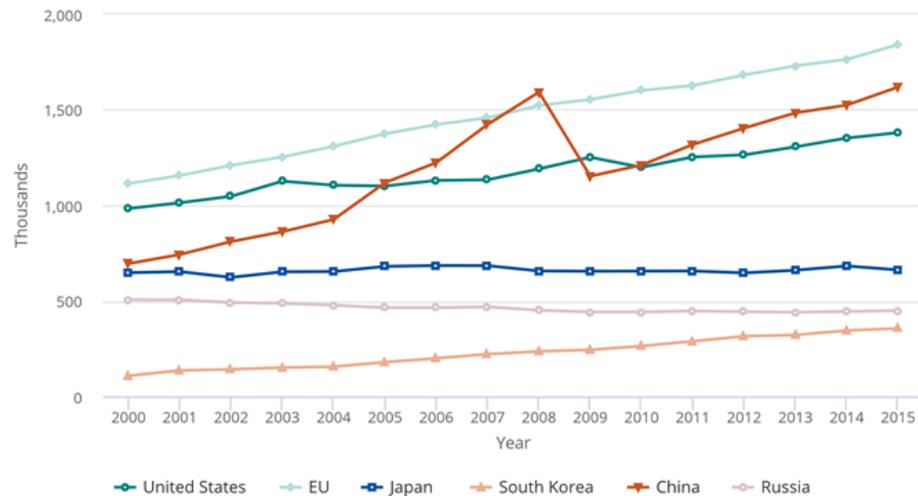


Source: Makri, A. (2018). Pakistan and Egypt had highest rises in research output in 2018. *Nature*, 21 December.

GLOBAL TRENDS IN RESEARCH (I)

There has been an increase in the number of research workforce in many major countries from the year of 2000 (OECD)

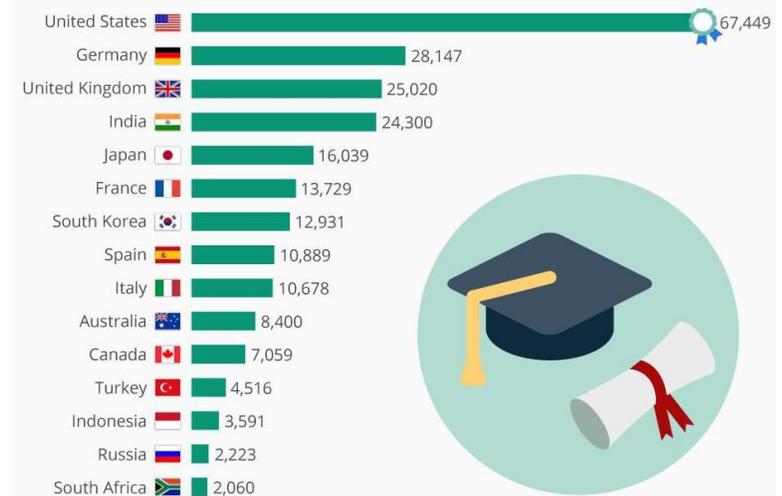
Estimated number of researchers in selected regions or countries: 2000-15



The total number of doctoral graduates in the research workforce varies from country to country (OECD 2014 data)

