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Higher education, high-impact research, and world university rankings: A case of India and comparison with China

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ABSTRACT

To date, this paper is probably the first to compare Indian and Chinese universities on educational performance metrics such as high-impact research and world university rankings. The study, therefore, examines the current state of higher education, high-impact research metrics, and world university rankings in an emerging market of India. First, we present an overview of the higher education system, government schemes for academic research, and related educational statistics. Second, we compare India and China on various academic-research metrics (citable documents, number of citations, cites per document, and H-index in three categories), and world university rankings. Special attention is devoted to revealing the progress of management research metrics, business school accreditations and rankings, and abstracting and indexing of publishing journals. Last, we discuss several challenges in university education and recommend policy guidelines pertaining to research funding, collaborative research projects, and research assessment council for imparting quality academic practices and standards in a higher education environment. Our exploratory analysis indicates that for citable documents in the 'all subjects' category, the United States is ranked first, followed by China in second, the United Kingdom in third, and India in ninth. Overall, world university rankings and research metrics of Indian universities are found to be far behind those of Chinese universities.

1. Introduction

Higher education is the most fundamental constituent, and it requires careful attention and evaluation to foresee prospective outcomes in a given country. It is indeed a reward for citizens, gives knowledge and respect, makes an individual self-assured, and provides a career. For human capital theory, higher education is an effective tool to develop science and technological capabilities that are required for a standard of living in a global knowledge economy (e.g. Ding and Zeng, 2015). Drawing on institutional theory, higher education institutions are often referred to as professional organizations driven by values and norms associated with academia. Hence, the accomplishment of strategic objectives by higher educational institutions depends on contextual factors such as the regulatory framework of the country, decision-making power, financial support, culture, communication, and assessment (Stensaker et al., 2014). For example, Xie et al. (2014) highlight four important factors that drive China in scientific research, namely, a large population and human capital base, a labour market favouring academic meritocracy, a large diaspora of Chinese-origin scientists, and a centralized government willing to invest in science.

In existing literature, several studies have examined the higher education stream for different reasons in different institutional settings. For instance, one group of scholars has mainly emphasized the performance of higher educational institutions, private higher education, the relationship between higher educational reforms and economic performance, curriculum development, student assessment and the job market, among others (e.g. Jabnoun, 2015; Kantola and Kettunen, 2012; Moed et al., 2011; Yaisawarng and Ng, 2014). Another group of researchers has particularly examined the internationalization of the higher education sector, university rankings, building world-class universities, collaborative research

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centres, research funding, and so forth (e.g. Daraio et al., 2015; Frølich et al., 2010; Jöns and Hoyler, 2013; Li et al., 2014; Millot, 2015; Saisana et al., 2011; Usher and Savino, 2006). Specifically, some scholars have paid attention to assorted themes such as the impact of individual researcher productivity on university performance, journal rankings, bibliometrics of specific areas and journals, and related issues (e.g. Abramo et al., 2013; Berlemann and Haucap, 2015; Hall, 2011; Huang, 2012; Lin et al., 2013; Neri and Rodgers, 2015). Importantly, there is a growing research interest in higher educational reforms, performance of higher educational institutions, university systems, research assessments, and university rankings in emerging markets like Latin American and the Asian continent, including the Russian Federation (e.g. Chinta et al., 2016; Gonzalez-Brambila et al., 2016; Halai, 2013; Jiao et al., 2015; Kang et al., 2014; Liu et al., 2015; Menon, 2016; Mironos et al., 2015; Pouris and Pouris, 2010; Yu and Gao, 2010). Though a small number of studies have analysed the performance of the Indian higher education sector – research performance and national university rankings (e.g. Gupta, 2010; Padalkar and Gopinath, 2015; Prathap, 2014; Sahoo et al., 2017; Yeravdekar and Tiwari, 2014) – to our knowledge, no study has examined Indian and Chinese universities on educational performance metrics such as high-impact research publications and world university rankings. Therefore, we attempt to fill this knowledge gap and contribute to the literature on higher educational institutions in developing countries.

At the outset, we wish to present some interesting observations about Indian higher education that were highlighted in the print and electronic media.

> Too many of our higher education institutions are simply not up to the mark. Too many of them have simply not kept abreast with changes that have taken place in the world around us…, still producing graduates in subjects that job market no longer requires… Not one Indian university today figures in top 200 universities of the world.

Dr. Manmohan Singh, Former Prime Minister of India (India Today, 2013).

> By 2030, India will be amongst the youngest nations in the world with nearly 140 million people in the college-going age group, one in every four graduates in the world will be a product of the Indian education system (Times of India, 2014), fifty percent of youth would be in the higher education system, at least 23 Indian universities would be among the global top 200, six Indian intellectuals would have been awarded the Nobel Prize, the country would be among top five countries globally in cited research output, its research capabilities boosted by annual R&D spends totaling over US$140 billion.

Businessline (2014).

> According to Aspiring Minds National Employability Report, which is based on a study of more than 150,000 engineering students who graduated in 2015 from over 650 colleges, 80% of the engineering graduates are unemployable.

Times of India (2016).

> 19,000 people applied for 114 posts as sweepers in Uttar Pradesh … of which some 6000 applicants are graduates in arts and sciences, post-graduates, even engineering graduates and MBAs; likewise, 75,000 well trained people have applied for 30 peon jobs in Chattisgarh; according to Census 2011, over 20% of Indian youth (between the age of 15–24) or 47 million Indians are jobless.

Indiatimes (2016).

From the aforementioned comments, one would notice at least two opposing views associated with the higher education system in India. On the one hand, we react to but disagree with the progress of the higher education system, research output, and university rankings. At the same time, we are dejected upon knowing the present job market in the country. This suggests how we should establish well-structured, managed, and excellent higher educational systems while removing contaminated procedures, controlling malpractice, and lessening political abuse, thus placing a governance-based and an objective-oriented higher education structure on the world map. On the other hand, the second comment seems to offer un(realistic) goals with some fancy numbers and audaciousness whilst focussing more on protecting the self-respect of the ruling political party. That being stated, one should aim high and work prudently for the development of the country. Then, the outcome will have a positive impact on economic progress, employment, foreign collaboration, capital mobilization, and entrepreneurship. In the context, institutional environment, economic resources, and human resources are important drivers of higher education and high-impact research (e.g. Xie et al., 2014; Zoogah et al., 2015).

Indian higher education has long been criticized for several reasons, including the poor quality in course content, shortage of skilled teaching faculty, lack of research interest, inadequate infrastructure facilities, scarce financial support, uneven industry-centric skills, poor international collaborations, lack of motivation to compete internationally, meagre research output and number of citations, reluctance to establish global universities, and so forth (e.g. Gupta, 2010; Prathap, 2014; Sheel and Vohra, 2014). This is because governments (central and state/province) have supreme power over administration, admissions, examinations, recruitment, and assessment, particularly in the public university system (central and state universities). Hence, a number of systems and practices in higher education have been redefined, redesigned, and transformed since the entry of the private university degree system and economic reforms in 1991 (e.g. Umashankar and Dutta, 2007; Yeravdekar and Tiwari, 2014). It can be inferred that economic deregulation and integration policies not only influence the economic performance of the country but also affect the human capital sector of higher education. Thus far, the government of India has mainly targeted some areas in higher education such as setting up Institutes of National Importance (e.g. Indian Institute of Technology (IIT), National Institute of Technology (NIT), Indian Institute of Management (IIM)), financial assistance to public universities, teacher training institutes, quality measures in admissions, job market assistance, and producing PhDs for teaching requirements, among others. While economic reforms affect higher educational performance metrics, Indian institutes hardly focus on industry collaboration, high-impact research, and world university rankings. Yet they are assessed by autonomous organizations such as the National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA).[1]

In recent years, admissions and job market numbers are becoming increasingly complex due to structural problems in the governance system, incentives to bureaucrats, and political influence (Times of India, 2015, 2016). An unforeseen point is that local institutes often thrive from admissions, central government grants, pay scales and increments, and national accreditation. Further, government and private universities are not able to focus on global university rankings because of institutional problems, which include financial assistance, research infrastructure, research

[1] The autonomous organizations such as 'NAAC' were established in 1994 (http://www.naac.gov.in) and NBA came into operations from 2010 (http://nbaind.org).

skills, and teaching emphasis (e.g. Sheel and Vohra, 2014). Even more interestingly, one would notice an increasing number of private universities over the past five years, quality and quantity contradictions, unethical practices in the university assessment, outdated policies in technical education, and so forth. On the other end, one may wish to compare Indian higher education and research performance with Chinese higher educational research metrics (e.g. Godinho and Ferreira, 2012; Leeves and Poon, 2015; Liu et al., 2015; Neri and Rodgers, 2015). For instance, research output by Chinese universities in the field of science and technology during 2000–2012 has shown an impressive annual increase of 17% compared to 4% in the United States (cf. Leeves and Poon, 2015). In the case of high-impact economics research over 2001–2010, China's rank has moved up from 33rd to 16th (Neri and Rodgers, 2015). Based on experiences and facts, India's newly elected government aims to establish the best practices of excellence and inclusiveness, and highest standards of ethics and accountability across university education, and work towards placing local universities in the world university league tables[2] (Businessline, 2014). This line supports the objectives of the 12th Five-Year Plan (2012–2017), which emphasizes some key areas to improve the standards in university education such as enhancing skills and employment, technology and innovation, and improved access to quality education.

1.1. Motivation, objective, and framework

On the one hand, a few studies examine Indian higher education for various reasons, including the policy reforms in public and private higher education, world-class universities, and ranking of state and central universities based on research output (e.g. Basant and Sen, 2014; Chawla and Saxena, 2016; Gupta, 2010; Prathap, 2014; Sahoo et al., 2017; Umashankar and Dutta, 2007; Yeravdekar and Tiwari, 2014). On the other hand, we notice a significant research interest in the new methods and approaches of university rankings, journal rankings and reputation, linking individual research performance to institutional rankings, role of governments in promoting research-driven institutes, and knowledge-sharing alliances, particularly in an emerging markets setting: Latin American, African, and Asian countries such as Brazil, China, India, Pakistan, Russia, and South Africa (e.g. Berlemann and Haucap, 2015; Cao and Li, 2014; Chen et al., 2007; Ding and Zeng, 2015; Gonzalez-Brambila et al., 2016; Halai, 2013; Hallinger, 2014; Jiao et al., 2015; Jöns and Hoyler, 2013; Kang et al., 2014; Lahiri, 2011; Leeves and Poon, 2015; Li et al., 2014; Liu et al., 2015; Mironos et al., 2015; Pouris and Pouris, 2010; Prathap, 2014; Rienda et al., 2011; Sheel and Vohra, 2014; Wang et al., 2012; Yaisawarng and Ng, 2014; Yu and Gao, 2010; Zoogah et al., 2015). Hence, a study on the performance of academic research metrics in India and comparison with China is missing in the higher education and world university rankings literature. Specifically, contemporary issues in higher education and the university system, government intervention driven by political parties' powers, student–university relations, competition between public and private universities, and institutional conflicts have motivated us to undertake this exploratory research project.

