



CGHE webinar 9 November 2021

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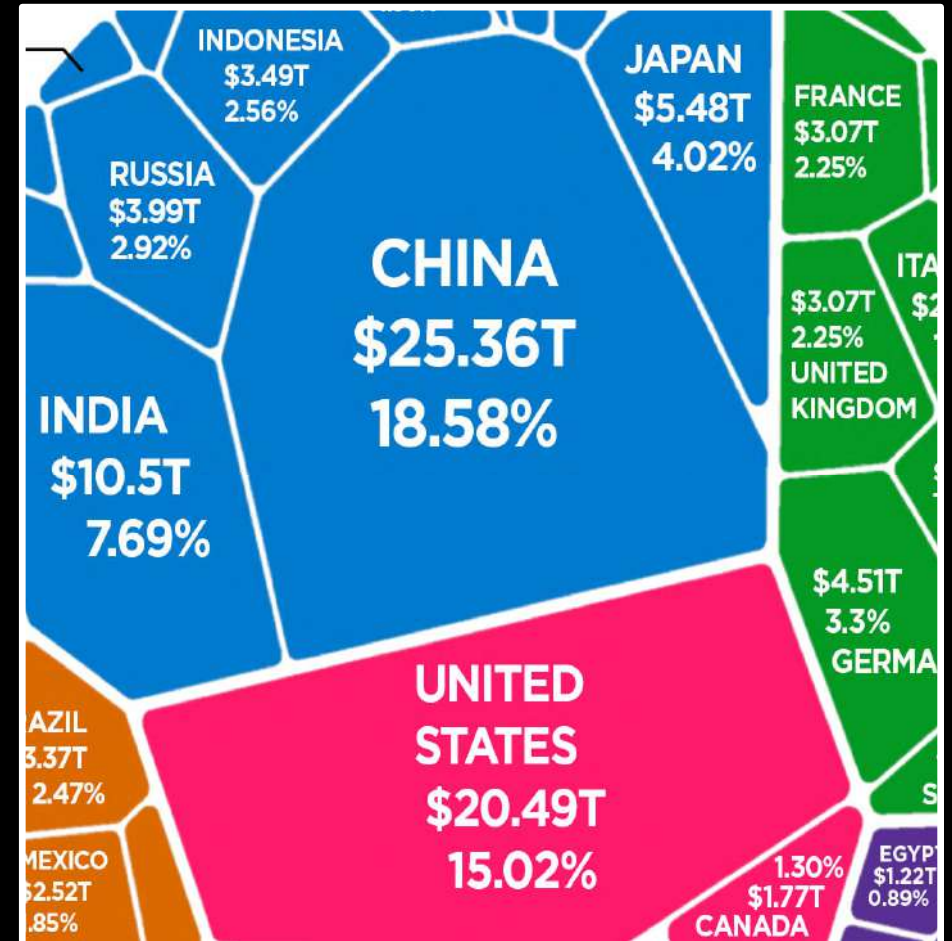
The rise and rise of research in China

What does it mean for China and the world?

‘Western’ dominance is eroding in a multi-polar world, that is both integrated and different

- ‘The new swing of the pendulum ... is going to lead to a world where no one will be dominant... What is different about our time is that globalization forces us to live all jumbled together and yet we have very different visions of what this common world should look like. [Political scientist] Charles Kupchan writes: “The next world will hardly be the first one in which the different great powers operate according to different conceptions of order. But, due to the onset of global interdependence, it will be the first time that such a diverse set of orders intensely and continuously interact with each other.”’

- Bruno Macaes, *The Rise of Eurasia*, Penguin, 2018, p. 2.



Opening up science after 1978

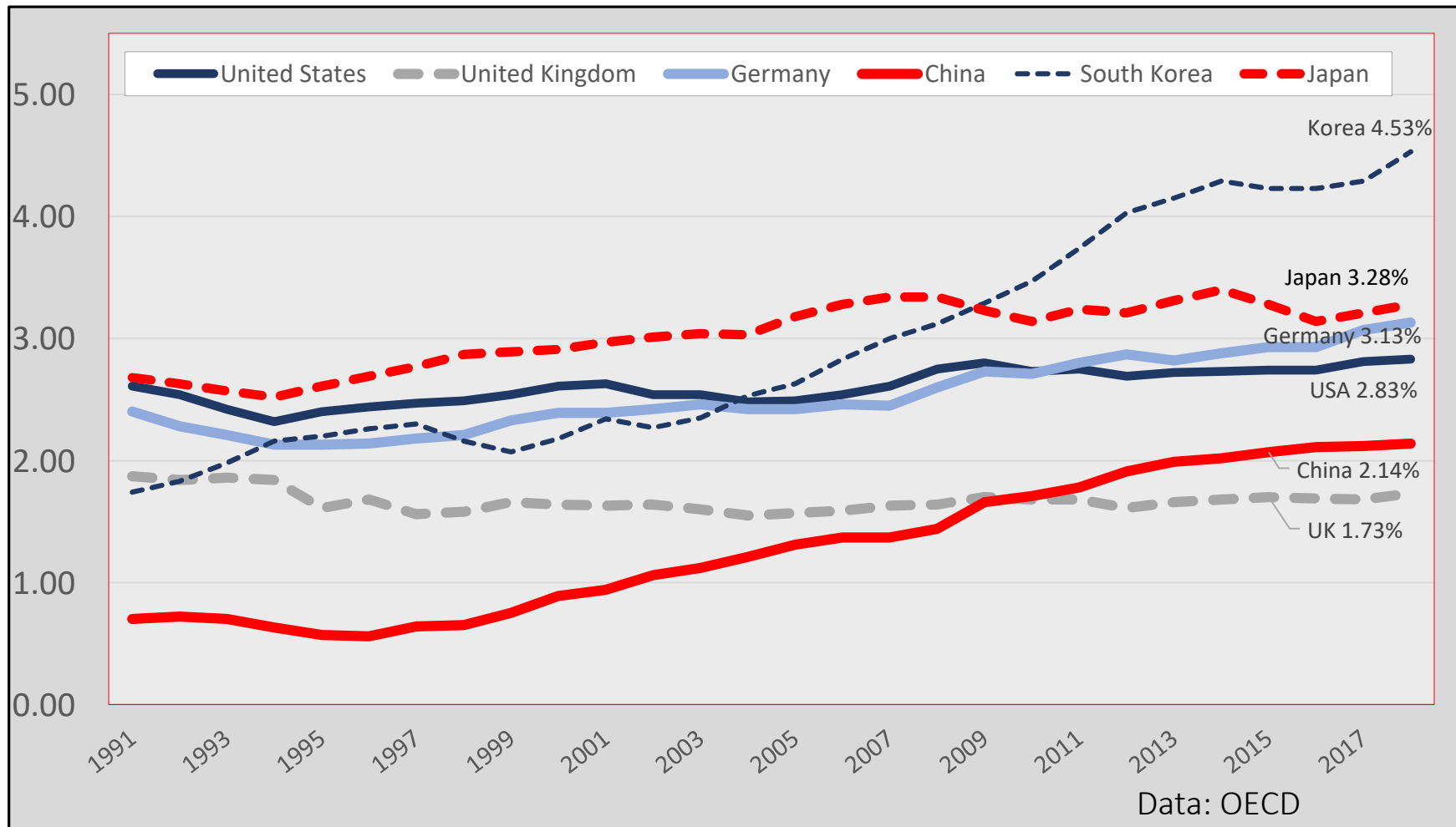
- Deng Xiaoping “considered science to be the most crucial of the four modernisations, the one that would drive the other three (industry, agriculture and national defense).” (Vogel, 2011, p. 197)
- *Depoliticisation*: “Deng said that science had no class character; it could be used by all classes and all countries despite their different political and economic systems” (Vogel, 2011, p. 201). It was enough that scientists were loyal to country and party (p. 202)
- Catch up was essential but China needed original and basic science: Deng saw *internationalisation* not as a source of borrowed science but a guide to building China’s own capacity