The Countries With The Most Doctoral Graduates

Number of doctoral graduates (all fields) in 2014



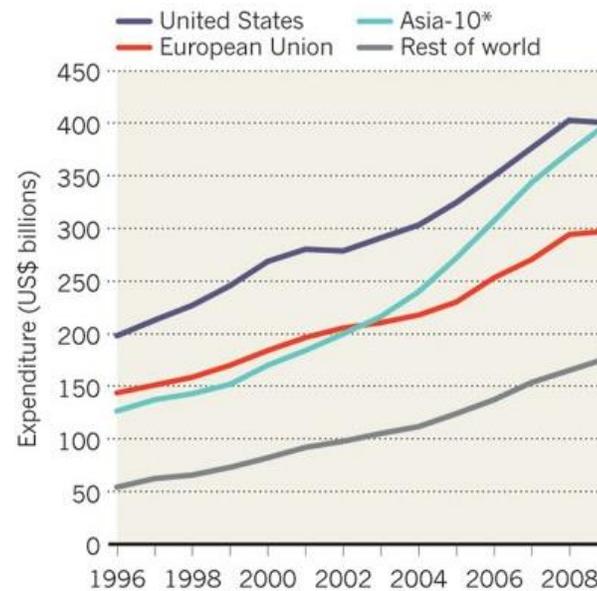
RESEARCH – ASIA

Asia has been on track to outpace the United States as the world's science and technology powerhouse.

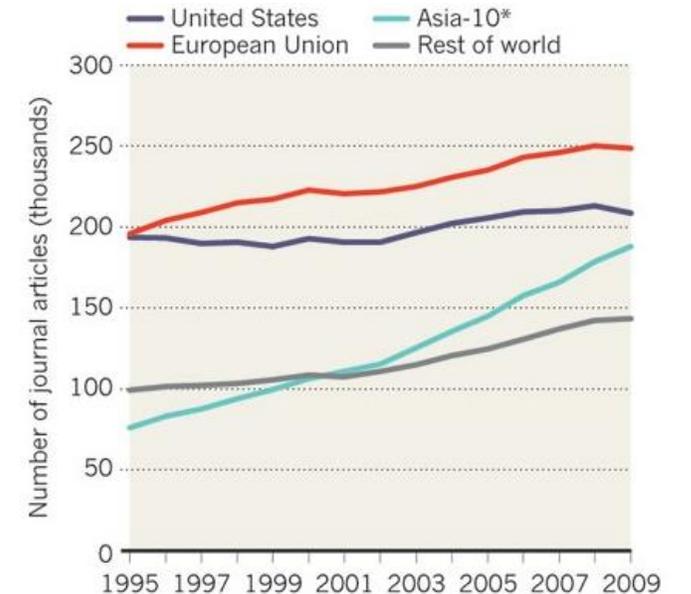
The figures do not include data for the most recent decade when many Asian countries, particularly China and India, speeded up their contributions to research.

Also, publications in languages other than English are not typically counted in analyses.

Comparison of spending on research and development



Comparison of STEM journal article publications



Source: Reich, E.S. (2012). Research in Asia Heats Up. *Nature*, 24 January.

RESEARCH – BRICS

- Corresponding to its size in both population and economy, China’s research output has grown exponentially since the early 1990. Some other BRICS countries, however, have also experienced a gradual growth. From the mid-1990, Russia’s research productivity slowed and fell behind India and Brazil ten years later, while Brazil is ranked third in the group just below India. South Africa, although has produced the lowest number of publications, has the highest impact factor (Source: Cross, et al. (2017). *Research in Brazil*. Clarivate Analytics).

Country	Papers	Impact	Top 1%	Top 10%
Brazil	250,680	0.78	0.78	6.32
China	1,402,689	1.00	1.25	10.95
India	347,293	0.78	0.72	7.07
Russia	194,126	0.63	0.66	4.92
S Africa	73,663	1.11	1.60	10.26

Productivity and impact of the BRICS countries

Country	Papers	Impact	Top 1%	Top 10%
Germany	653,718	1.29	1.91	14.37
Japan	483,505	0.90	0.93	8.24
France	451,450	1.24	1.80	13.42
Canada	413,445	1.31	2.00	14.07
Spain	348,994	1.19	1.60	12.67
Mexico	78,318	0.82	1.00	6.69
Argentina	54,546	0.92	1.09	7.43

Comparable countries to BRICS

RESEARCH INVESTMENT IN CHINA

■ Expenditures on R&D¹

The purchasing power of China's expenditures on R&D surpassed that of the EU by 2014 and is getting closer to the United States by the end of this decade according to its trend