Therefore, we set three goals in this paper. First, we present an overview of the higher educational system in India, government schemes for conducting academic research, and related educational statistics. Second, we highlight academic research metrics of India and China (e.g. citable documents, number of citations, cites per documents and H-index in three categories), and show Indian universities that ranked in the world university rankings. We choose China as a more appropriate country because both countries are characterized by comparable population size and number of higher educational institutions. Indeed, several studies in economics, management, and social sciences have considered China and India to be the most comparable settings (e.g. Amighini, 2012; Godinho and Ferreira, 2012; Holdaway et al., 2015; Nagano and Yuan, 2013; Reddy et al., 2016). Specifically, we show the progress of management research, business school accreditations and rankings, and abstracting and indexing of publishing journals. Lastly, we discuss potential challenges embedded in existing higher education and academic research, and suggest policy recommendations for the betterment of the academic practices, research skills, and university environment. The findings will have a significant impact on policy development, university education, industry collaboration, high-impact research, and global university rankings. This paper contributes to emerging themes and wider debates on the assessment of higher educational institutions in a global knowledge economy, particularly in an emerging markets framework.

The remainder of this paper proceeds as follows. Section 2 presents research design. Section 3 outlines an overview of the higher education system in India, various government schemes for academic research, and related statistics. Section 4 discusses the current state of high-impact research and other research performance indicators. Section 5 highlights world university rankings and associated listings. Section 6 explains a number of challenges in higher education and academic research, and suggests policy guidelines for the betterment of the system. Finally, Section 7 concludes the study.

2. Research design: approach and data

The main goal of this paper is to discuss the progress of higher education, academic-research metrics, and world university rankings in India and compare these with China. To do so, we create an interdisciplinary research setting by linking inductive and deductive logic based on archival sources (Reddy, 2015; Reddy and Agrawal, 2012). This approach allows qualitative researchers to discuss several important observations. In this exploratory research, we present not only the evolution of the higher education system but also uncover the level of academic research and innovation by making a connection to the world university rankings. It eventually helps us to explore various challenges and opportunities in higher education governance and control mechanisms, and suggest policy guidelines for improving the existing practices. Hence, a small number of studies referring to India have been reviewed for strategic reasons (e.g. Chawla and Saxena, 2016; Gupta, 2010; Lahiri, 2011; Prathap, 2014; Rienda et al., 2011; Sahoo et al., 2017; Yeravdekar and Tiwari, 2014). Given the indication of a qualitative framework, we collect data from archival sources to achieve the goals of this study. First, statistical data on Indian higher education is collected from respective government organizations such as Ministry of Human Resource Development (MHRD), Universities Grants Commission (UGC), and All India Council for Technical Education (AICTE).[3]

[2] In March 2016, MHRD (Ministry of Human Resource Development) launched the 'National Institutional Ranking Framework' (NIRF) for assessing and ranking all educational institutes in India based on selective parameters (see https://www.nirfindia.org/Home). Hence, it is premature to comment on this new policy initiative, which is outside the scope of this paper.

[3] See UGC (http://www.ugc.ac.in), MHRD (http://mhrd.gov.in), and AICTE (http://www.aicte-india.org).

Second, with regard to the assessment of high-impact research, previous studies have used globally referred to and accredited databases such as *Web of Science* (ISI's Science Citation Index Expanded, Social Sciences Citation Index) and *SCImago*[4] for different purposes in different disciplines (e.g. Abramo et al., 2013; Berlemann and Haucap, 2015; Frey and Rost, 2010; Gupta, 2010; Hall, 2011; Huang, 2012; Jiao et al., 2015; Jin and Hong, 2008; Lin et al., 2013; Liu et al., 2015; Quer et al., 2007; Vastag and Montabon, 2002; White, 2002; Yu and Gao, 2010). Therefore, we use 'country-based research and citation rankings list' from SCImago – an open access resource of research and citation metrics, based on Scopus (a product of Elsevier). In line with the usage of the SCImago database, we find both strengths and weaknesses highlighted in previous studies (e.g. de Mesnard, 2012; Gupta, 2010; Mañana-Rodríguez, 2015; Moed et al., 2011; Prathap, 2014). For example, Hall (2011) performs a bibliometric analysis of tourism research using the SCImago Journal Rank indicator, and suggests that 'the indicator poses as a serious alternative to the well-established journal [impact factor], mainly due to its open-access nature, larger source database, and assessment of the quality of citations' (p. 21). Conversely, de Mesnard (2012) highlights a number of flaws in the university rankings based on SCImago, and the database has been responsible for issues, including the problems of nomenclature, multiple affiliations, the question of aggregation, and of bias toward large public-funded research institutions. Yet the SCImago database (Journal Rankings and Institutional Rankings) is the best-known and the most widely referred to and accredited example of the world university rankings carried out by bibliometricians (e.g. Abramo and D'Angelo, 2015; Gruber, 2014). Capturing this, we use four metrics, namely, citable documents, number of citations, cites per document, and H-index,[5] for three categories: (i) all subjects; (ii) business, management, and accounting; and (iii) economics, econometrics, and finance.

Third, we find several studies that use different world university rankings (for instance, *Academic Ranking of World Universities (ARWU)* of Shanghai Jiao Tong University, the *UK's Times Higher Education (THE) World University Rankings*, *Quacquarelli Symonds (QS) World University Rankings*, *Webometrics*, *SCImago Institutional Rankings (SIR)*, and the *U.S. News & World Report (USNWR)*) for different purposes (e.g. Bengoetxea and Buela-Casal, 2013; Berbegal-Mirabent and Ribeiro-Soriano, 2015; Blanco-Ramírez and Berger, 2014; Boulton, 2011; Daraio et al., 2015; Free et al., 2009; Hallinger, 2014; Huang, 2012; Jabnoun, 2015; Jöns and Hoyler, 2013; Kim and Bastedo, 2012; Lin et al., 2013; Lukman et al., 2010; Marginson and Wende, 2007; Millot, 2015; Policano, 2007; Pouris and Pouris, 2010; Prathap, 2014; Saisana et al., 2011; Siemens et al., 2005; Usher and Savino, 2006; Webster, 2001; Yeravdekar and Tiwari, 2014).[6] In this paper, ARWU Rankings 2015 and THE World University Rankings 2015–16 are referred to to analyse the performance of Indian and Chinese universities (ARWU, 2015; THE, 2015).

Fourth, in the case of high-impact management research, we refer to the most commonly referred to and open-access research metrics databases such as the *University of Texas at Dallas (UTD) Top 24 Journals*. Fifth, we check the accreditation status of business schools that were accredited by the US-based Association to Advance Collegiate Schools of Business (AACSB) International.[7] Sixth, we report business schools ranked in the *Financial Times Top 100 Business School Rankings 2015* (FT, 2015). Last, we survey abstracting and indexing of Indian and Chinese publishing journals in economics, management, and related fields by a serious attempt at browsing 13 of the world's leading publishers of academic journals, namely, Cambridge, De Gruyter, Elsevier, Emerald, Inderscience, Informs, John Wiley, Oxford, Palgrave Macmillan, Sage, Springer, Taylor & Francis, and World Scientific.[8]

3. An overview of higher education system in India

Indian higher education is the third-largest educational system in the world after the United States and China, and has a great potential to compete with global universities (Rienda et al., 2011; Times of India, 2014). Main participants in the system include Institutes of National Importance, central universities, state universities, deemed-to-be universities, private universities, autonomous institutes, and supporting institutes. According to MHRD,

> [the] number of universities has notably increased from 20 in 1950 at an extreme growth rate by 3285%, to 677 in 2014, which represents 51 institutions of national importance (16 IITs, 30 NITs and 5 IISERs),[9] 45 central universities, 318 state universities, 185 state private universities, 129 deemed-to-be universities, and 4 institutions established under various state legislations. Likewise, [the] number of registered colleges has markedly increased from 500 in 1950 at a massive growth rate by 7341%, to 37,204 in March 2013.[10]

These statistics allow us to infer that the government of India has mainly focused on the development of higher education for benefitting a larger population. According to the UGC annual report 2012–13 (March), the state of Tamil Nadu has registered with the highest number of universities at about 79, followed by Uttar Pradesh at 56, Rajasthan at 56, and Andhra Pradesh at 43, among others. Total student enrolment in all courses in the regular stream has reached nearly 21.5 million (female students number 9.3 million (43.28%)). The state of Uttar Pradesh has enrolled the maximum number of about 3.36 million students, followed by Maharashtra at 2.46 million, Tamil Nadu at 2.04 million, and Andhra Pradesh at 2.01 million, among others. Further, the number of teaching faculty has reached nearly 951,000, in which 82.5% of teachers are affiliated with colleges, and the remaining 17.5% of teachers are associated with universities. Importantly, the number

[4] The research metric database 'SCImago' (http://www.scimagojr.com) is developed and maintained by the research group of the Universities of Granada, Extremadura, and Carlos III in Spain (Hall, 2011).

[5] Definition: H-index, or Hirsch index – a scientific contributor with an index of *h* has published *h* papers, each of which has been cited in other papers at least *h* times. A physicist, Jorge E. Hirsch, developed it in 2005. It captures the number of publications (productivity) and the number of citations per publication (citation impact). It can be applied to an author, journal, department, university, or country (see Hirsch, (2005)).

[6] The ARWU has been published annually by the Shanghai Jiao Tong University since 2003. Whereas THE World University Rankings has been published annually by the Times Higher Education Supplement since 2004 (Saisana et al., 2011), a metric indicator, Webometrics, is produced by the Cybermetrics Lab, a branch of the Centro de Ciencias Humanas y Sociales (Millot, 2015). Hence, the rankings differ in the mode in which they report the rankings and scores.

[7] The AACSB was established in 1916 and first adopted accreditation standards in 1919 (http://www.aacsb.edu). Conversely, there are similar organizations such as the Accreditation Council for Business Schools and Programs (ACBSP), the Association of MBAs (AMBA), and the European Foundation for Management Development's Quality Improvement System (EQUIS) (for a detailed survey, see Miles et al., 2014).

[8] See, for example, the world's 56 largest book publishers (Publishers Weekly, 2014).

[9] IISER stands for Indian Institute of Science Education and Research.

[10] Notes: these statistics, however, slightly differ from the data presented in Table 1 due to the representation of various government departments and differences in sampling period.

of PhD recipients totals 17,631, of which the Faculty of Arts and Faculty of Science[11] awarded the highest number of research degrees, about 5642 and 5,607, respectively, followed by the Faculty of Engineering and Technology at 2,098, Faculty of Education and Medicine at 617 each, and the Faculty of Agriculture at 564, to cite a few. In fact, one would notice a significant increase in the number of PhD recipients as well as doctoral admissions over the last five years.