Vogel, E. (2011). *Deng Xiaoping and the transformation of China*.
Cambridge, MA: Belknap Press

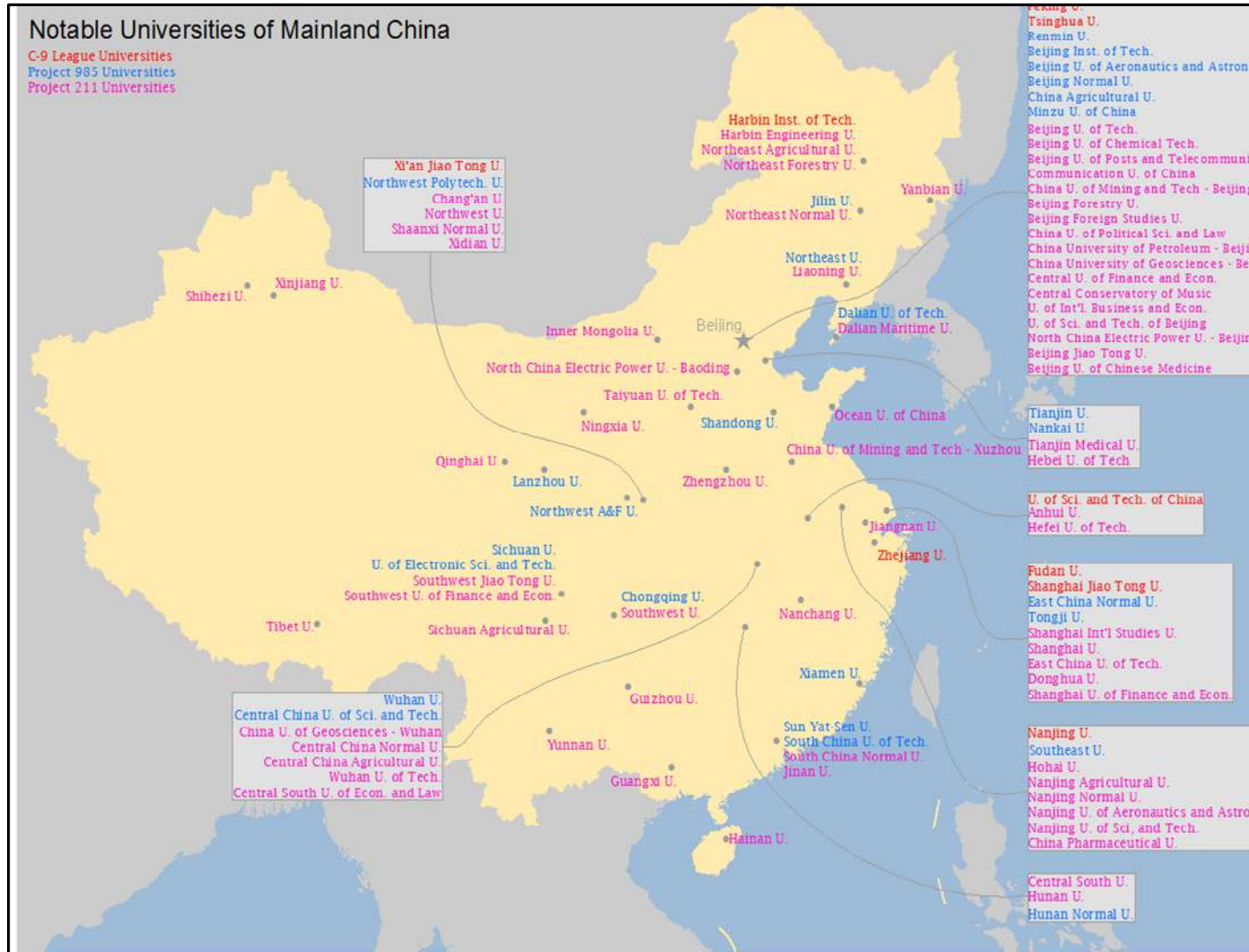


Growth of R&D as a proportion (%) of GDP, 1991-2018

USA, UK, Germany, China, Japan, South Korea

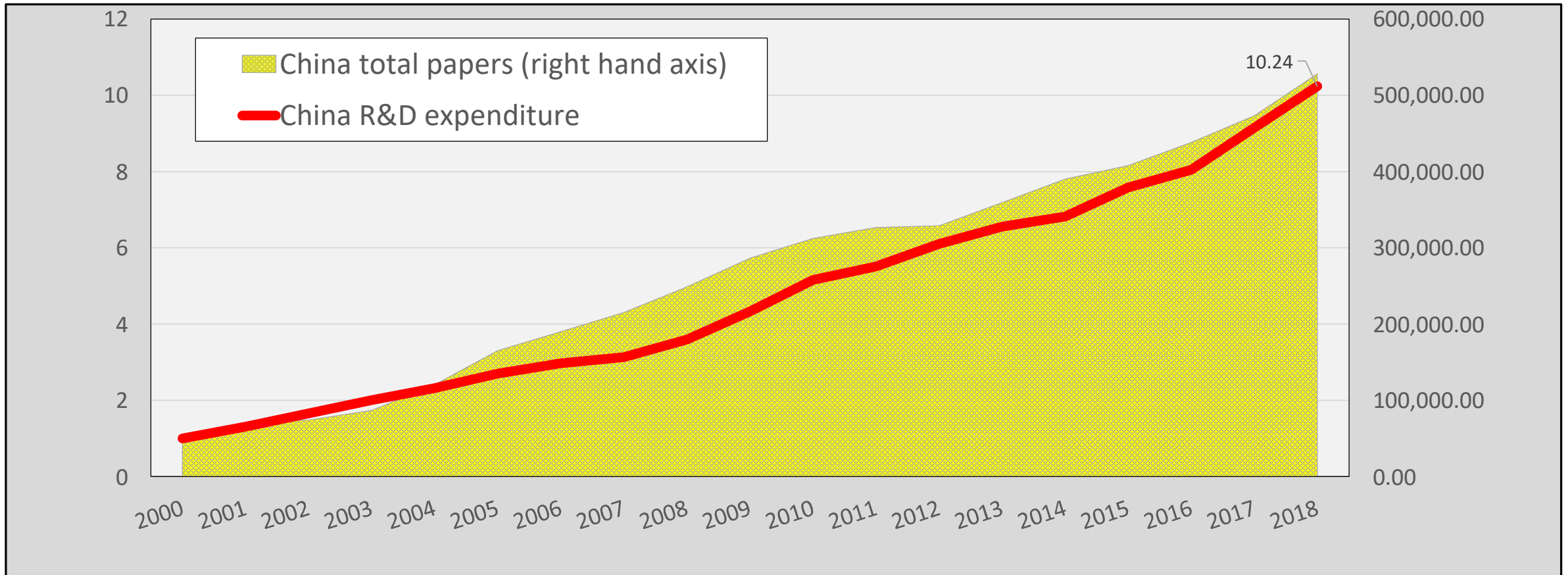


Since the mid 1990s China's national 211, 985 and Double World-Class funding projects have built a strong national science system