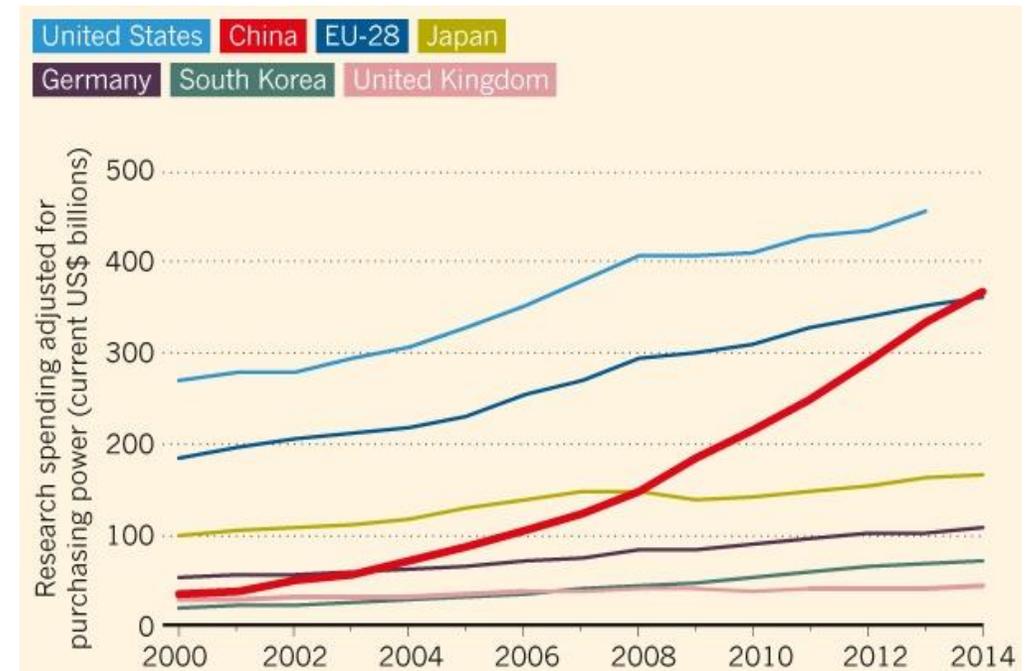
■ Higher educational institutions

China has a total of 4,296 higher ed institutions of various types² in comparison to the United States that has a total of 4,029 institutions³

