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Shanghai Rankings 2018: Poor Performance of Indian Universities and IITs

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Abstract

Academic ranking of world universities (ARWU) 2018 is released on 15 August by Shanghai Ranking Consultancy of China. ARWU has been presenting the world Top 500 universities annually since 2004. It is unfortunate that none of the Indian universities and IITs find a slot among the Top 500, except Indian Institute of Science, Bangalore ranked at 427. China has moved to 2nd position after USA on the basis of subject ranking leaving behind UK and other European countries. It is suggested to set up "Schools of Excellence" in Indian universities to improve its ranking position at global level.

Keywords: *Global Ranking, Indian universities, IITs, Subject-wise ranking.*

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I have been using the Shanghai rankings of global universities [1], publisher of Academic Ranking of World Universities (ARWU), since 2004 to assess the performance of Indian universities at the global level [2, 3]. Balaram [4], the then editor of Current Science, took notice of poor performance of Indian universities in 2004 and wrote an editorial with his critical remarks: "I found the Shanghai rankings provocative and disturbing. It is clear that academic ambience of our large institutions is decaying. The government which funds these institutions, and the bodies that govern them need to take a long, hard and critical look at the higher education scene in India". Despite efforts made both at political and academic levels during these fourteen years, there is hardly any improvement in the global ranking of Indian universities. Ministry of Human Resource Development, Govt. of India has started ranking of the Indian universities [5] under National Institutional Ranking Framework (NIRF) in 2016.

An analysis of Shanghai ARWU rankings 2018 reveals that Indian universities and IITs do not find any slot among Top 500 universities at global level. Indian Institute of Science (IISc), Bangalore, enjoying the status of a university under special provisions of University Grants Commission (UGC), is the only Indian institute which is ranked at 427 among Top 500 in the ARWU ranking list. In 2016, India had 6 Institutes, 5 IITs and IISc, among ARWU ranking list of 500. In 2017 and 2018, India has been represented by the IISc, Bangalore only, which clearly shows that during the last two years Indian universities/institutes are losing ground to other Asian countries.

The country-wise ranking status among Top 10 universities in 2018 remains the same as reported in 2017. In ARWU list of 2018, out of top 10, 8 slots are occupied by US universities with Harvard and Stanford ranking first and second as usual. Universities of Cambridge and Oxford in UK occupy 3rd and 7th slot, respectively, as in 2017. Among Top 100 universities ranked globally, 50 belong to USA, 31 to Europe (including 8 of UK), 6 to Australia, 4 to Canada, 5 to Switzerland, 2 to China, 3 to Japan and 1 each to Israel and Singapore. Compared with 2017 ranking, USA has improved its position by 3 at the cost of European universities losing 3 slots but most of other countries (Australia, Canada, China and Japan) maintain their status quo in 2018 ranking.

However, if we consider the overall ranking for Top 500 universities at global level, USA occupies 136 slots and China (including Hong Kong) has 50 slots occupying 2nd position in ARWU list. The other top scorers are UK having 38, Germany 37, France 20, Canada

19, Japan 17 and Italy with 16 universities among the top 500. Some of the other countries which have improved their ranking in ARWU list of 2018 are South Korea with 12 universities, Taiwan with 7, Israel with 6, Brazil with 6 and Saudi Arabia with 4 universities among top 500. Malaysia, Singapore and Iran have 2 slots each among 500 top universities at the global level.

What about ranking of Indian Universities? The performance of Indian universities is as dismal in ARWU 2018 ranking as it was in 2017. However, it is most disappointing that none of Indian Universities and IITs find a slot among top 500 of ARWU 2018 list. The editor Shanghai Ranking has provided the embargoed data of ranking in the category 500–1000 among the total 1600 ranked universities at the global level. Calcutta University finds a slot among 501–600 category; IIT Madras among 601–700 category, IITs at Delhi, Kharagpur, Bombay, and Jawahar Lal Nehru University (JNU), New Delhi, are ranked among 701–800 category, IITs Kanpur and Roorkee, along with Indian Institutes of Science Education and Research (IISERs) are ranked among 801–900 category, All India Institute of Medical Sciences (AIIMS), Anna University, Madras, and Punjab University, Chandigarh are ranked among 901–1000 category. The only saving grace is IISc Bangalore which has a slide down from rank 225 in 2016 to rank 323 in 2017 and to rank 427 in 2018, a sort of downslide among global ranking ARWU 2018.

GLOBAL RANKING OF ACADEMIC SUBJECTS

The subject-wise ranking of universities has been introduced in recent years as a part of global ARWU ranking. The Shanghai rankings have worldwide popularity as it has started ranking in 54 subjects (disciplines) of natural sciences, life sciences, medical sciences, engineering sciences and social sciences. Ranking indicators [6] include measures of research productivity, quality of research output based on the quality of journals, extent of international collaboration, and the highest academic recognitions of the faculty of the concerned university.