We present some related statistics on Indian higher education (see Table 1). For instance, (i) growth of student enrolment (including research degrees: MPhil and PhDs) has significantly increased from 3.4 million in 1984–85 to 8.4 million in 2000–01, and reached 21.5 million in 2012–2013; (ii) teaching staff number 165,964 in universities and university colleges, and 785,875 in affiliated colleges. In particular, we show government expenditure on education activities corresponding to the country's GDP. For example, the amount has increased remarkably from Rs. 640 million [US$10.28 million] (0.64% of GDP) in 1951–52 to Rs. 196,150 million [US$3149.98 million] (3.84% of GDP) in 1990–91, then Rs. 824,860 million [US$13,245.95 million] (4.28%) in 2000–01, and Rs. 4,032,360 million [US$64,753.02 million] (4.29%) in 2012–13.[12] Although the percentage of the higher education budget in relation to GDP represents about 4%, it is still less than that of South Africa (6.6%) and the world average (4.9%).[13]

In view of the autonomy and central administration, UGC is the principal body of university education and primarily responsible for allocation of government grants to higher education institutions and various research promotion activities. It is an independent public agency, which works under the guidelines of MHRD, prepares an annual budget, and allocates funds to universities under specific schemes and other research fellowships and promotion schemes. It supports state and central universities and institutions for establishing computer labs, and research and training centres at post-graduate-level courses focussing on computer applications. The commission granted Rs. 170 million (US$2.73 million) out of the Rs. 310.5 million (US$5.06 million) amount planned for the period 2007–08 through 2012–13. The commission also provides financial assistance to universities for organizing seminars, workshops, or conferences at national and international levels in different disciplines. The financial grants range from Rs. 70,000 (US$1124) to Rs. 150,000 (US$2408) under this scheme. Herewith, we present an important academic research fellowship that was sponsored by the UGC,[14] and other related schemes.

3.1. Junior research fellowship

Under this scheme, a candidate admitted into a PhD program for science, humanities, and social science disciplines is eligible to

[11] Definition: The Faculty of Arts and Faculty of Science are the two main departments in central and stage universities. The Faculty of Arts offers courses in culture, history, language, literature, philosophy, and related vocational streams. The Faculty of Science offers courses in biochemistry, botany, chemistry, computer science, geography, geology, geophysics, mathematics, physics, statistics, zoology, and related science streams.

[12] In this paper, we use the Indian Rupee–US dollar conversion rate of Rs. 62.273 to the US dollar, dated 31 March 2015 (www.exchange-rates.org).

[13] In the case of China, education expenditure as percentage of GDP was 4.28% in 2012 (see Ding and Zeng, 2015).

[14] A list of UGC fellowship schemes include Rajiv Gandhi national fellowships for the SC/ST category, postdoctoral fellowships for the SC/ST category, postdoctoral fellowships for women, Dr. D.S. Kothari postdoctoral fellowships, research fellowships in science for meritorious students, single girl child fellowship scheme, UGC-BSR faculty fellowship scheme, one-time grant to teachers under the BSR program, and start-up grant for newly recruited faculty, among others (UGC Annual Report, 2012–2013, http://www.ugc.ac.in).

Table 1
Related statistics on Indian higher education.

I. Number of institutions by category 2013–14 (provisional)

Number of universities	712
■ Central university	42
■ State public university	310
■ Deemed university	127
■ State private university	143
■ Central open university	1
■ State open university	13
■ Institution of national importance	68
■ Institutions under state legislature act	5
■ Others	3
Number of colleges	36,671

II. Number of recognized educational institutions

Year	Colleges	Universities
1950–51	578	27
1960–61	1819	45
1970–71	3277	82
1980–81	6963	110
1990–91	5748	184
2000–01	10,152	254
2005–06	16,982	350
2006–07	19,812	371
2007–08	23,099	406
2008–09	27,882	440
2009–10	25,938	436
2010–11	32,974	621
2011–12	34,852	642
2012–13 (provisional)	35,829	665
2013–14 (provisional)	36,671	712

III. Level-wise enrolment of students

Year	Higher education (millions)
1950–51	0.4
1960–61	1
1970–71	3.3
1980–81	4.8
1990–91	4.9
2000–01	8.6
2005–06	14.3
2006–07	15.6
2007–08	17.2
2008–09	18.5
2009–10	20.7
2010–11	27.5
2011–12	29.2
2012–13 (provisional)	29.6

IV. Percentage of enrolment in different disciplines at PhD and post-graduate levels, 2013–14

Discipline	PhD	Post-graduate
Agriculture & Allied	4.39	0.61
Commerce	3.21	8.04
IT & Computer	1.93	9.34
Engineering & Technology	17.45	6.34
Foreign Language	3.16	4.83
Home Science	0.68	0.21
Indian Language	6.14	8.78
Law	0.84	0.76
Management	4.47	16.92
Medical Science	6.50	4.17
Science	20.61	8.75
Social Science	18.27	20.58
Other	12.35	10.69

V. Gross enrolment ratio (GER)

Year	GER
2001–02	8.1
2002–03	9.0
2003–04	9.2
2004–05	10.0
2005–06	11.6

(continued on next page)

Table 1 (*continued*)

V. Gross enrolment ratio (GER)	
Year	GER
2006–07	12.4
2007–08	13.1
2008–09	13.7
2009–10	15.0
2010–11	19.4
2011–12	20.8
2012–13 (provisional)	21.1

VI. Public expenditure on all educational segments		
Year	Expenditure [Rs. Crore]/(US$ million)	Expenditure as % of GDP
1951–52	64.46 (10.35)	0.64
1960–61	239.56 (38.47)	1.48
1970–71	892.36 (143.29)	2.11
1980–81	3884.2 (623.74)	2.98
1990–91	19,615.85 (3149.98)	3.84
2000–01	82,486.48 (13,245.95)	4.28
2005–06	113,228.7 (18,182.63)	3.34
2006–07	137,384 (22,061.57)	3.48
2007–08	155,797.3 (25,018.43)	3.4
2008–09	189,068.8 (30,361.29)	3.56
2009–10	241,256 (38,741.67)	3.95
2010–11	293,478.2 (47,127.68)	4.05
2011–12 (revised estimates)	351,145.8 (56,388.13)	4.18
2012–13 (budget estimates)	403,236.5 (64,753.02)	4.29

Notes: (i) Gross Enrolment Ratio is the total student enrolment in a given level of education, regardless of age expressed as a percentage of the corresponding eligible official age group population in a given school year.
(ii) 1 Crore = 10 million; we use Indian Rupee–US dollar conversion rate of Rs. 62.273, dated 31 March 2015 (www.exchange-rates.org).
Source: Compiled from Educational Statistics at a Glance, Bureau of Planning, Monitoring & Statistics, Ministry of Human Resource Development, New Delhi, Government of India, 2014 (http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/EAG2014.pdf).

receive a monthly fellowship for the maximum period of five years, provided the scholar has qualified for the National Eligibility Testing (NET) or UGC-CSIR. In addition, a scholar receives an annual contingency grant to meet expenses like textbooks, computer peripherals, and attending conferences/workshops. According to Sixth Pay Commission guidelines, a monthly fellowship ranges from Rs. 25,000 [US$401] (for the initial two years) to Rs. 30,000 [US$482] (for the remaining years). Moreover, UGC helps MPhil scholars meet some academic research expenses for one to two years. For 2012–13, UGC spent about Rs. 1900 million (US$30.51 million) and incurred Rs. 700 million (US$11.24 million) on account of reimbursement to non-university institutions. In a given year, UGC typically opens 8000 fellowship slots for national citizens.

3.2. AICTE-research promotion scheme

This is a special scheme for technical institutions initiated by the technical council of India, AICTE. The organization provides limited financial assistance for engineering and technical institutes to meet various academic research activities. The grant ranges from Rs. 0.5 to 2 million (US$8029 to US$32,116) for each proposal. During 2011–12, the committee approved 394 out of 2797 proposals received from all technical institutions in India, which is equal to Rs. 420 million (US$6.74 million).

3.3. Shodhganga – the open access repository of Indian research

Shodhganga (http://shodhganga.inflibnet.ac.in) is an electronic thesis and dissertation repository of Indian research, which was initiated in 2010 under the UGC Regulations (Minimum Standards & Procedure for Award of MPhil and PhD), 2009 (Sheeja, 2012). The purpose of this project is to host Indian research wherein theses and dissertations are awarded by universities and institutions, and to provide open access to that academic resource. It is administered by the Information and Library Network (INFLIBNET) centre established in 1991, with an aim to 'establish a network by interlinking libraries and information centres of universities, colleges, institutions of national importance and R&D institutions' (Chauhan and Mahajan, 2013). As per the UGC notification, a university must sign a memorandum of understanding with INFLIBNET in order to upload the thesis into Shodhganga. The repository has received the e-India Jury Choice award for the best ICT-enabled higher education institute of the year 2011.

As of 10 February 2015, the repository shows 197 universities signed MoUs, and 30,545 theses were submitted. Interestingly, the number of theses submitted to the repository has significantly increased from 1171 in 2010 to 1522 in 2011, 2299 in 2012, 7057 in 2013, and then 17,951 in 2014. The top ten contributing universities include Jawaharlal Nehru University at 4,433, Anna University at 2,415, Mahatma Gandhi University at 1,974, Bundelkhand University at 1,769, Cochin University of Science & Technology at 1,428, Chaudhary Charan Singh University at 1,281, Pondicherry University at 779, Pt. Ravishankar Shukla University at 774, University of Hyderabad at 744, and Periyar University at 730. In particular, the number of university-level repositories[15] has increased to 81 in 2012 from 27 in 2007. India ranked seventh worldwide for the number of repositories after Brazil (Sahu and Arya, 2013).

3.4. ShodhGangotri – the open access repository of Indian research in progress

The purpose of the ShodhGangotri project is to host 'Indian research in progress' and provide open access to it (http://shodhgangotri.inflibnet.ac.in). Research in progress refers to 'approved research synopsis'. The project helps research scholars to avoid copying, plagiarism, duplication in research framework as well as 'to claim a particular topic in the national level before it is registered by others in the same university or other universities in India'. As of 10 February 2015, 1884 proposals are freely available to academia. The top five contributing universities include Shri Jagdishprasad Jhabarmal Tibrewala University at 1,062, Dayalbag Educational Institute at 198, Mahatma Gandhi University at 178, Andhra University at 73, and Symbiosis International University at 52.

4. High-impact research metrics: theory and analysis

This study is motivated by recent articles giving viewpoints on higher education institutions, country research metrics, world university rankings, and the Indian research environment (e.g. Gruber, 2014; Sheel and Vohra, 2014; Zoogah et al., 2015). Therefore, we present theoretical notes and analysis in four strands, namely, the importance of academic scholarship, determinants of high-impact research, country-based research indicators, and abstracting and indexing of Indian and Chinese journals.