1. Noorden, R.V. (2016). China by the Numbers. *Nature*, 534(23), p. 453.

2. Chinese Ministry of Education data, 2019

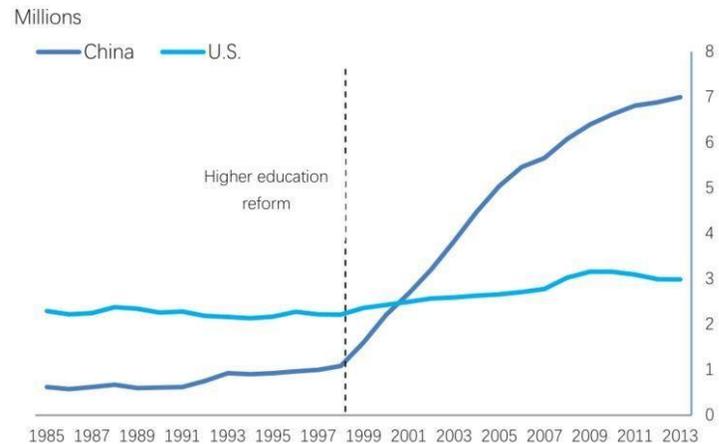
3. Chronicle of Higher Education, 2019



RESEARCH WORKFORCE IN CHINA

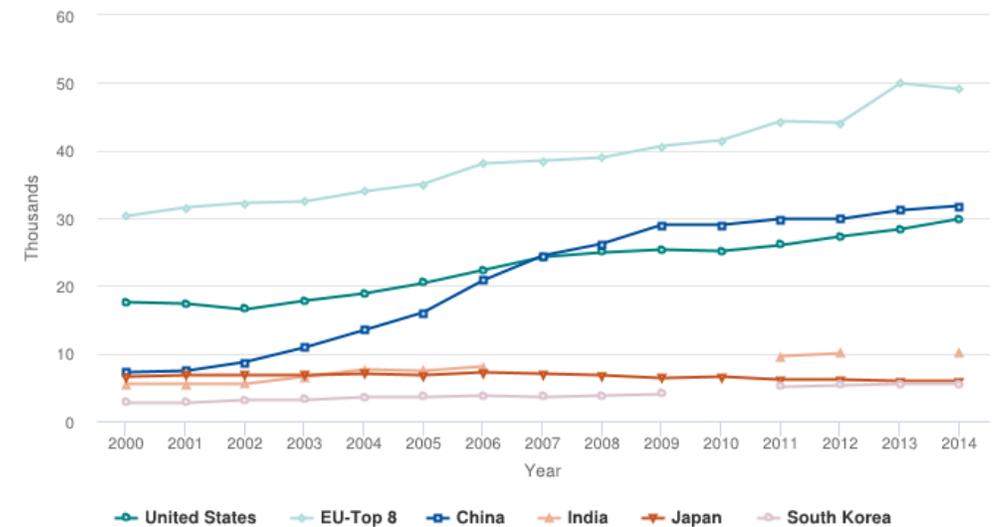
- China has displaced the United States as the largest country in enrolling college students
- China has surpassed the United States to produce more doctoral students in sciences and engineering since 2007
- China has surpassed the United States to produce more doctoral students in total since 2016

Annual enrolment of new students in higher education institutions



Left – Source: NSF, 2014

Natural sciences and engineering doctoral degrees, by selected country: 2000–14



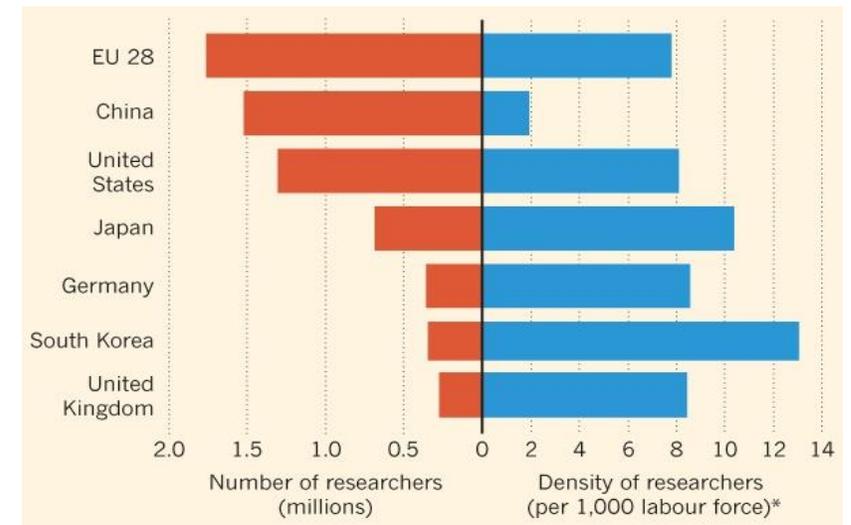
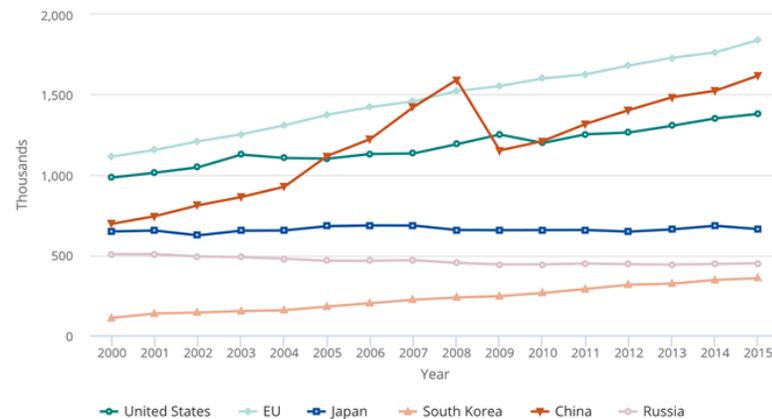
Right – Source: China National Bureau of Statistics and US Department of Education, 2015

RESEARCH WORKFORCE IN CHINA (I)

■ Total Researchers

China's number of researchers has surpassed the United States to become the largest country in the world. However, its proportion to the total population is smaller than all other major science nations, which may indicate its potential of increases

Estimated number of researchers in selected regions or countries: 2000-15



Source: Noorden, R.V. (2016). China by the Numbers. *Nature*, 534(23), p. 453.