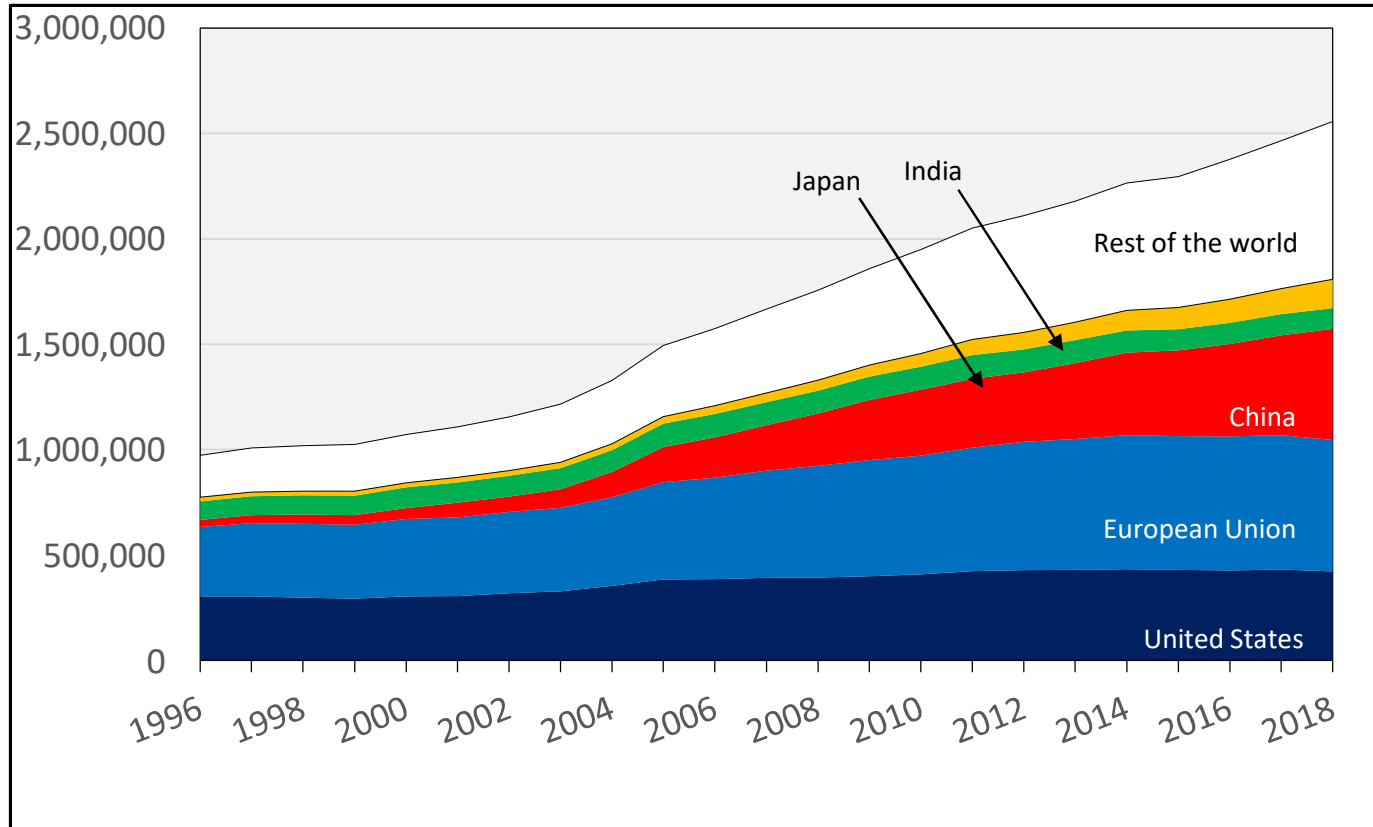
China's growing investment in university science has been matched by the rate of increase in published papers

Spending on R&D in higher education, constant prices, and science papers 2000-2018 (2000 = 1.00)



In a globalising science world China has used national capacity building and international collaboration, especially with US, to advance each other

Number of science papers in Scopus, by large nation/region, world: 1996-2018



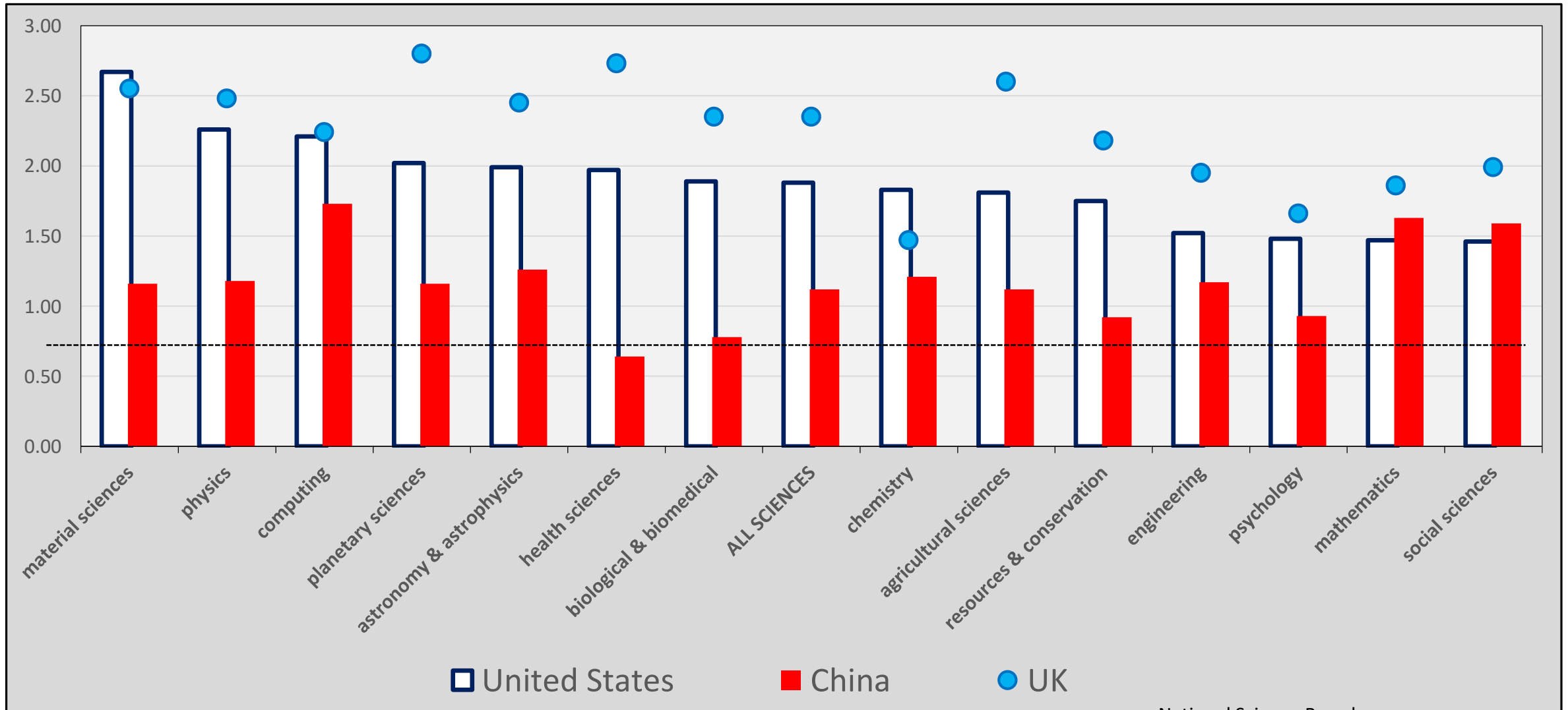
Countries with which China had over 5,000 joint papers in 2018