4.1. Academic scholarship

Academic scholarship is the most important intellectual asset of a faculty, university, and nation. Indeed, research scholarship is a continuous effort influenced by a set of motives and requirements

[15] See, for example, a list of institutional repositories in India (Appendix I).

of institutions, which aims to discover new knowledge that simplified human life. In other words, research is a determination of 'search and re-search' so as to explore new findings for defining the new order of the world. For Boyer (1990),

> scholarship involves *discovery* - original research that advances knowledge; *integration* - synthesis of information across disciplines, across topics within a discipline, or across time; *application* - the rigor and application of disciplinary expertise with results that can be shared with and/or evaluated by academic peers and appreciated by the non-academic world; and *teaching and learning* - the systematic study of teaching and learning processes.
>
> cf. Zoogah et al. (2015).

In particular, academic research helps faculty members not only in receiving government grants but also in publishing research and teaching courses. Thus, a blend of theory and industry-oriented research enriches the classroom experience, especially in the management subject. The findings and observations of major research projects have a significant impact on policy-making and social issues. For example, research on road accidents in metropolitan cities may help the respective government ministry, police department, society, and higher education institutions to prevent road accidents and improve safety measures. Overall, research is a form of intangible asset (e.g. patents, research papers, books) that is owned by a faculty, university, and country.

4.2. Factors affecting high-impact research metrics

High-impact research has a distinct meaning in different disciplines (Ahlstrom, 2015; Ahlstrom et al., 2013; Jie et al., 2008; Penfield et al., 2014). It also differs between users and audiences. Penfield et al. (2014) say that impact 'is assessed alongside research outputs (knowledge generated and publications) and environment to provide an evaluation of research taking place within an institution. In turn, research can be translated into outcomes: new products and services, and impacts or added value' (p. 21). For example, research on the causes of cancer in the medical sciences should be at a high level that requires significant financial support, talented medical scientists, and physical and scientific infrastructure. Then, findings of the research can be published in reputable journals such as *Nature*, *Science*, and the *New England Journal of Medicine*, among others. Specifically, high-impact research in 'management discipline' refers to 'an approved project or interesting problem that is meaningful to the industry that may help in managerial decision making or government policy making'. The findings of the research can be publishable in top-ranked journals, for example, *Journal of Marketing*. Nevertheless, publishing research in high-quality journals is the only measure to assess the performance of a faculty/university (e.g. Zoogah et al., 2015). Further, Zoogah et al. describe,

> three characteristics of high-impact research, including *problematization* (diagnoses economic, social, and technical problems with the purpose of generating meaningful solutions), *focus* (directs the empirical lens at the specific problem with laser-precision to achieve valid and reliable outcomes), and *contextuality* (distinguishes temporal, physical, and psychological contextual features so as to minimize errors and to maximize the desired effects).

Based on the former and latter illustrative experiences, we perceive that high-impact research is an essential task of disseminating research findings by publishing in a reputable journal and is relevant if that project has received grants from the government or industry (Ahlstrom, 2015; Ahlstrom et al., 2013). A reputable academic journal features an international outlook, editorial board, mission and objectives, a blind review system, and is highly accessed, often cited, and SCI/SSCI-indexed, with the highest impact factor and highest H-index. We thus suggest that several factors influence the performance of high-impact research, including *individual-specific factors* (e.g. educational qualification, job profile, university affiliation, level of research skills, knowledge of research methods, writing and presentation skills, personal motivation, field of interest, and academic network), *university-specific factors* (e.g. physical and technical infrastructure, research culture, data access, training and workshops on research publications, research assistance, financial support, international collaborations, incentives for research publications, teaching load, coordination among various departments, political and social behaviour, and university policies with regard to faculty appointment and promotion), and *country-specific factors* (e.g. institutional environment, level of government involvement in university administration, level of political intervention, government budgeting for higher education, tax incentives on research grants and income, postdoctoral research fellowships, collaborative research grants, and bilateral agreements). Altogether, it is probably best to publish high-impact research in a journal with the highest impact factor, which will receive a significant number of citations. For example, a special issue of *Long Range Planning* on 'business models' published in 2010 is the most exciting case in strategic management. As of 2013, the special issue has attracted more than 150,000 downloads, more than 3500 citations in Google Scholar, and more than 500 in ISI (Baden-Fuller and Haefliger, 2013).

Hence, there is no rule-based approach by which the paper published in a journal with the highest impact factor receives the highest number of citations. Indeed, the number of citations is influenced by numerous factors, including the journal outlook, open access, journal subscription, speed in publishing the forward-looking research (articles in the press), level of interest in the field (e.g. business models, corporate governance), progress in the research field (e.g. emerging markets), and so forth (Bernius, 2010). However, one has to consider that managing research projects and publishing papers in journals with good impact factors are two different goals in an academic environment. Early academic scholars must remember that publishing in high-quality journals is not a trouble-free job. High-impact research has greater value than low-impact research, which indeed influences the researcher performance and university rankings. For the management stream, we notice three high-quality journal rankings, such as *UTD Top 24 Journals*, *Financial Times Top 45 Journals*, and *Bloomberg Top 25 Journals*. Other noteworthy listings include the *Chartered Association of Business Schools, UK (CABS) Academic Journal Quality Guide*, *SCImago Journal Rank*, *Australian Business Dean's Council (ABDC) Quality Journal List*, and so forth.[16]

4.3. Publishing research: country-based metrics

We present publishing research metrics of Top 20 countries during the period 1996–2013, in three categories: (i) all subjects; (ii) business, management, and accounting (BMA); and (iii) economics, econometrics, and finance (EEF) (Table 2). Thus, we discuss

[16] For further information, see CABS (http://charteredabs.org) and ABDC (http://www.abdc.edu.au).

Table 2
Publishing research metrics of Top 20 countries, 1996–2013.

Rank	Country	Citable documents	Citations	Citations per document	H-index
I. All subjects					
1	United States	7,281,575	152,984,430	22.02	1518
2	**China**	3,095,159	14,752,062	6.81	436
3	United Kingdom	1,932,907	37,450,384	19.82	934
4	Germany	1,876,342	30,644,118	17.39	815
5	Japan	1,874,277	23,633,462	13.01	694
6	France	1,348,769	21,193,343	16.85	742
7	Canada	1,040,413	18,826,873	20.05	725
8	Italy	1,015,410	15,317,599	16.45	654
9	**India**	825,025	5,666,045	8.83	341
10	Spain	800,214	10,584,940	15.08	531
11	Australia	723,460	11,447,009	18.24	583
12	South Korea	642,983	5,770,844	11.49	375
13	Russian Federation	629,671	3,664,726	6	355
14	Netherlands	574,144	12,103,482	23.03	636
15	Brazil	510,194	4,164,813	10.98	342
16	Taiwan	434,662	3,993,380	11.35	300
17	Switzerland	419,372	9,238,679	24.53	629
18	Sweden	397,095	8,069,960	21.76	567
19	Poland	378,483	2,939,536	8.93	336
20	Turkey	330,411	2,417,631	9.07	237
II. Business, management, and accounting					
1	United States	161,082	2,369,434	16.96	382
2	United Kingdom	48,889	564,178	13.97	181
3	**China**	35,829	73,474	5.28	83
4	Germany	23,982	133,488	6.43	116
5	Australia	20,882	186,638	12.88	117
6	Canada	19,155	255,573	17	158
7	**India**	13,792	41,503	4.14	66
8	France	12,559	107,164	13.86	118
9	Netherlands	12,214	173,818	19.5	139
10	Spain	11,301	83,896	10.44	87
11	Taiwan	10,374	80,875	12.12	91
12	Italy	8843	73,344	13.01	91
13	Hong Kong	8285	122,153	18.17	121
14	Japan	7601	39,026	6.64	63
15	Sweden	6451	73,601	16.72	101
16	South Korea	6453	64,952	15.4	89
17	Switzerland	5356	50,510	11.88	84
18	Finland	5026	47,869	15.7	79
19	New Zealand	4663	46,115	13.53	74
20	Brazil	4646	15,954	7.07	45
III. Economics, econometrics, and finance					
1	United States	119,070	1,918,542	18.97	345
2	United Kingdom	36,832	444,270	14.96	178
3	Germany	20,368	152,114	9.84	102
4	France	16,004	106,455	10.09	100
5	Canada	15,694	168,652	12.63	128
6	Australia	14,017	112,089	10.6	99
7	Spain	11,358	80,637	10.51	86
8	**China**	11,296	55,134	15.85	74
9	Italy	10,922	84,186	11.47	92
10	Netherlands	10,606	131,945	15.24	115
11	Japan	7143	36,037	6.79	57
12	**India**	6240	22,769	7.02	57
13	Taiwan	5540	34,293	10.54	66
14	Switzerland	5322	59,757	16	86
15	Belgium	5058	50,635	13.08	80
16	Sweden	5002	61,759	16.09	92
17	Hong Kong	4334	61,899	17.39	91
18	South Korea	4332	32,542	12.09	66
19	Norway	3296	36,247	14.05	69
20	Brazil	3264	15,145	11.11	47

Source: Compiled from SCImago Journal & Country Rank (http://scimagojr.com), accessed 3 April 2015.

four important metrics such as citable documents, number of citations, citations per document, and H-index. For citable documents in the 'all subjects' category, the United States ranked first, followed by China in second, the United Kingdom in third, and India in ninth. For citable documents in the BMA category, the United States ranked first, followed by the United Kingdom in second, China in third, and India in seventh. For citable documents in the EEF category, the United States ranked first, followed by the United

Kingdom in second, China in eighth, and India in twelfth. Importantly, the H-indexes for China in the 'all subjects' category (436), BMA (83), and EEF (74) were significantly higher than the H-index for India (341, 66, and 57). We also show the trend line of category-based metrics for India and China (Fig. 1). In case of citable documents for all subjects, the speed in rate of growth for China is more remarkable than the speed in rate of growth for India. Hence, we observe different trend lines for both countries in the BMA and EEF categories. For number of cites and cites per document in the 'all subjects' category, the trend line of Chinese and Indian publishing research represents 'rising yet declining' sharply, especially after the year 2008, while mixed performance is noticed for the remaining categories. In sum, Indian research metrics are found to perform far behind Chinese research metrics.

Given the gist of the research framework, special attention is devoted to reporting the progress of management research on various indicators. We find a few studies that examine the number of research publications published by Indian institutes in reputable management journals (e.g. Lahiri, 2011; Rienda et al., 2011; Sahoo et al., 2017; Sheel and Vohra, 2014). For instance, Lahiri (2011) examines India-focused publications in seven international business journals for 1991–2008[17] and highlights how authors associated with US-based universities published more papers considering India as a sampling country. It is evident that only 10 (13.5%) out of 74 articles and only 19 (10.55%) out of 180 contributors represented Indian institutes. Rienda et al. (2011) exhibit similar findings for papers published in 11 management journals during 1991–2010.[18] Only 15 (16%) out of 94 papers published by institutes were found to be based in India. The observations are further corroborated by our attempt at counting the number of papers published by Indian and Chinese universities in UTD Top 24 Journals[19] over 1991–2014. Unsurprisingly, only 101 papers were published by 14 institutes established in India (e.g. the Indian School of Business contributed 54 articles; IIM Bangalore, 19),[20] while 1513 papers were published by 75 institutes that are based in China (e.g. HKUST contributed 406 articles; City University of Hong Kong, 185; Chinese University of Hong Kong, 178; Hong Kong Polytechnic University, 135; University of Hong Kong, 106; and Peking University 54). The upshot is that not even one paper was published by Indian institutes in the two most respected field journals such as *The Journal of Finance* and *Journal of Marketing*, whereas Chinese universities published 59 and 36, respectively. In sum, it is evident that the papers (institutes) associated with India are far fewer in number than the papers (institutes) associated with China. After all, in our view, it is disagreeable to compare isolated research metrics of Indian management institutes with skyrocketing research indicators of Chinese management schools.