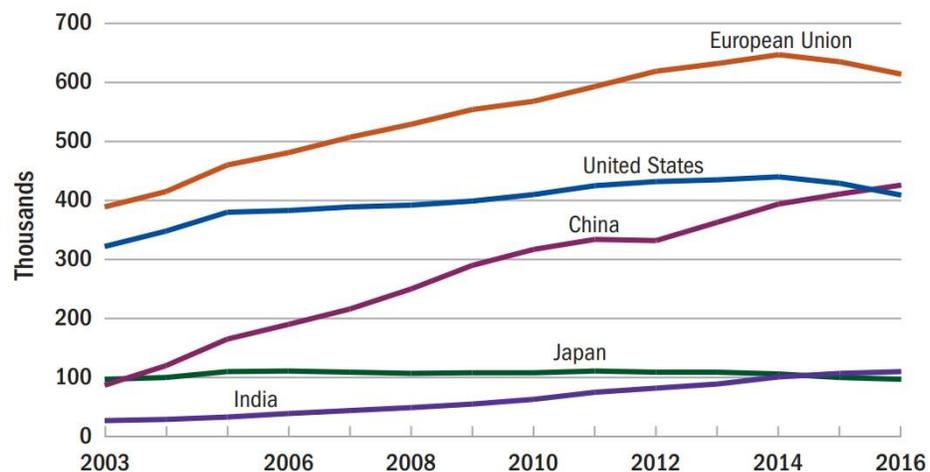
Source: *SCIMago Journal & Country Rank*, February 2019.

RESEARCH OUTPUT IN CHINA

China has produced more scholarly articles than many major science nations and surpassed the United States in 2016. Its top-cited articles are growing similarly

Source: National Science Board, 2017

S&E articles, by selected region, country, or economy: 2003–16



Indicators 2018: S&E Publication Output, Chapter 5.

	Citable Items	Citations	Cites per Item
United States	9875662	267612868	24.25
China	5052579	39244368	7.64
United Kingdom	3150874	68803194	21.84
Germany	2790169	54834760	19.65
Japan	2539441	39049963	15.38

Research impact, if measured by citations, is still low in comparison to other major contributors

Source: SCIMago Journal & Country Rank, February 2019.

DISCIPLINARY DISTRIBUTION IN CHINA

- Journal articles published in English, mostly in journals outside China, are primarily by scientists in various fields in natural science, life science, agriculture, and engineering
- Within these fields, some specific areas are particularly visible, including traditional nature sciences as shown in the table where the WoS data is used (SCI: Science Citation Index; EI: Engineering Index)
- These numbers of publication distribution can reflect the clustering of researcher workforce in scientific disciplines

	SCI	EI
Physics	10.14%	4.95%
Chemistry	15.66%	3.72%
Earth Science	3.63%	6.07%
Biology	11.92%	7.95%
Basic Medicine	6.63%	-
Clinic Medicine	11.05%	-
Material Science	7.57%	9.54%
ECE	4.48%	6.92%
Computer	3.92%	4.92%
Civil Construction	0.85%	7.32%
Environment	2.98%	17.78%
Total	78.81%	69.17%

Source: The National Bureau of Statistics of China, 2018, *Online Data*

DISCIPLINARY DISTRIBUTION IN CHINA (CONT.)