Country pair	Joint papers	1996 = 1.00
China-USA	55,382	26.10
China-UK	14,763	21.74
China-Australia	13,138	46.42
China-Canada	9,449	18.75
China-Germany	8,206	14.03
China-Japan	8,024	9.47
China-Singapore	5,563	46.00
China-France	5,472	19.83

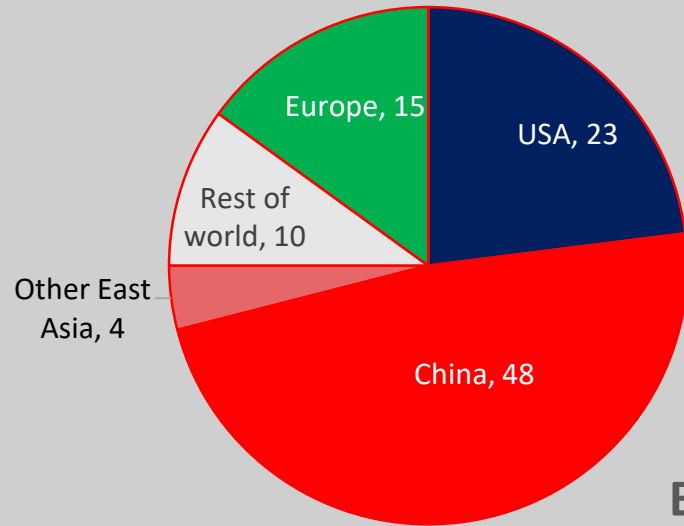
US National Science Board data from Scopus

Proportion (%) of papers in top 1% of field, by discipline

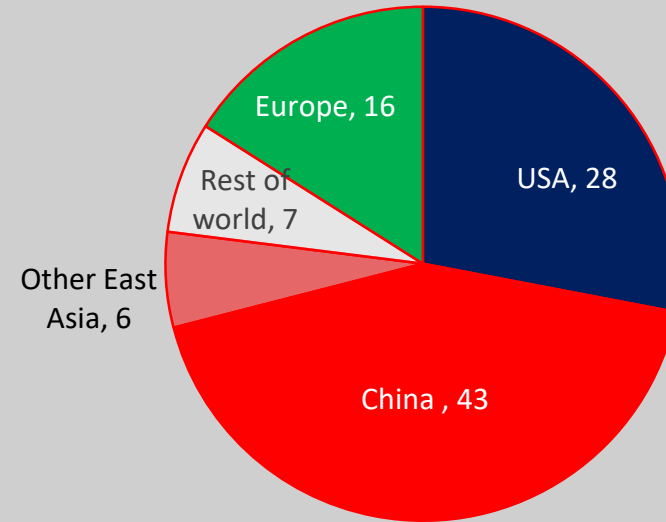
US, China, UK: 2016 (world average = 1.00)



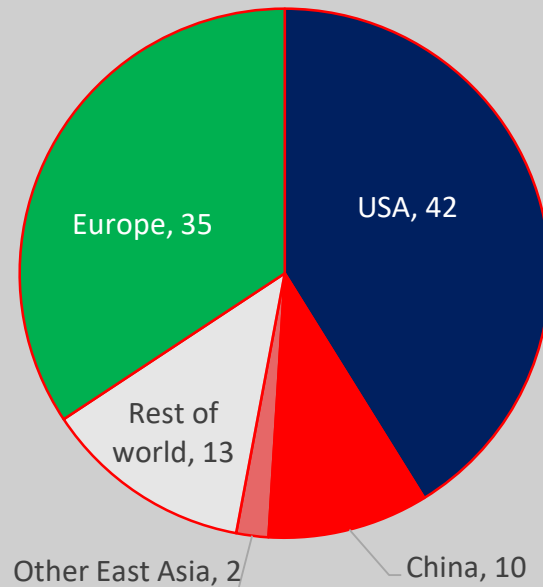
Maths and Computing



Physical Sci and Engineering



Biomedical and Health Sci



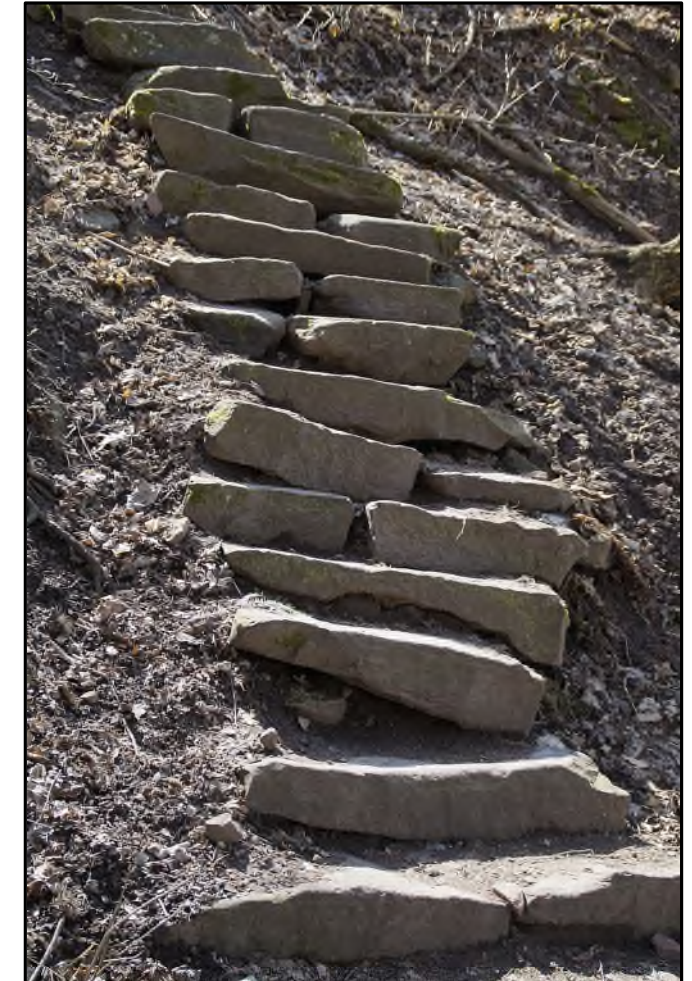
Top 100 universities on basis of number of top 5% papers, 2016-2019