In case of journal editorship, we find that a professor associated with [a] Chinese university is currently an associate editor and 10 professors affiliated to Hong Kong universities are editorial board members of the *Academy of Management Journal* (AMJ), while only one professor associated with an Indian institute is an editorial board member.[21] Furthermore, the number of China-based professors representing high-impact journals (e.g. editor, associate editor, and board member) is significantly higher than the number of Indian-based professors representing low-impact journals. Therefore, we suggest that Chinese universities are performing far better than Indian universities, especially in citable documents, number of citations, international collaborations (e.g. Xi'an Jiaotong-Liverpool University (XJTLU), China–Europe International Business School (CEIBS)),[22] collaborative research projects, and publications and editorships.

4.4. Abstracting and indexing of Indian and Chinese publishing journals

In this section, we present some interesting observations with regard to abstracting and indexing of Indian and Chinese publishing journals in economics, management, and related subjects. First, given the degree of linguistic advantage, several Indian institutes publish academic journals in different streams, but most of them represent a local perspective with no indexing in the Web of Science, Scopus, and related listings (see Appendix II). Over the past few years, Indian business schools have taken advantage of the 'worldwide distribution at low cost pricing' scheme for academic journals offered by Sage India Publications, then selected 'hosting services' (initiated new journals). Examples include journals such as *Business Perspectives and Research*, *Foreign Trade Review*, *Indian Journal of Corporate Governance*, *Management and Labor Studies*, *Paradigm*, *Vikalpa*,[23] and *Vision*, among others. Likewise, Elsevier publishes *IIMB Management Review*, and Springer publishes *Global Journal of Flexible Systems Management and Decision* based on a pricing and distribution agreement. Emerald publishes *Journal of Indian Business Research*, *Indian Growth and Development Review*, and *Journal of Advances in Management Research*, and Taylor & Francis publishes *Macroeconomics and Finance in Emerging Market Economies*. Inderscience publishes *International Journal of Indian Culture and Business*, but the journal is not affiliated to any Indian university. The most striking observation is that not even one Indian journal in the management discipline has been indexed in SSCI, which is the best indicator of publishing quality research. More positively, we find a few journals publishing from India are included in the CABS, UK Academic Journal Guide 2015, and the ABDC Journal List 2013.

[17] A list of sampling journals includes International Business Review, International Marketing Review, Journal of International Business Studies, Journal of International Management, Journal of International Marketing, Journal of World Business, and Management International Review (Lahiri, 2011).

[18] A list of sampling journals includes Academy of Management Journal, Asia Pacific Journal of Management, California Management Review, Harvard Business Review, International Business Review, Journal of International Business Studies, Journal of International Management, Journal of World Business, Management International Review, Organization Science, and Strategic Management Journal (Rienda et al., 2011).

[19] The UTD Top 24 Journals include Academy of Management Journal, Academy of Management Review, The Accounting Review, Administrative Science Quarterly, Information Systems Research, Journal of Accounting and Economics, Journal of Accounting Research, Journal of Consumer Research, The Journal of Finance, Journal of Financial Economics, Journal of International Business Studies, Journal of Marketing Research, Journal of Marketing, Journal of Operations Management, Journal on Computing, Management Science, Manufacturing and Service Operations Management, Marketing Science, MIS Quarterly, Operations Research, Organization Science, Production and Operations Management, The Review of Financial Studies, and Strategic Management Journal (see UTD Research Metrics).

[20] A list of contributing Indian institutions include Indian School of Business with 54, IIM Bangalore with 19, IIM Ahmedabad and IIM Calcutta with 7 each, IIM Lucknow with 3, IIT Delhi and Amrita University with 2 each, Tata Institute of Fundamental Research, Tata Consultancy Services, Dayalbagh Educational Institute, University of Hyderabad, IIT Bombay, IIT Kanpur and Xavier Labour Relations Institute with 1 each (UTD Research Metrics).

[21] This line is restricted to the browsing period, March 2015; see, for further information, the following: http://aom.org/amj.

[22] The XJTLU is the first Sino-British partnership institution located in Suzhou, Jiangsu. It was established in 2006 following the strategic partnership between two public universities, Xi'an Jiaotong University, China, and the University of Liverpool, UK. CEIBS is located in mainland China, Pudong district of Shanghai. It was founded in 1994 and results from a strategic joint venture between the Ministry of Commerce and the European Commission.

[23] The publication 'Vikalpa: The Journal for Decision Makers' is published by the Indian Institute of Management, Ahmedabad, since 1976.

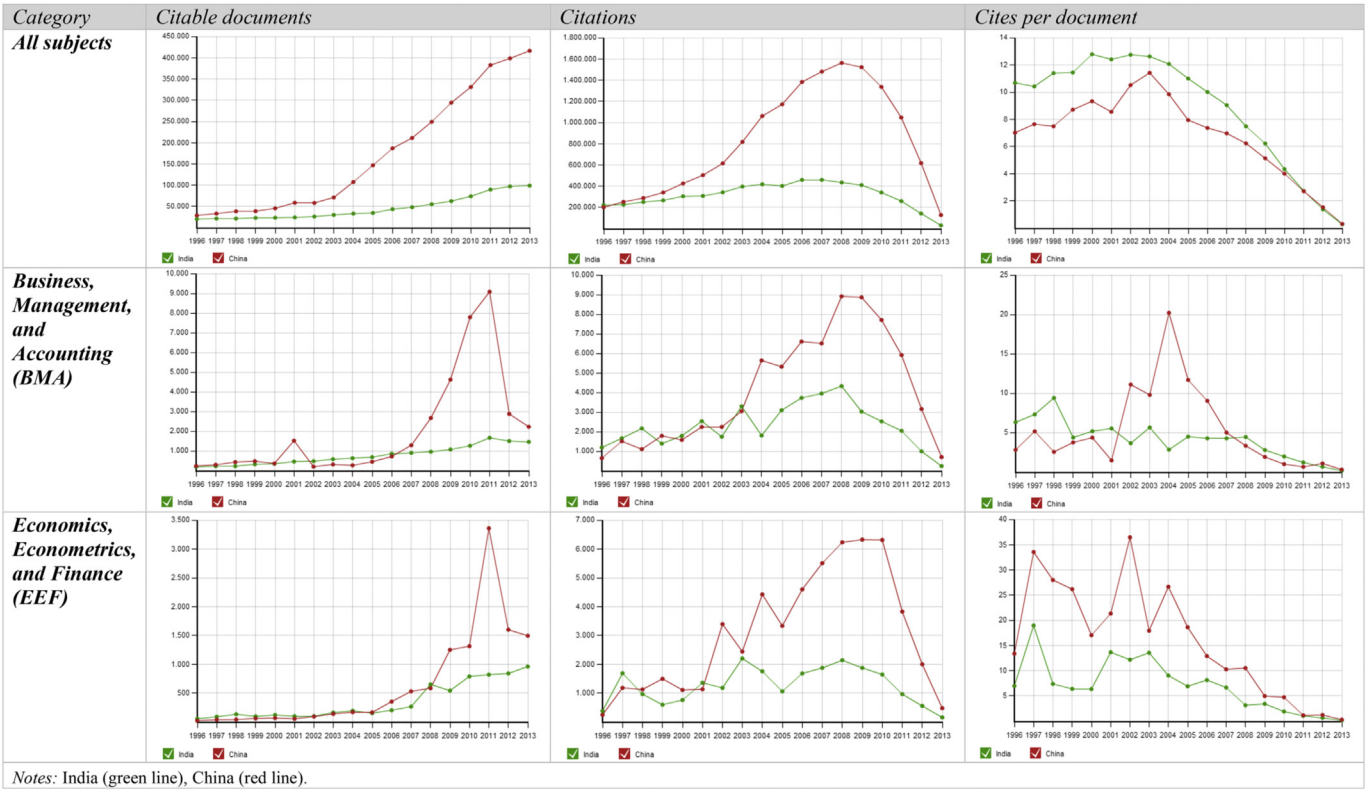

Fig. 1. Trend line of category-based research metrics for India and China, 1996–2013.

Second, despite the level of linguistic barriers, China has a number of high-quality focused journals such as Asia Pacific Journal of Management,[24] Management and Organization Review,[25] China Economic Review, Chinese Management Studies, Asia Pacific Journal of Tourism Research, Journal of Travel & Tourism Marketing, and so forth. It is worth highlighting that Chinese universities have developed their own Chinese Social Science Citation Index (CSSCI) in 1998, which covers nearly 500 journals (Liu et al., 2015; Xin-ning et al., 2001). In our survey (see Appendix II), we notice that 81 journals represent India (sponsoring institution, editor-in-chief, managing editor, or country perspective), which is reasonably lower than the number of journals that represent China: about 95. Even more interestingly, a large number of Chinese-focused journals are indexed in the Web of Science and Scopus. In addition, we notice some quality journals associated with South Africa, including African Development Review, South African Journal of Economics, Review of Development Finance, Africa Journal of Management, Journal of Africa Business, and African Journal of Economic and Management Studies, among others. Specifically, the number of special issues edited by resident Indian management scholars has not even reached double digits. Overall, our observations suggest that Indian management institutes need adequate training in matters such as data analysis, paper development, publishing academic research, new journal development, collaborative research, and institutional press.

5. World university rankings: you deserve this!

The concept of university rankings originally evolved in the Western world, and thereby engulfed developing countries due to globalization, privatization, and internationalization of higher education and research practices. Broadly speaking, rankings or league tables establish the best benchmarking practices in the higher education system, and allow policy makers to draft various administrative and development guidelines. Best practices indeed become uniform not only for evaluating current performances but also for improving rule-based systems (e.g. Berbegal-Mirabent and Ribeiro-Soriano, 2015; Usher and Savino, 2006). Several researchers and independent organizations have developed different measures, in order to evaluate and rank universities or specialized institutions (Gruber, 2014). A blend of measures include number of admissions, number of international students, library and resource budgeting and usefulness, use of ICT, industry collaboration and financial support, university budget, job market placement, high-impact academic research including the number of Nobel Prize nominees and recipients, number of citations, and international outlook, among others. Thus, we refer to the two most widely accessed university rankings such as ARWU Rankings 2015 and THE World University Rankings 2015–16. For management, we use AACSB International accreditation listings and Financial Times Top 100 Best Business Schools 2015.