- Number of doctoral degrees granted by discipline in 2018, with a percentage as high as 75% in STEM (Source: Chinese Ministry of Education, 2019)
- Doctoral students are required to publish at least two articles in SCI or EI journals in order to get a degree

Science	19.67%
Engineering	35.73%
Medicine	11.48%
Management	7.75%
Total	74.63%

EARLY CAREER RESEARCHERS IN CHINA

- A recent national survey of scientific workers in 2017 revealed that ¹
 - The R&D workforce in China has increased from 173.6 million in 2007 to 324.7 million five years later
 - The average age of researchers was 36.8,
 - As high as 45.7% of researchers are under the age of 35, and this number seemed to keep increasing
 - More than half percent of researchers are in the fields of science and technology
- Young researchers are more under tremendous pressure than their senior counterparts ²
 - In writing grant proposals for funded research projects
 - In publishing scholarly articles and books
 - Articles published in SCI and EI journals are considered acceptable
 - The higher a journal's impact factor is, the more value an article published by a Chinese researcher has

1. Nature Publishing Group (2015). *Turning Point: Chinese Science in Transition*, November 25

2. Xu, et al. (2018). Chinese Early-Career Researchers' Scholarly Communication Attitudes and Behaviours. *Journal of Scholarly Publishing*, 49(3)

EARLY CAREER RESEARCHERS IN CHINA (CONT.)

- Scholarly information is typically available through online channels, particularly social media ¹
 - Wechat is absolutely the number one social media tool where young researchers exchange scholarly information, such as sharing articles and research activities
 - Other social media tools in Chinese, such as Weibo, are also used frequently
 - ResearchGate is becoming increasingly popular among young researchers to access scholarly materials
- Young researchers tend to fully comply with institutional policies and evaluation systems although they do not show any interest in metrics
- Young researchers in China show many similarities, in addition to differences, with their counterparts in developed countries ²

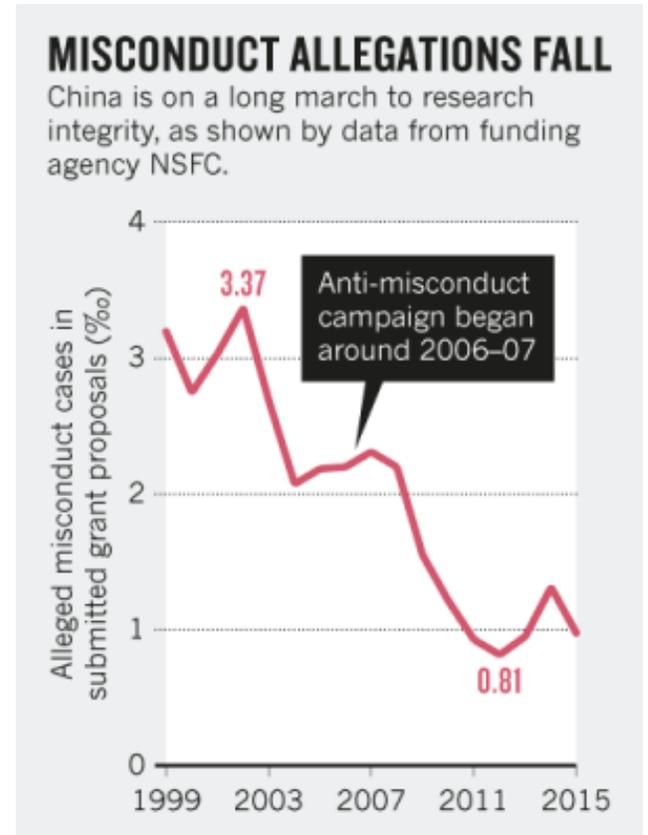
1. Xu, et al. (2018). Chinese Early-Career Researchers' Scholarly Communication Attitudes and Behaviours. *Journal of Scholarly Publishing*, 49(3): 320-343.

2. Nicolas, et al. (2018). Early Career Researchers' Quest for Reputation in the Digital Age. *Journal of Scholarly Publishing*, 49(4): 375-396.