Leiden University ranking

Europe includes UK, China includes Hong Kong SAR

China has two universities in the world leading 15, in terms of the number of high citation (top 5%) papers in 2016-19

university	country	Top 5% papers	all papers	% of papers in top 5%
Harvard U	USA	4230	34,234	12.4%
Stanford U	USA	2117	16,454	12.9%
U Oxford	UK	1696	16,088	10.5%
U Toronto	CANADA	1691	23,454	7.2%
MIT	USA	1586	10,507	15.1%
Tsinghua U	CHINA	1574	21,225	7.4%
U Michigan	USA	1490	18,756	7.9%
U Cambridge	UK	1440	14,080	10.2%
Johns Hopkins U	USA	1439	17,337	8.3%
U College London	UK	1430	14,923	9.6%
Zhejiang U	CHINA	1427	25,964	5.5%
U Pennsylvania	USA	1290	13,568	9.5%
U Washington , Seattle	USA	1288	14,807	8.7%
Columbia U	USA	1234	12,558	9.8%
U California, Berkeley	USA	1225	10,006	12.2%



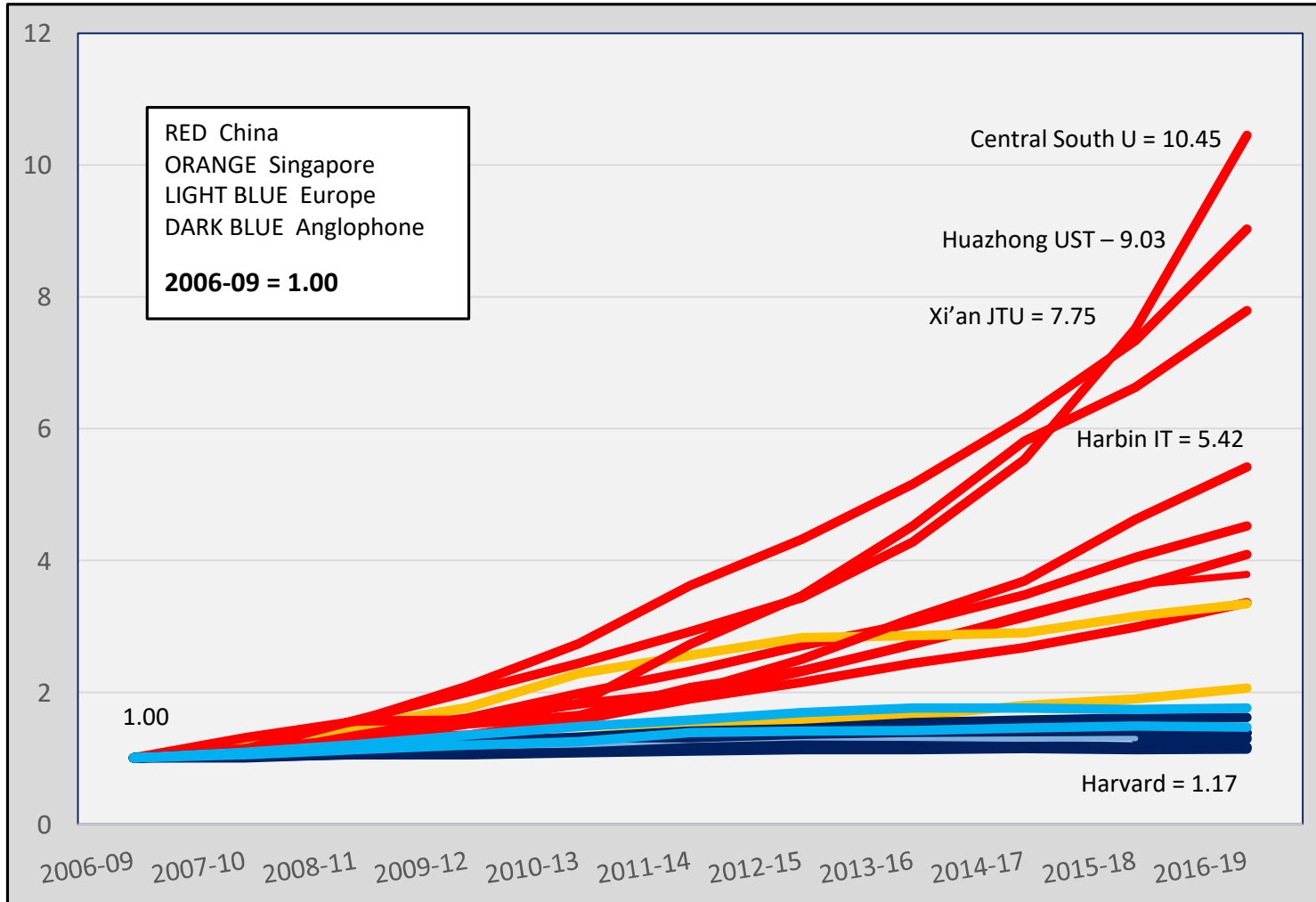
Top universities in STEM research

(1) physical sciences and engineering, and (2) mathematics and complex computing, Papers in top 5 per cent of their field by citation rate, World: 2016-2019 (*Leiden ranking*)

University	System	Physical sciences & engineering
Tsinghua U	CHINA	909
MIT	USA	683
Zhejiang U	CHINA	622
Nanyang TU	SINGAPORE	566
U Science & T.	CHINA	556
Harbin IT	CHINA	545
Stanford U	USA	541
Shanghai JT U	CHINA	513
Xi'an Jiaotong U	CHINA	512
Huazhong U S&T	CHINA	502
Harvard U	USA	487
National U	SINGAPORE	455
U Calif., Berkeley	USA	449
Peking U	CHINA	444

University	System	Maths & computing
Tsinghua U	CHINA	292
U Electronic S&T	CHINA	275
Harbin IT	CHINA	269
Huazhong U S&T	CHINA	231
Xidian U	CHINA	221
Beihang U	CHINA	215
MIT	USA	205
Zhejiang U	CHINA	194
Southeastern U	CHINA	193
Nanyang TU	SINGAPORE	187
Shanghai JT U	CHINA	178
Northwestern P. U	CHINA	164
Wuhan U	CHINA	161
Beijing IT	CHINA	159

Ten year growth in top 5% papers in East Asian universities (China and Singapore) with the most such papers in 2016-19 compared with ten leading Anglo-American and European universities: 2006-09 to 2016-19 (**2006-09 = 1.00**)