The 2015 ARWU Rankings[26] report that 'Harvard University was to remain the number one in the world for the 13th year', followed

[24] The academic publication *Asia Pacific Journal of Management* is officially affiliated to the Asian Academy of Management, which is published by Springer. The journal metrics include the following: acceptance rate is approximately 5% of submissions; impact factor for the year 2016 is 2.137; and H-index is 50.

[25] The academic research publication *Management and Organization Review* is the official journal of The International Association for Chinese Management Research, which is published by Cambridge.

[26] The ARWU Rankings mainly focus on six indicators to rank world universities, 'the number of alumni and staff winning Nobel Prizes and Fields Medals, the number of highly cited researchers, the number of articles published in journals of Nature and Science, the number of articles indexed in SCI–Expanded and SSCI, and per capita performance' (ARWU, 2015).

Table 3
Top 10 universities in the world, 2011–2015.

	Top 500 ARWU universities in ARWU rankings					Top 800 universities in THE rankings				
	2015	2014	2013	2012	2011	2015–16	2014–15	2013–14	2012–13	2011–12
Harvard University, USA	1	1	1	1	1	6	2	2	4	2
Stanford University, USA	2	2	2	2	2	3	4	4	2	2
MIT, USA	3	3	4	3	3	5	6	5	5	7
University of California, Berkeley, USA	4	4	3	4	4	13	8	8	9	10
University of Cambridge, UK	5	5	5	5	5	4	5	7	7	6
Princeton University, USA	6	6	7	7	7	7	7	6	6	5
California Institute of Technology, USA	7	7	6	6	6	1	1	1	1	1
Columbia University, USA	8	8	8	8	8	15	14	13	14	12
University of Chicago, USA	9	9	9	9	9	10	11	9	10	9
University of Oxford, UK	10	9	10	10	10	2	3	2	2	4

Source: Compiled from ARWU Rankings of Shanghai Jiao Tong University (http://www.shanghairanking.com), and THE World University Rankings of Times Higher Education (https://www.timeshighereducation.com/world-university-rankings).

by Stanford University, Massachusetts Institute of Technology, University of California Berkeley, University of Cambridge, Princeton University, and California Institute of Technology, among others (see Table 3). As expected, Indian universities ranked far behind universities that are based in China, Japan, and South Korea. The upshot is that not even one Indian university ranked in the top 300 ARWU-ranked universities for 2015. In the case of China, 10 universities ranked in the top 200, 19 in the top 300, 37 in the top 400, and 44 in the top 500 universities. However, only one institute, that is, the Indian Institute of Science (IISc), ranked (301–400 grouping) in the top 500 universities. Even more interestingly, four South African, six Brazilian, and two Russian universities ranked in the top 500 list (ARWU, 2015).

Specifically, we show some country-specific metrics of number of universities ranked in the top 500 ARWU-ranked universities during 2006–2015 (see Table 4). It is observed that the number of universities based in the United States dropped noticeably from 167 in 2006 to 154 in 2010 and 146 in 2015. On average, we observe constant performance over a 10-year period of university rankings for Germany, Canada, France, Italy, Australia, Netherlands, South Korea, and the United Kingdom (fairly dropped). Unpredictably, the number of Japanese universities dropped considerably from 32 in 2006 to 25 in 2010 and 19 in 2015. In the case of the BRICS economic group, one would certainly appreciate the outstanding performance of Chinese universities, wherein the number increased from 19 in 2006 to 34 in 2010 and 44 in 2015. On average, we find stable rankings for Brazil, South Africa, and Russia, while India performed dismally, only accounting for two universities between 2006 and 2010, and the number shockingly dropped to one during 2011–2015.

Drawing on THE World University Rankings[27] for 2015–16, the California Institute of Technology was ranked the number-one university in the world, followed by the University of Oxford, Stanford University, University of Cambridge, Massachusetts Institute of Technology, Harvard University, and Princeton University, among others. Similar to ARWU Rankings 2015, not even one Indian university ranked in the top 250 universities, while four Chinese universities ranked in the top 100 universities (Peking University at 42, University of Hong Kong at 44, Tsinghua University at 47, and HKUST at 59), six in the top 200, and 10 in the top 250 universities. Only the Indian Institute of Science (IISc) ranked in the top 251–300 universities, IIT Bombay in the top 351–400, IITs-Delhi, Kharagpur, and Madras in the top 401–500, and IITs-Guwahati, Kanpur, Roorkee, Jadavpur University, and Punjab University in the top 501–600.[28] In the continental setting, University of Tokyo remained first among the top 50 Asian universities, followed by the National University of Singapore, University of Hong Kong, Peking University, and Tsinghua University. By comparison, only two institutes, the Indian Institute of Science (37) and Punjab University (38), ranked in the top 50 Asian listing, and China remarkably fielded 20 universities (THE, 2015).

With regard to business school accreditation, only three Indian business schools, the Indian School of Business, TA Pai Management Institute, and IIM Calcutta, were accredited by the AACSB International.[29] In the case of China, 20 management schools earned the accreditation.[30] Last, but not least, only three Indian business schools ranked in the Financial Times Top 100 Best Business Schools 2015, namely, IIM Ahmedabad at 26, Indian School of Business at 33, and IIM Bangalore at 82. Six Chinese business schools were found in the rankings, with CEIBS at 11, HKUST Business School at 14, University of Hong Kong at 28, CUHK Business School at 30, Shanghai Jiao Tong University: Antai at 55, and Fudan University School of Management at 55.

In addition to the aforementioned observations, we come across some intriguing facts about the rankings of intellectual property rights and the best publishers in the world. In a recent study, Godinho and Ferreira (2012, p. 500) reveal that China was the number-one country in the world for trademark applications filed with domestic offices in 2009, while India ranked fifth. For patent filings, China was ranked third and India ninth. In particular, no Indian-based publishing company was found in the listings of the world's largest book publishers, despite India having more than one billion people, millions of students, and thousands of educational institutions. Two publishing companies that are based in China, namely, China Publishing Group and China Education and Media Group, ranked 14 and 21, respectively (Publishers Weekly, 2014).

[27] The Times Higher Education, UK (THE) ranks universities based on 13 performance indicators, which are grouped into five areas: teaching, 30% (the learning environment); research, 30% (volume, income, and reputation); citations, 30% (influence); international outlook, 7.5% (staff, students, and research); and industry income, 2.5% (knowledge transfer).

[28] Aligarh Muslim University, Amrita University, Andhra University, BITS Pilani, University of Calcutta, University of Delhi, and Savitribai Phule Pune University ranked in the top 600–800 universities in the THE Rankings 2015–16. (Amrita and BITS Pilani are private universities).

[29] As of September 2015, we find that 739 institutions in 48 countries earned the AACSB accreditation.

[30] A list includes CEIBS, Chinese University of Hong Kong, City University of Hong Kong, Dalian University of Technology, Fudan University, Hong Kong Baptist University, Hong Kong Polytechnic University, HKUST, Lingnan University College (Sun Yat-sen University), Lingnan University, Nanjing University, Peking University, Renmin University of China, Shanghai Jiao Tong University, Sun Yat-sen University, Tsinghua University, University of Hong Kong, University of Science and Technology of China, Xi'an Jiaotong University, and Zhejiang University.

Table 4
Country-specific metrics of number of ARWU-ranked universities for the period 2006–2015.

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
USA	146	146	149	150	151	154	152	159	166	167
UK	37	38	37	38	37	38	40	42	42	43
Germany	39	39	38	37	39	39	40	40	41	40
Japan	18	19	20	21	23	25	31	31	33	32
Canada	20	21	23	22	22	23	22	21	22	22
France	22	21	20	20	21	22	23	23	23	21
Italy	20	21	19	20	22	22	21	22	20	23
Australia	20	19	19	19	19	17	17	15	17	16
Netherlands	12	13	12	13	13	12	12	12	12	12
South Korea	12	10	11	10	11	10	9	8	8	9
BRICS economic group										
China	44	44	42	42	35	34	30	30	25	19
Brazil	6	6	6	6	7	6	6	6	5	4
South Africa	4	4	3	3	3	3	3	3	4	4
Russia	2	2	2	2	2	2	2	2	2	2
India	1	1	1	1	1	2	2	2	2	2

Source: Compiled from ARWU Rankings of Shanghai Jiao Tong University (http://www.shanghairanking.com).

To this end, we suggest that Chinese universities even outperform Western universities on key indicators such as student strength, urbanized infrastructure facilities, research funding, high-impact journal publications, highly cited authors, international partnerships, collaborative research projects, student-faculty ratio, and international students, among others. In the case of high-impact management research, Chinese business schools lead the league tables compared to Western and Asian institutes. Given this fact, the performance of Indian universities (including those of national importance) is 'inadequate' compared with Chinese universities. Therefore, South Africa, Mexico, or Russia are more appropriate for meaningful comparisons in future research on Indian higher education.

6. Challenges and policy implications

We discuss several challenges in Indian higher education, including the gross enrolment ratio, university education and infrastructure, job market placement, industry-oriented research and innovation, quality and assessment of practices, inadequate financial support, and political interference (Fig. 2). We also suggest policy recommendations for improving the existing practices and governance systems.

6.1. Challenges in higher education and academic research

6.1.1. Gross enrolment ratio

The number of admissions to university degree programs is remarkably less than the number of admissions to pre-university education. Given that, the Indian government aims to improve the gross enrolment ratio in higher education from 17.9% in 2012–13 to 30% by 2020 (Times of India, 2014). Hence, the current rate is low when compared to 26% in China and 36% in Brazil (British Council, 2014). Several reasons explain these numbers, for example, poor financial status of students, lack of motivation and awareness of courses among students, accessibility to the institute, scarcity of jobs after obtaining the university degree, improper guidelines in admissions criteria, deprived system of examinations, unlawful practices in public and private institutions, and so forth. Therefore, government must establish rigorous control measures and conduct promotional workshops not only to overcome these dichotomous problems but also to present the institutional transparency.

6.1.2. University education and infrastructure

In order to provide quality education at graduate and post-graduate levels, universities must furnish adequate infrastructure facilities such as administration blocks, technically equipped classrooms, reference and reading rooms, research databases, and technology centres, among others (Sheel and Vohra, 2014). On top of that, one must have sufficient funds, a pool of talented faculty, and aspire to go beyond the university system (e.g. Meyer, 2006). However, Indian universities are never referred to as world-class institutions, expect for a few corporate-promoted institutions (e.g. Indian School of Business) and government institutions (e.g. IITs, IISc and IIMs). Besides, many state universities and government colleges noticeably fail to have standard buildings, library resources, access to research data and journals, transportation facilities, ICT labs, security systems, and other stationary facilities, including restrooms. In case of doctoral research, scholars 'do a lot' following their PhD supervisor instructions except for academic research and publications. For instance, we personally ask some PhD scholars about the awareness of online subscriptions to international journals in the management stream. Surprisingly, they were not even aware of high-impact journals (e.g. *Management Science*, *Journal of International Business Studies*) and the world's best publishers of academic journals (e.g. Elsevier, Taylor & Francis). However, they recalled some local journals that are mostly available in print form, for example, *Global Business Review*, *Indian Journal of Finance*, *Indian Journal of Marketing*, etc. Regrettably, some scholars had not even heard of APA referencing style during their doctoral studies. Thus, we understand that scholars joined simply to obtain a secure teaching job in a government institution.[31] In any case, they become doctorate holders and act as mentors for future research scholars. A strong barrier of the doctoral research in India is 'university culture and research environment'. This argument is further supported by relevant issues like lack of motivation to international competition among public and private universities, inadequate financial support, and poor quality of skills and training (Sheel and Vohra, 2014).