The criteria of Shanghai ARWU ranking is listed in Table 1. Ranking Indicators include six parameters which are briefly described in Table 1. The relative importance of each parameter is given in ARWU comprehensive list [1, 6]. The most significant parameter is number of publications; the others being collaboration at international level with co-authors from two or more foreign countries; the quality of research journals in which articles (papers) are published; and the International Awards won by the faculty. This data is compiled from Web of Science and InCites database of the publications made during the last five years. Antonio Fernandez-Cano et al. [7] have suggested that Shanghai Ranking methodology as a tool for the evaluation of universities is not in line with Berlin Principles [8] and the conclusions drawn from an institution's ranking position must be considered highly controversial and questionable.

Table 2 records the list of number one (Top most) universities in 54 subjects. Out of more than 4000 universities ranked, universities from the United States take 35 top positions in 54 subjects, followed by 9 institutions from China (including Hong Kong) and 3 from the Netherlands. The best performing institution is Harvard, taking 17 crowns (Number One), 9 of which are from social sciences subjects, 4 from medical sciences, 2 from life sciences, and 2 from engineering. MIT tops 5 subjects, 4 of which are engineering subjects. Other universities which top more than in one subject rankings include University of Pennsylvania and University of Colorado at Boulder from the United States, Wageningen University from the Netherlands, and Nanyang Technological University from Singapore. The league table of ARWU 2018 Shanghai ranking has a total of 18407 entries of published data from more than 1600 universities from 83 countries of all regions. Universities from the United States appear 4661 times, followed by Chinese universities (2171 times) and universities from the United Kingdom (1487 times). It clearly shows that China has gained second rank in overall ranking of all subjects in 2018, leaving all the major European nations behind.

Table 1: *2018 Shanghai Ranking's Global Ranking of Academic Subjects—Ranking Indicators.*

Indicator	Definition
PUB	The number of papers authored by an institution in an Academic Subject
CNCI	Category Normalized Citation Impact from InCites to measure average impact of papers authored by an institution in an Academic Subject
IC	The percentage of internationally co-authored papers authored by an institution in an Academic Subject
TOP	The number of papers published in top journals and conferences in an Academic Subject.
AWARD	The total number of the staff of an institution winning a significant award in an Academic Subject

Table 2: *List of Number 1 Universities in 54 Subjects.*

Field	Subject	Institution Name	Country/Region
Natural Sciences	Mathematics	Princeton University	USA
	Physics	Massachusetts Institute of Technology (MIT)	USA
	Chemistry	University of California, Berkeley	USA
	Earth Sciences	University of Colorado at Boulder	USA
	Geography	University of Oxford	UK
	Ecology	University of Montpellier	France
	Oceanography	University of Washington	USA
	Atmospheric Science	University of Colorado at Boulder	USA
Engineering	Mechanical Engineering	University of Cambridge	UK
	Electrical & Electronic Engineering	Massachusetts Institute of Technology (MIT)	USA
	Automation & Control	University of Illinois at Urbana-Champaign	USA
	Telecommunication Engineering	Tsinghua University	China
	Instruments Science & Technology	Harbin Institute of Technology	China
	Biomedical Engineering	Harvard University	USA
	Computer Science and Engineering	Massachusetts Institute of Technology (MIT)	USA
	Civil Engineering	Tongji University	China
	Chemical Engineering	Massachusetts Institute of Technology (MIT)	USA
	Materials Science & Engineering	Massachusetts Institute of Technology (MIT)	USA
	Nanoscience & Nanotechnology	Nanyang Technological University	Singapore
	Energy Science & Engineering	Nanyang Technological University	Singapore
	Environmental Science & Engineering	Stanford University	USA
	Water Resources	University of Arizona	USA
	Food Science & Technology	University of Wageningen	Netherlands
	Biotechnology	Harvard University	USA
	Aerospace Engineering	Beihang University	China
	Marine/Ocean Engineering	Shanghai Jiao Tong University	China
	Transportation Science & Technology	Beijing Jiaotong University	China
	Remote Sensing	Wuhan University	China
	Mining & Mineral Engineering	The University of Queensland	Australia
	Metallurgical Engineering	University of Science and Technology Beijing	China
Life Sciences	Biological Sciences	Harvard University	USA
	Human Biological Sciences	Harvard University	USA
	Agricultural Sciences	University of Wageningen	Netherlands
	Veterinary Sciences	Ghent University	Belgium
Medical Sciences	Clinical Medicine	Harvard University	USA
	Public Health	Harvard University	USA
	Dentistry & Oral Sciences	University of Michigan-Ann Arbor	USA
	Nursing	University of Pennsylvania	USA
	Medical Technology	Harvard University	USA
	Pharmacy & Pharmaceutical Sciences	Harvard University	USA