US-China in science

- After 1979 US-China Agreement on Cooperation in Science and Technology: 50 interagency agreements and thousands of cooperative programmes
- China's special relationship with the United States in science has helped to propel it to the scientific frontier'
 - Packalen, M. (2019). Edge factors: scientific frontier positions of nations, *Scientometrics*, 118, pp. 804-805
- China's researchers led largest number of high citation joint papers 2016-2019
 - Lee, J. and Haupt, J., (2020). Winners and losers in US-China scientific research collaborations. *Higher Education*
- US authorities' decoupling strategy of bearing down on joint appointments, restricting doctoral scholarships, fostering suspicion about motives of researchers



China in global science

Achievements

- Concentrated long-term investment in science
- Astonishing development of national science in thirty years
- Effective combination of central policy focus and autonomous discipline groups with initiative
- Open border internationalisation: universal English, connectivity
- Global disciplinary leadership in physical sciences STEM fields
- Many spinoffs for modernisation of China and Belt & Road regions
- Layer of top universities akin to Anglo-American leaders

Limits

- Potential for central party-state to overbear science and universities
- Uneven disciplinary capacity, medicine/life sciences lagging behind physical sciences STEM
- Western modernisation vs. partly defined indigenous modernisation agendas ('Chinese characteristics')
- Frenetic performance culture and some academic corruption
- Highly stratified university system, quality issues in local universities
- Dependence on US relationship creates problem now?
- Social sciences and humanities neglected, academic freedom in those disciplines more limited

Humanities and Social Sciences (HSS) Research in China

- Global space is open yet unequal
- HSS research revolves around the multiplicity of cultures, languages, knowledges, traditions, and social realities
- Multiple-discrimination and exclusion: cultural homogeneity, language domination, knowledge hegemony, etc.
- Constant tensions of Internationalisation, westernisation, and indigenisation/endogenisation in China's HSS research

Example: The coverage of Web of Sciences (WOS) and Scopus in terms of languages

		English	Chinese (Mandarin)
Percentage of speakers in the world		≈5%	≈12%
Databases	Total number of journals	Ratio of English-medium journals	Ratio of Chinese-medium journals
Ulrich's Directory	158,344	68.65%	9.07%
Web of Science	21,419	89% in Science Citation Index Expanded (English only) 90% in Social Sciences Citation Index (English only)	≈0% in SCIE (17 Chinese only, 2 Chinese + others) 0% in SSCI
Scopus	38,589	88% (English only, or English + others)	1.6% (415 Chinese Only, and 45 Chinese + others)

Data sources: Journal lists of the above databases, updated on 21 January 2021. Ethnology, 22nd Edition, 2019.



Note: The Chinese character 誠(诚) means sincere/sincerity, honest/y etc.



HSS: International or national publications?

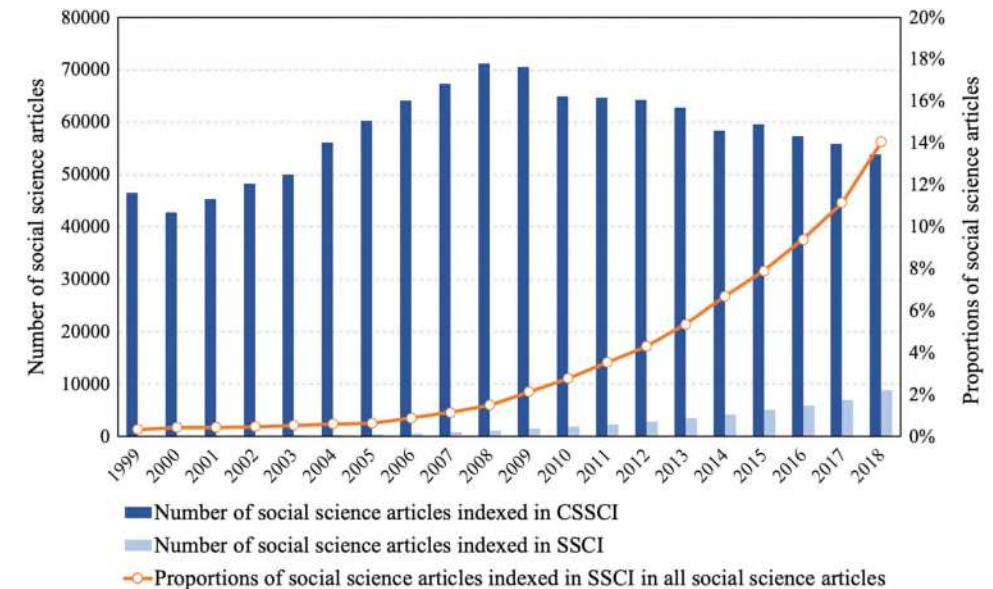
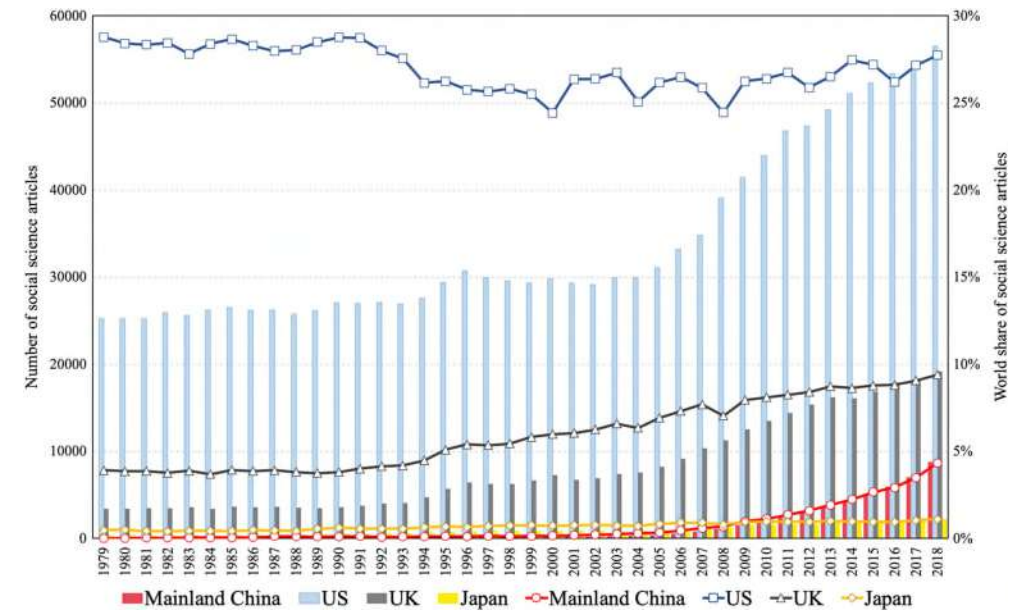
- The world's share of social sciences publications from China has been **increasing** rapidly since the late 2000s, now constituting about 5%; China is also taking **leadership roles** in international collaborations
- In comparison, the world shares of social sciences publications from the US and UK have not experienced as drastic changes, constituting around 25-30% and 5-10%
- Since the late 2000s, there is a **decrease of the proportion of publications in domestic journals** (CSSCI, Chinese Social Sciences Citation Index; largely Chinese-medium), coupled with **an increase of publication ratio in SSCI journals**
- **The total number of domestic publications still outnumbers that in international journals**
- The 2020 policy to abolish the 'supremacy' of international publications is not entirely new; it is a continuity of long-standing policy concerns to
 - **balance** the national and international
 - increase the **quality and integrity** rather than simply quantity
 - **'go out'** in publications and other forms (e.g. encouraging more journals from China to become 'international')