With this, we suggest that government must provide adequate funds and training to access high-impact research journals and databases (e.g. SDC Platinum), so that scholars and faculty not only improve their knowledge for teaching needs but also publish research findings in reputable journals. One should also remember that 'researcher knowledge and interest (passion), data analysis techniques, and paper development skills are the most influencing factors of a good academic publication'. At the policy level, governments have to control unethical practices that influence

[31] This observation was the result of personal communication with some PhD scholars who registered in local universities (communicating author).

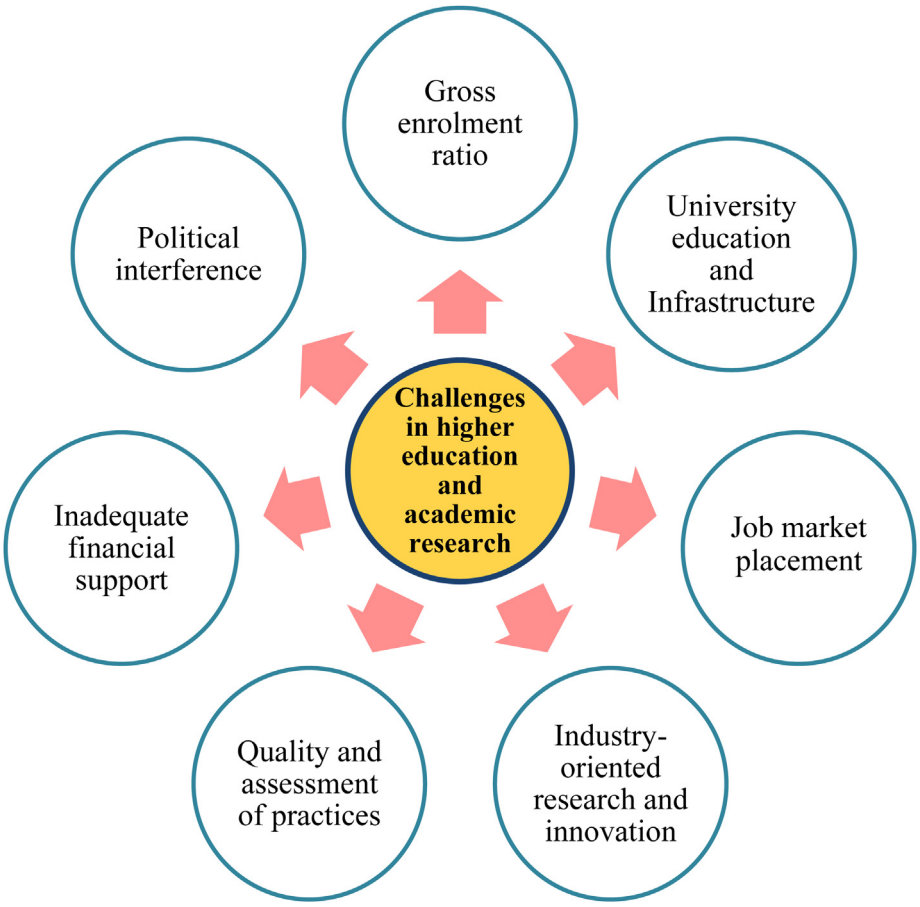

Fig. 2. Challenges in Indian higher education and academic research.

university administration and offer incentives to top researchers and faculty for improving overall performance of the university (Pelger and Grottke, 2015).

6.1.3. Job market placement

In recent times, job market placement has become a more challenging task in higher education at both universities and affiliated institutions (see, for example, Mironos et al., 2015). A recent survey by NASSCOM reports that only 25% of technical graduates and 15% of other graduates are employed in the information technology sector.[32] Another survey on management discipline indicates that only 23% of graduates are employed in various corporate businesses, mainly the banking and finance sector (Times of India, 2014). According to Aspiring Minds National Employability Report, over 80% of the engineering graduates are unemployable (Times of India, 2016).

We present some real examples that came across in our academic experiences. First, the number of applications for PhD admission in both universities and institutes of national importance has increased considerably over the past few years. This is due to the rate of increase in unemployment in the corporate sector, an increasing number of fresh graduates, and a significant increase in a monthly fellowship, from Rs. 16,000 (US$256) to Rs. 25,000 (US$401). Generally, a PhD scholar continues to receive a scholarship for a minimum of three years and a maximum of five years. The upshot is that a monthly fellowship of a PhD scholar in a management discipline is three times higher than the monthly salary of a faculty member (e.g. assistant professor) who is working in a university-affiliated college.

Second, an academic doctor who dedicated five years to a PhD in management has joined as a junior faculty member a third-grade management college for Rs. 14,000 per month (US$224). Another doctor has joined a pre-university college for Rs. 6500 per month (US$104) with 12 h teaching load in a week. In the recent past, 255 applicants out of 2.3 million who hold PhDs have applied for 368 unskilled job vacancies, as 'peons' in the state secretariat of Uttar Pradesh (Times of India, 2015). In a similar case, 75,000 applicants applied for 30 peon jobs in Chattisgarh (Indiatimes, 2016). Based on these observations, one would certainly realize whether to continue in the current job or to do another PhD. After all, we should not treat academic doctorates as 'the dignity of labour'; in that case, the purpose of the doctoral degree is vague.

Third, several private business schools in India consider only teaching experience and admit much less importance to research publications in the faculty recruitment process. The contradiction is that non-public business schools often call for faculty appointments, mentioning that 'preference will be given to candidates who have a Ph.D. from a recognized university along with significant journal publications and conference presentations'. In our view, management colleges that are owned by private groups mostly operate like business firms, act as movie-playing theatres, recruit faculty who simply look into textbooks, and do placement agency jobs. In fact, some private engineering institutions often impose on students to pay building funds, library deposits, and placement

[32] NASSCOM stands for National Association of Software and Services Companies, India.

fees. At last, they even fail to provide language development skills. In such educational environments, the number of new admissions and placements will disappear. Overall, our argument is that Indian higher education courses, material, language skills, and teaching methods are not effective to catch up to student placements in the corporate sector.

6.1.4. Industry-oriented research and innovation

Drawing on competitiveness of universities in emerging economies, higher education institutions must acquire requisite resources to establish innovation and incubation centres for promoting new ventures and entrepreneurship activities. For instance, it is argued that 'educational institutions train millions of youngsters but corporates often complain that they do not get the necessary skill and talent required for a job' (Times of India, 2016). In order to achieve specific goals, institutions have to focus on course design, course material, faculty sources, collaborative projects, joint ventures with international universities, and industry-sourced research centres. Together, they not only bridge the gap between academic degrees and industry requirements but also improve the overall student activity and performance of the university (see, for example, Schröder et al., 2014). Hence, many such initiatives represent the very poor in India due to lack of administrative support and lack of faculty-student engagement. Therefore, universities and companies may design strategic plans to establish some research centres that would help faculty and students to understand the industry needs and requirements.

6.1.5. Quality and assessment of practices

Despite the evidence of world university rankings, university education needs to be clearly defined, designed, dedicated, assessed, and improved due to strategic issues such as economic changes, increasing competition among public and private universities, job market, and industry requirements. Thus, one must adopt best practices in the administration and governance systems, and teaching resources, course design, examinations, and placements that allow universities to access markets and opportunities as well as establish strong academic relations with the industry. In the case of India, NAAC and NBA assess the performance of universities and autonomous institutions. Yet quality measures and assessment practices are not up to the *de facto* subject, and the assessment is arguably biased. In many instances, grading is influenced by the ruling political party and unlawful behaviour. Further, a method to calculate the scores for journal publications, conference presentations, workshops, and book publications is not convincing to many academicians. For example, a paper carries the same score whether it is presented in a reputable academic meeting or an unknown international symposium. Together with this, the Indian university system needs progressive changes in governance systems, quality measures, research assessment, and policy development matters. A suggestion in practice is that 'leadership control and administrative powers of the university should not freeze by political inoculation'. Given the situation, only the chief administrator (e.g. Chancellor) of the university can bring any productive changes that profoundly affect the overall performance of the university (e.g. university culture, high-impact research).

6.1.6. Inadequate financial support

In general, public higher educational institutions require unremitting financial support from the government. On top of that, the chief administrator of the university is responsible for managing funding and budget allocation, and for controlling the misuse of such funds. In the early post-independence years, the Indian government allocated a vast budget for setting up institutes of national importance, central and state universities, and specialized institutions. Despite the evidence of financial disorder in the 21st century, funding has become a major issue for development of the public universities (Sheel and Vohra, 2014). Besides, policy makers often design (un)productive schemes; then government approves the budget for such projects for no productive benefits. For example, a UGC postdoctoral fellowship for 'unemployed' women with doctorates (in our view) indicates that national citizens are still jobless after holding a doctoral degree. By contrast, it can be inferred that government still supports doctoral graduates even when they are jobless. The scheme also implies that postdoctoral fellowships are intended not for doctoral graduates who are interested in them but for ones who are unemployed. In a true sense, these fellowships have been funded by the taxpayers of the country. One would perceive that policy makers have truly eradicated the purpose of postdoctoral fellowships. Thus, government should work on productive schemes that benefit all groups of national citizens to establish high-level transparency, especially in higher education.

6.1.7. Political interference

Accessible literature on higher education suggests that university education is influenced by the institutional environment in a given economy (e.g. Stensaker et al., 2014). The institutional milieu comprises a set of political, social, and regulatory behaviours (North, 1990). In a recent study, Xie et al. (2014) mention that China has been facing several difficulties due to political issues and scientific fraud. Similarly, the level of political intervention is severe in the overall Indian education system (Business Standard, 2014; New Indian Express, 2015). Despite the nature of the ruling political party and elected ministers, several politicians have established their own educational institutions in different segments, including secondary school, pre-university college, engineering academy, medical institute, management school, and private university. In particular, an appointment of vice chancellor in a state university is mostly influenced by ruling political party behaviour, including the chief minister of the respective state and the education minister. Likewise, faculty recruitment in a university-affiliated college is greatly shaped by local influential persons. It will be even more so when faculty recruitment happens at state and central universities. In fact, some private universities offer faculty jobs to applicants who intend to pay bribes, and based on the applicants' background (caste, community, religion, and place). In addition, many intervening issues (e.g. reservation system, fee reimbursement) need solutions for creating a high-quality academic environment first and establishing world-class universities later (Basant and Sen, 2014). Our observation, however, appears to be a general view, but the intention is to persuade government and other stakeholders about the current state of higher educational institutions in India.