RESEARCH MISCONDUCT IN CHINA

- Plagiarism and other misconducts
 - An overspread plagiarism has made open access in China a pseudo open
 - IRB is still in its infancy
 - Other misconducts are also visible such as data fabrication, false peer review, ghostwriting, nonsense writing, duplicated publications
- The implementation of various polices has a positive impact

Source: Yang, W. (2016). Policy: Boost Basic Research in China. *Nature*, 22 June.



OTHER FACTORS IN CHINA

- Open access initiatives
 - Because of the culture, one will not expect the open access movement can move forward at a similar scale and speed as it has been in the Western countries. The mandate policies implemented by its government or funders (Plan S) may not work as well as expected.
- Policies at various levels: e.g., central government, local governments, and institutions

LANGUAGES IN SCHOLARLY PUBLISHING IN CHINA

- English versus Chinese
- Sciences versus social sciences/humanities
 - Major areas (percentage of total published books in Chinese):
 - Culture, education and sports: 41%
 - Literature: 11%
 - Economics 7%
 - Arts 5%
 - Chinese medicine: 5%
 - History and geography 4%
 - Policy and law 4%

WHAT DO THESE NUMBERS MEAN?

- These numbers indicate a very promising publishing market in China, which is further supported by the fact that
 - An exponential growth of article submissions and publications by Chinese authors
 - Chinese researchers active in seeking publication opportunities in English journals
 - Young scholars have become the mainstream of research workforce
 - Scientific misconducts, though decreasing, are still popular in research
 - Open access has a long way to go

A DIFFERENT PERSPECTIVE

- **Myth I:**

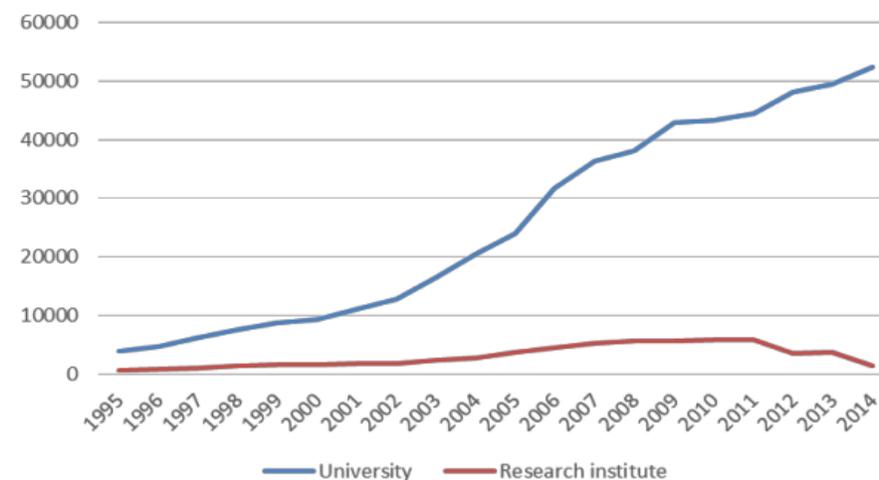
- Because the growth of the scholarly publishing in China has been tremendous, it will follow the same growth rate in the future

- **Realities:**

- China's market may have reached, or close to, its saturation in some areas. Here are some signs:
 - China's economy has significantly slowed down, partially because of the US-China tariffs, which will affect investments on science
 - Internationally scholarly collaborations, particularly between U.S. and China, have faced challenges
 - China has implemented more censorship on studies in the areas of national interests

TAKE A CLOSE LOOK AT SOME FACTS

- Chinese academic market includes universities, research institutes, hospitals for medical content, and others. Universities are the major contributions to the number of scholars and scholarly publications (over 80% in almost all categories such as numbers of books, journals and workforce¹)
- Degree-granting universities can be grouped into 3 tiers^{2,3}
 - Tier I: Project 985 universities (39 in total)
 - Tier II: Project 211 universities (73 in total)
 - Tier III: other



1. National Bureau of Statistics of China, 2016
2. Quan, et al. (2017). Publish or Impoverish. *Aslib Journal of Information Management*, 69(5): 486-502.
3. Ministry of Education of China, 2016.