References:

Zhang, L., Shang, Y., Huang, Y., Sivertsen, G. (2021). Toward internationalization: A bibliometric analysis of the social sciences in Mainland China from 1979 to 2018. *Quantitative Science Studies*, 2 (1): 376–408.

https://doi.org/10.1162/qss_a_00102

Xu, X. (2021). A policy trajectory analysis of the internationalisation of Chinese humanities and social sciences research (1978–2020). *International Journal of Educational Development*. <https://doi.org/10.1016/j.ijedudev.2021.102425>



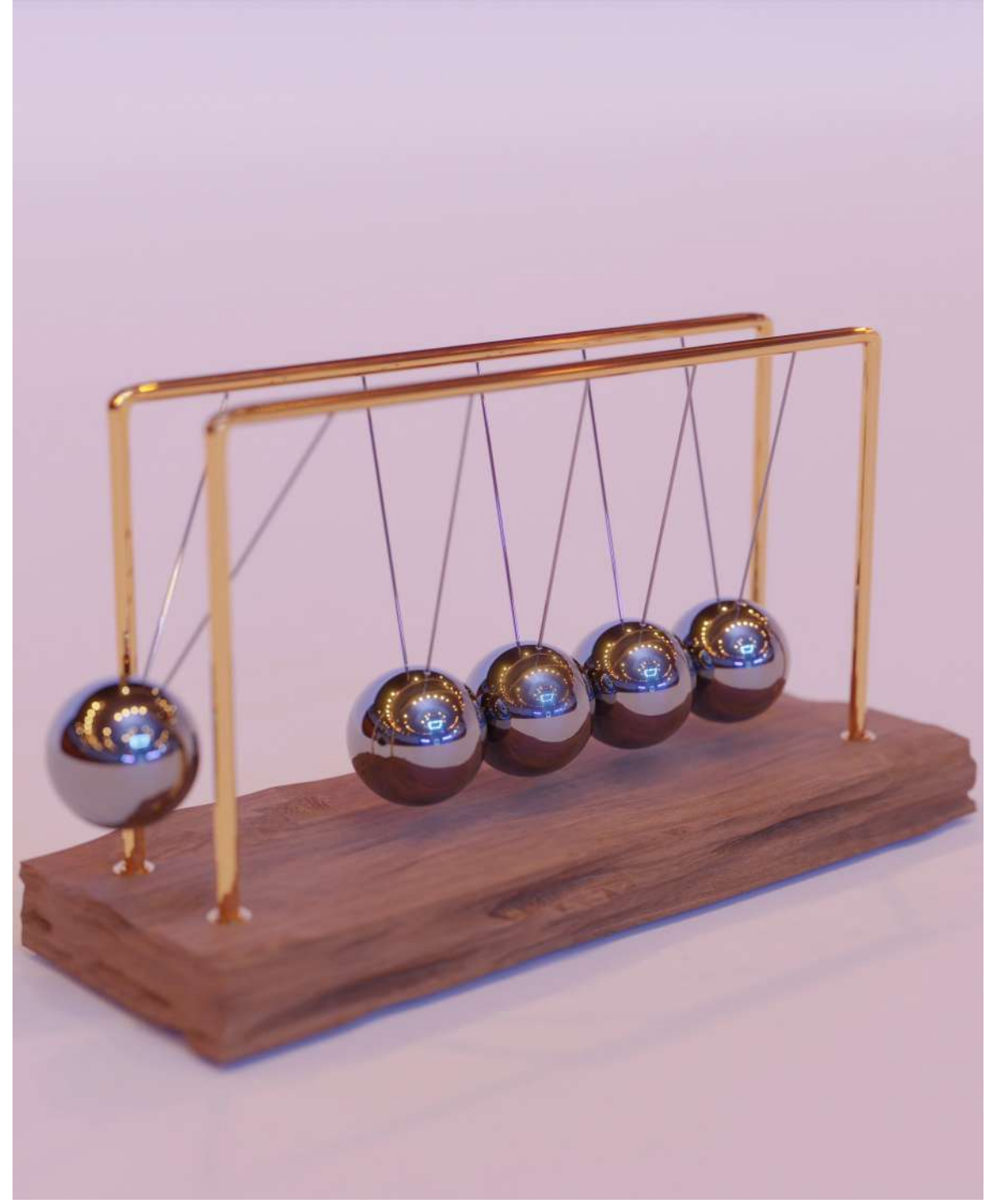
Figures from: Zhang, L., Shang, Y., Huang, Y., Sivertsen, G. (2021). Toward internationalization: A bibliometric analysis of the social sciences in Mainland China from 1979 to 2018. *Quantitative Science Studies*, 2 (1): 376–408. https://doi.org/10.1162/qss_a_00102

Changes and tensions in Chinese policy discourses on HSS

- Rising recognition of the value of HSS research, as compared to ‘sciences’
- From learning from the West to ‘Going-out’
- Internationalisation and indigenisation
 - ‘Chinalisation’ / ‘Chinese characteristics’
 - **Epistemically**, to respect and inherit historical, cultural and philosophical roots of Chinese traditions – indigenous cultural awareness
 - **Ideologically**, to uphold Marxism with Chinese characteristics – political sensitivity
 - **Practically**, to set agenda on Chinese reality and bring impacts on contemporary China – pragmatic orientations
- Ideological openness and vigilance
 - ‘Letting a hundred flowers bloom and a hundred schools of thought contend’ (*bai hua qi fang, bai jia zheng ming*; 百花齐放, 百家争鸣)
 - The hundred flowers do not grow in a vacuum

Reference

Xu, X. (2021). A policy trajectory analysis of the internationalisation of Chinese humanities and social sciences research (1978–2020). *International Journal of Educational Development*. <https://doi.org/10.1016/j.ijedudev.2021.102425>



Tensions in institutional and individual practices

- Internationalisation and indigenisation

'Now we are just borrowing Western theories to interpret some facts in China, rather than using our cases to develop theories further.' (Academic interviewee)

- Quality and quantity

[Numbers and indicators are like 'distorting mirrors'] 'we can have a rough image, while realizing the image is twisted. ..., not regard them as the whole truth.' (Academic interviewee)