Social Sciences	Economics	Harvard University	USA
	Statistics	Harvard University	USA
	Law	Harvard University	USA
	Political Sciences	Harvard University	USA
	Sociology	Harvard University	USA
	Education	Harvard University	USA
	Communication	The Ohio State University - Columbus	USA
	Psychology	Harvard University	USA
	Business Administration	University of Pennsylvania	USA
	Finance	New York University	USA
	Management	Harvard University	USA
	Public Administration	Erasmus University Rotterdam	Netherlands
	Hospitality & Tourism Management	The Hong Kong Polytechnic University	China-Hong Kong
	Library & Information Science	Harvard University	USA

In the category of social sciences, the country-wise ranking of Top 10 universities is same as in overall ARWU ranking, i.e., USA retains 8 and UK 2 positions out of 10. Out of Top 100 universities, USA retains 58 slots, Australia 5, China 3 and Hong Kong 3. Out of total 200 universities ranked in Social Sciences, UK has 20 slots and Canada 14 slots. None of the Indian universities, including the famous Tata Institute of Social Sciences, finds a slot among Top 200 universities ranked at the global level. Out of 300 universities ranked in Economics, Delhi School of Economics finds no slot. Among Top 10 in Economics, USA has 9 slots and the London School of Economics and Political Science occupies 8th slot among the top 10.

In Medical Sciences, out of 500 universities/medical schools ranked in the subject of Clinical Medicine, All India Institute of Medical Sciences (AIIMS), New Delhi, finds a slot among the category 301–400. In Biological Sciences, India is not so lucky to find a slot among the top 500 universities at global level.

In Natural Sciences, the situation is slightly better. In Mathematics, Aligarh Muslim University (AMU) is ranked among the top 201–300 category along with IISC, Bangalore, and Indian Statistical Institute (ISI), Kolkata, is ranked in the category 401–500. In Physics, out of 500 universities listed under global ranking, Punjab University, Chandigarh has been ranked among 151–200, Jammu university among 301–400, and IISc Bangalore and IIT Bombay both occupy a slot in the category 401–500. In Chemistry ranking of 500 universities, IISC Bangalore is ranked among 151–200, IIT Bombay 301–400, and IITs of Kanpur, Kharagpur and Madras are ranked in the category 401–500. In computer sciences, as expected, Indian universities show better performance. Jadavpur University, Kolkata, is ranked among 101–150, IIT Delhi and ISI Kolkata among 201–300, and IITs Bombay and Kharagpur among 301–400, IISC Bangalore, IITs Kanpur and Roorkee among the category 401–500 in the global ranking of 500 universities.

In the emerging area of nanoscience and nanotechnology, there are some big surprises. The topmost slot among 300 universities ranked globally is occupied by Nanyang Technological University of Singapore. Among the other top ranking universities, USA occupies 75 slots followed by China with 57 slots and South Korea emerging as an Asian giant with 17 slots, with Seoul University at 10th slot out of total 300 universities ranked at global level. India lags much behind China and South Korea with IISc Bangalore ranked among top 151–200 and IIT Kharagpur among the category 201–300.

In engineering sciences, Indian universities performance is appreciable. In electrical and electronics engineering, India occupies 5 slots among 500 ranked universities with IISc Bangalore, IITs Delhi and Bombay ranked among top 201–300, followed by IITs Kanpur and Kharagpur ranked among top 401–500,

respectively. The best performance of Indian universities is recorded in the discipline of mechanical engineering. Out of 300 universities ranked globally, IIT Madras is ranked among top 51–75, IISC Bangalore and IITs Kanpur and Kharagpur among 101–150, IITs Delhi and Bombay among 151–200, followed by IIT Roorkee ranked among category 201–300, respectively.

There is a dire need to investigate the results of Shanghai ranking consultancy and determine the factors responsible for dismal performance of Indian universities. The criteria for NIRF ranking of Indian universities must be made compatible with International ranking in line with the spirit of the Berlin Principles [8]. India has announced recently 'Centres of Excellence' among Indian universities for providing special grants of ₹1000 Crores (ten million) to augment research facilities, which is a step in the right direction, if followed strictly on merit. It has caused a lot of heart burning among the universities ranked by the NIRF, Ministry of Human Resource Development (MHRD), Government of India. None of the top ten universities ranked by NIRF finds a slot among the list released by Government of India, except IISc. Bangalore, which is a special institute of its own kind, not falling in the category of regular universities set up under the act of UGC.

In my view, India needs to follow an alternative route to excellence. Instead of choosing a university as a unit, we must identify one hundred eminent scholars in each subject. These scholars should be provided liberal funding without any strings for setting up "Schools of Excellence" in their area of expertise. The scholar will act as a nucleus for the growth of his School. If Indian scholars are not available in any subject, offer can be made to foreign based Indian or foreign scholars at their own terms and conditions. I suggest just one; there may be other routes to bring in Excellence in Indian universities at global level.

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