FACTS (I)

- Tier I & II universities are heavily invested by governments and the most active ones in scholarly publishing. Pressured by the central and local governments for international visibility, these institutions created policies to incentivize publishing of articles in SCI and EI indexed journals.
- The cash reward for an article ranges from \$30 to \$165,000 USD, depending on the ranking of a journal by citation count or quartile
- Chronologically from 2008 to 2016, the reward rate has decreased except for very top journals such as *Science* and *Nature*

FACTS (II)

- There are many more Tier III universities. Yet, they have produced much fewer journal articles, especially SCI and EI indexed journal articles, than those of other tiers in the past
- Tier III universities also implemented incentive policies. The average cash rewards across 3 tiers are as follows ¹
- Many universities and research institutions have set publishing policies that provide a list of journals where their employees need to publish for tenure and promotion
- Only the first author is given credit

	Nature Science	PNAS	PLOS One	MIS Quarterly	JASIST	Library Hi Tech
Tier I	\$38,846	\$2,704	\$401	\$1,924	\$1,465	\$283
Tier II	\$53,823	\$4,113	\$783	\$3,251	\$2,695	\$679
Tier III	\$63,187	\$5,488	\$1,661	\$5,150	\$3,902	\$1,172

1. Quan, W, Chen, B & Shu, F (2017). Publish or Impoverish. *Aslib Journal of Information Management*, 69(5): 486-502.

SOME TAKEAWAYS FROM THE NUMBERS

- The major performers from Tier I & II universities have slowed down their pace in producing high-quality journal articles
- A larger group of researchers from Tier III starts joining the effort of seeking publishing opportunities in English journals
- Only SCI and EI indexed journals are considered having academic values to meet the requirements of Chinese institutions for incentives and promotion
- Institutions require publications in specific journals

IMPLICATIONS

- Marketing Implications:

- When considering Chinese market, the potentials may be

SCI and EI indexed journals, and

Journals that are with lower quartiles and lower journal impact factor scores (Due to limited resources, Tier III researchers may not be able to produce as many very top articles, such as the *Nature* and *Science* level, as their counterparts from Tier I & II universities)

Journals in selected fields in natural science, life science, and engineering

SOME RECOMMENDATIONS

- Recommendations:
 - To expand existing journals rather than creating new journals because only established journals are included in the list of required journals according to institutional policies
 - Focus on some popular disciplinary areas
 - Open access journals are not as popular

DIFFERENT PERSPECTIVES

- Myth 2
 - Recruiting more Chinese scholars in editorial boards will make journals more appealing
- Realities
 - For historical reasons, senior researchers (40+) are less comfortable about reviewing papers in English. For example, young scholars extensively expressed adequate mentioning by seniors in English at every research stage ¹
 - Young scholars, though more fluent in English, do not have enough experience or solid background in reviewing scientific studies ²
 - Internationalization is the driving force of English publishing. Too many domestic names on editorial board will hurt the popularity of a journal ²

1. Nature Publishing Group (2015). *Turning Point: Chinese Science in Transition*, November 25.

2. Xu, et al. (2018). Chinese Early-Career Researchers' Scholarly Communication Attitudes and Behaviours. *Journal of Scholarly Publishing*, 49(3).

DIFFERENT PERSPECTIVES (CONT.)

- Myth 3
 - The Chinese have published extensively in English journals and therefore know where to submit
- Realities
 - Chinese authors, particularly young authors, are always confused while submitting papers to international journals although they know how to focus on SCI and EI journals
 - Many of them are unfamiliar with the peer review process

SOME RECOMMENDATIONS

- Using social media to promote visibility of a journal
 - Social media tools, particularly WeChat and ResearchGate, have become the main channels to disseminate publications and exchange scholarly information on a daily basis, according to a recent study ¹
- Introducing more special issues targeting specific groups of scholars

1. Xu, et al. (2018). Chinese Early-Career Researchers' Scholarly Communication Attitudes and Behaviours. *Journal of Scholarly Publishing*, 49(3).