- Integrity and instrumentalism

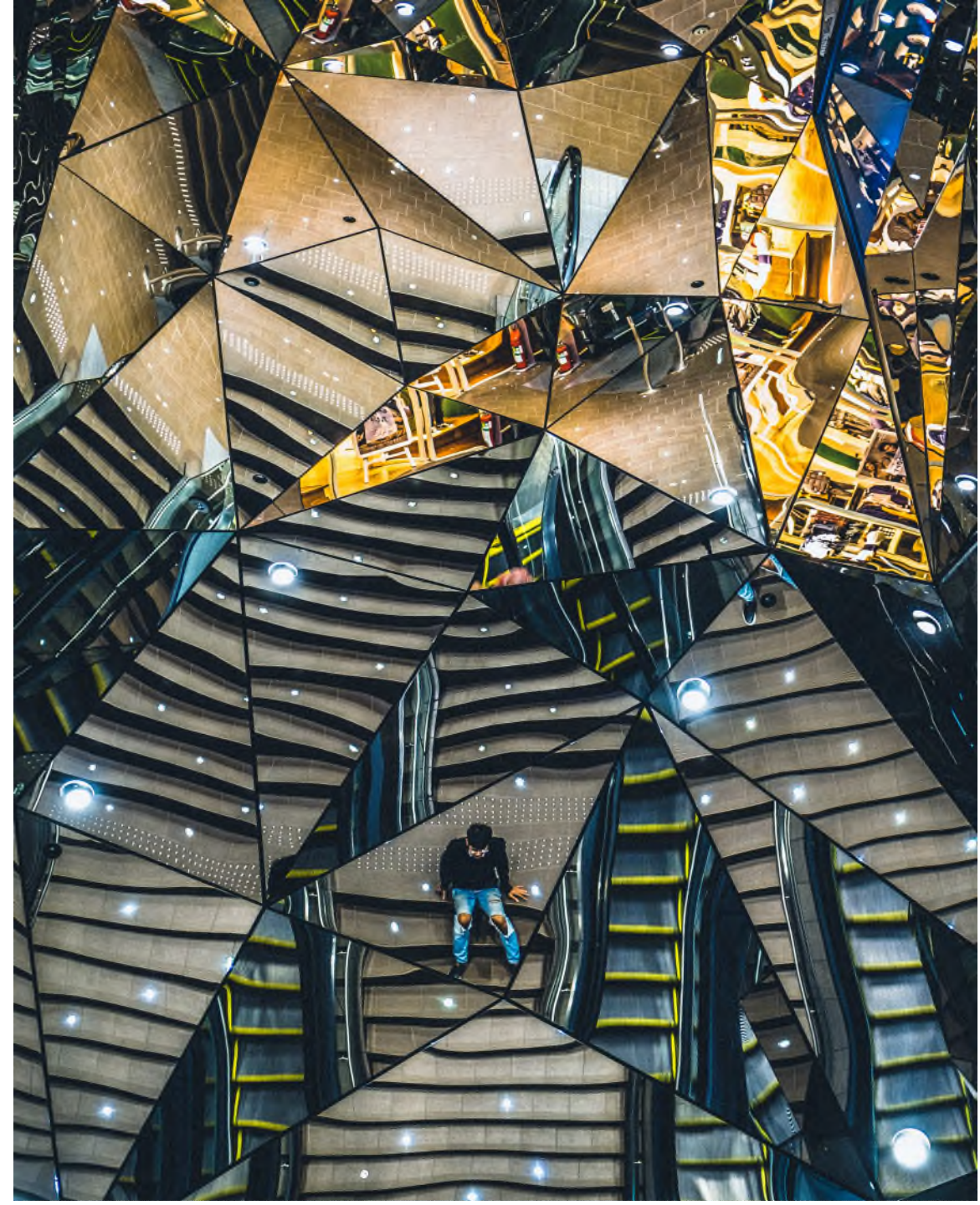
'Such systems could produce some opportunists, but so long as you do not become over-utilitarian in the future.' (Academic interviewee)

- Equity and inequity

- Stratification across institutions, disciplines, academics from different career stages, academic backgrounds, etc.

References

- Xu, X., Oancea, A. & Rose, H. (2021). The impacts of incentives for international publications on research cultures in Chinese humanities and social sciences. *Minerva: a review of science, learning and policy*. <https://doi.org/10.1007/s11024-021-09441-w>
- Xu, X. (2020). Performing 'under the baton of administrative power'? Chinese academics' responses to incentives for international publications. *Research Evaluation*, 29(1): 87-99.



China and the world, what's next?

- On-going geopolitical influences and wider global changes
- On-going international and regional collaboration and cooperation, between China and the US, East Asian systems, and the 'global south'
- On-going tensions in the understandings and practices of academic freedom and university autonomy
- The continuing imprint and influence of 'West' on higher education and research in China, with hybridisation of the Chinese frameworks
- The pluralisation of global research from the Chinese side, with more focus on originality, quality, integrity and influences of its research outputs, particularly in the humanities and social sciences

SYSTEM	WORLD SHARE RANK	TOP TEN COLLABORATORS (LISTED IN RANK ORDER)
<i>East Asian systems</i>		
China	2	USA, Germany, UK, Australia, Japan , Singapore , Canada, France, South Korea , Sweden
Japan	5	USA, China , Germany, UK, France, South Korea , Australia, Switzerland, Canada, Taiwan
South Korea	8	USA, China , Japan , Germany, UK, Switzerland, France, Canada, Australia, Italy
Singapore	16	China , USA, UK, Japan , Australia, Germany, France, South Korea , India, Canada
Taiwan	19	USA, China , Japan , Germany, UK, France, Italy, Australia, Switzerland, South Korea
Vietnam	44	USA, Japan , Germany, China , UK, France, Switzerland, South Korea , Australia, Italy
Mongolia	108	China , Germany, USA, Russia, Italy, UK, South Korea , Sweden, Hungary, Japan
<i>Other systems among top ten world share of scientific publications</i>		
USA	1	China , UK, Germany, Canada, France, Japan , Australia, Switzerland, South Korea , Italy
UK	4	USA, Germany, China , France, Australia, Switzerland, Italy, Netherlands, Spain, Canada
Germany	3	USA, UK, China , France, Switzerland, Netherlands, Italy, Spain, Japan , Australia
France	6	USA, Germany, UK, China , Switzerland, Italy, Spain, Japan , Netherlands, Canada
Canada	7	USA, China , UK, Germany, France, Japan , Australia, Switzerland, Italy, Netherlands
Switzerland	9	USA, Germany, UK, France, Italy, China , Spain, Japan , Netherlands, Canada
Australia	10	USA, China , UK, Germany, Japan , France, Canada, Netherlands, Switzerland, Italy

Note: East Asian systems in bold; no data for Hong Kong and Macau SARs. Original data from Nature Index; Table adopted from Marginson & Xu, 'The Ensemble of Diverse Music': Internationalization Strategies and Endogenous Agendas, in Marginson & Xu (eds., forthcoming), *Changing Higher Education in East Asia*, Bloomsbury.

China and the world, what's next?

- Chinese researchers in China
 - Hybridisation of international and local/national orientation for some researchers
 - Continuing tensions in Chinese and international academia, including the performativity pressure and injustice in national/global academia
- International researchers in China
 - A new generation for China: full-time and long-term international academic faculty with research and teaching responsibilities
 - Largely driven by academic motivation to come to China, with a prospect of a rising China and rising science from China
 - Mostly from OECD countries, while there is a growth of China-educated international doctoral researchers and post-doctoral researchers from non-Western countries
- Chinese researchers outside China
 - An ambiguous label of being 'Chinese', as defined by different ones: Chinese birthplace, nationality, ethnicity, diasporas, ancestry, family, etc.
 - Racism, discrimination and injustice experiences
- International researchers outside China
 - 'China scholars' getting more attention, but facing increasingly dilemmatic positionalities
 - Collaboration and engagement with China and Chinese research are continuing, the future is yet to unfold



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