6.2. Policy implications

6.2.1. Research funding

Research funding is the most important element in higher education and high-impact academic research. It is suggested that adequate financial support, sophisticated physical and technical infrastructure, talented academic faculty, high-impact research, and quality of admissions not only influence university recognition and brand name, but also affect industry income, number of citations, and international outlook of the university (see, for example, Abramo et al., 2013; Berlemann and Haucap, 2015; Chen et al., 2007; Frølich et al., 2010; Jabnoun, 2015; Jowkar et al., 2011; Schröder et al., 2014; Yaisawarng and Ng, 2014). Then, the output will have a positive impact on the university rankings. Therefore, the Indian government must allocate appropriate funds to

university-level research and training centres to encourage students to pursue doctoral programs and postdoctoral research. For example, the ratio of China's R&D expenditure to that of the United States has appreciably increased to 44% in 2010 from 5% in 1991 (Xie et al., 2014).[33] On the one hand, government may approach some large business groups to fund and manage state universities for strategic reasons like physical infrastructure, industry-oriented research, network building, placement, administration, and governance. This scheme is probably the appropriate one compared to schemes that allow corporations to start their own universities. For instance, company officials can participate in top-level decisions, faculty recruitment, course content, research training, and placements. Similar schemes can be designed for international universities that are keen to offer programs in India.

On the other hand, policy makers have to think genuinely about the purpose of research fellowships in doctoral programs. In other words, government 'financially' supports research scholars for learning as well as conducting productive research. For example, a scholar completed her PhD in four years, wherein she received the budget (monthly fellowship and annual contingency grant) for all years. She then joined the faculty of a private institution. The question is 'did she pay back the research fellowship that she received during her doctoral program?'. Since the answer is evidently 'no', how can government support new doctoral admissions? This line supports the claim that research funding has a significant impact on the government budget. To overcome the budget deficit, it is suggested that government design a scheme whereby previous stipendiary candidates should pay back research fellowships that they received during their doctoral degrees in equivalent future years (at least 50%). It will not be a serious financial burden if government implements a 'paying-back fellowship scheme' after two years from the awarding year. Further, government may include this scheme as a primary criterion in the faculty recruitment process at state and central universities. A motivation for this scheme is to create a serious research environment among research scholars and supervisors, and to support the economic development of the country.

6.2.2. Collaborative research projects

In a recent study, Zoogah et al. (2015) describe how institutional environment, resources, level of involvement by universities, institutions, and individuals are the most important drivers of high-impact research, while we posit that level of involvement is the most critical success factor in collaborative research projects. The level of involvement should be high when a local university plans to collaborate with the foreign university. These schemes are special purpose instruments, wherein universities have leverage over direct participation, research output, research grants, and research publications (see Kantola and Kettunen, 2012; Li et al., 2014; Schröder et al., 2014). For example, a state university has signed a collaborative research agreement with the US university. First, there will be an exchange of ideas among faculty members who participate in the project. This allows local faculty members both to share their own thoughts and experiences, and to improve their research skills in specific domains. Second, research grants can be shared among participant universities (e.g. co-funding), and research output eventually disseminated by publishing in journals and books. Lastly, local faculty members who participated in collaborative research projects may guide their colleagues and doctoral students toward better progress in research projects and publications. Thus, universities may promote international collaboration not only in project handling but also in course development, teaching methods, quality assessment process, infrastructure development, and faculty recruitment and training. To the best of our experiences, Chinese universities are successful examples for India, thus for establishing world-class universities by encouraging joint venture and partnership schemes in higher education.

6.2.3. Research assessment council

In our view, the purpose of the research assessment council is to evaluate research papers and books published by faculty and research scholars in a university; audit revenue statements of the industry-oriented research; and rank best papers, best professors, best journals, and best universities in India (a recent initiative by MHRD, the National Institutional Ranking Framework: https://www.nirfindia.org/Home). The council should be an independent organization under MHRD and UGC. Further, it is responsible for establishing a research assessment cell in all public and private universities. Senior scholars, foreign academicians, and government officials guide the council on serious issues such as scientific fraud, fake journal publications, forged PhD theses and certificates, duplication in research output, and record of patents, among others. The council is also accountable for communicating the university research-metrics report for various purposes, including the NAAC and NBA assessment, national rankings, and world university rankings. The council awards incentives for best research articles published by faculty members, senior researchers, postdoctoral fellows, and doctoral students. Hence, the number of incentives for high-impact research should be restricted to authors who are associated with Indian universities.

The council coordinates with global ranking assessment institutions and multinational publishing companies to provide adequate training for universities, faculties, and students in matters such as publishing research, new journal development, research assessment, university rankings, publication press, and so forth. Specifically, the council conducts workshops on open access repositories such as Shodhganga and ShodhGangotri. Above all, Indian researchers must remember 'the aim of [a] researcher is to discover new things and to create knowledge by presenting and publishing quality research' (cf. Gruber, 2014).

7. Conclusion

The aim of this paper was to examine the state of the higher education system, high-impact research metrics, and world university rankings in India. Nested within the exploratory research framework, we collected relevant data from archival sources and accomplished our goals based on inductive and deductive logic. First, an overview of higher education and government schemes for academic research was presented. Second, a theoretical note on the academic scholarship and the determinants of high-impact research was described, as was the progress of research metrics for three categories (all subjects, BMA and EEF), and the most recent world university rankings were reported. In particular, the indicators of high-impact management research, business school accreditation and rankings, and abstracting and indexing of publishing journals were deeply discussed. Third, we outlined various potential challenges in Indian university education and suggested fruitful policy guidelines for improving accessible practices and university performance.

[33] The Chinese government has implemented a number of policy initiatives for betterment of the higher education institutions, for example, 'Project 211: an allocation of additional funding of US$20 billion to a group of 112 universities to strengthen their research capabilities with an ultimate goal for them to become national catalysts for raising Chinese educational standards to world-class quality' (Yaisawarng and Ng, 2014). This project is different from 'Project 985' and the recently launched 'one belt, one road'.

In sum, based on educational statistics, we found that the number of private universities (students, affiliated institutions) in higher education has significantly increased during post-1991 economic reforms. It was also noticed that the GDP share of the education budget is lower than that of other emerging markets. In our second objective, we reported that for citable documents in the 'all subjects' category, the United States ranked first, then China, the United Kingdom, Germany, Japan, France, Canada, Italy, India, and Spain, among others. With regard to high-impact management research articles in UTD Top 24 journals, only 101 papers were published by 14 Indian institutes, while 75 institutes that are established in China published 1513 papers. Regrettably, not one Indian institution published even one article in the *Journal of Finance* and *Journal of Marketing*. Despite the linguistic barrier, Chinese universities publish more high-quality journals than Indian universities.

In the case of world university rankings, not even one Indian university ranked either in the top 300 ARWU-ranked universities for 2015 or in the top 250 THE-ranked universities for 2015–16, while 10 universities that are based in China ranked in the top 200, 19 in the top 300, 37 in the top 400, and 44 in the top 500 ARWU-ranked universities for 2015. This tendency was further corroborated by the fact that four Chinese universities ranked in the top 100, six in the top 200, and 10 in the top 250 THE-ranked universities for 2015–16. Surprisingly, only one university, the Indian Institute of Science, ranked in the 301–400 grouping of ARWU Rankings 2015 and also ranked in the top 251–300 THE-ranked universities for 2015–16. This observation was supported by the fact that only one Indian university ranked in the ARWU Rankings during 2011–2015, whereas the number of Chinese universities increased tremendously from 19 in 2006 to 44 in 2015. In an acceptable manner, three Indian management institutes ranked in the Financial Times Top 100 Best Business Schools 2015 compared to six business schools from China. All in all, Indian universities are far behind Chinese universities.

In our third objective, we discussed a number of challenges in Indian higher education, including the gross-enrolment ratio, university education and infrastructure, job market placement, industry-oriented research and innovation, quality and assessment of practices, inadequate financial support, and political interference. We also recommended productive guidelines for imparting quality academic practices and standards in university education, namely, research funding, collaborative research projects, and a research assessment council. Importantly, our view was that government should embark on a 'paying-back fellowship scheme' to create serious research interest among public and private universities as well as to support the economic development of the country. We suggested that several universities required training in academic matters such as publishing research, new journal development, research assessment, project funding, and publication houses. In unison, policy makers have to remember that the 'growing trend for accountability within the university system is not limited to research and is mirrored in the assessment of teaching quality, which now feeds into evaluation of universities to ensure fee-paying students' satisfaction' (Penfield et al., 2014, pp. 22–23).

To our knowledge, this paper is probably the first of its kind to shed light on higher education, high-impact research metrics, and world university rankings in emerging markets like India and China. Yet the study was restricted to a sampling country and exploratory framework. Despite a concluding verdict, our realization is that comparison between the remote performance of Indian universities and the skyrocketing performance of Chinese universities was fuzzy. Therefore, we propose that Brazil, South Africa, Russia, or Mexico are more appropriate models to explore some comparisons in future research on Indian higher education. A serious attempt to analyse performance indicators of public and private universities using a survey/interview method and comparative studies are most welcome.

Acknowledgment

The opinions expressed in this article are entirely those of the authors and do not necessarily represent the views of the authors' affiliated institutions. The first author is responsible for discussions with regard to Indian higher education, while remaining authors are responsible for discussions with regard to China and comparative metric analysis. The usual disclaimer applies.

Appendix-I

List of institutional repositories in India.

Source: Directory of Open Access Repositories (http://www.opendoar.org), accessed 6 February 2015.

- ABA-NET
- Aligarh Muslim University
- Aryabhatta Research Institute of Observational Sciences
- Central Drug Research Institute
- Central Marine Fisheries Research Institute
- Cochin University of Science & Technology: Dyuthi
- CSIR-Institute of Microbial Technology
- CSIR-National Physical Laboratory
- CSIR-Central Electrochemical Research Institute
- CSIR-Central Scientific Instruments Organisation
- Delhi Technological University
- Gokhale Institute of Politics and Economics
- Guru Gobind Singh Indraprastha University
- Indian Academy of Sciences
- Indian Agricultural Research Institute
- Indian Association for the Cultivation of Science
- Indian Institute of Technology, Bombay
- Indian Institute of Astrophysics
- Indian Institute of Horticultural Research
- Indian Institute of Management Kozhikode
- Indian Institute of Management, Ahmedabad
- Indian Institute of Petroleum, Dehradun
- Indian Institute of Science
- Indian Institute of Technology Roorkee: Bhagirathi
- Indian Institute of Technology Kanpur
- Indian Institute of Technology Delhi
- Indian Statistical Institute, Bangalore Centre
- Indira Gandhi Institute of Development Research
- Indira Gandhi National Open University
- Information and Library Network Center (INFLIBNET): ShodhGanga
- Information Centre for Aerospace Science and Technology
- Institute of Mathematical Sciences
- Inter-University Centre for Astronomy and Astrophysics
- International Crops Research Institute for the Semi Arid Tropics
- Madras Diabetes Research Foundation
- Madurai Kamaraj University
- Maharaja Sayajirao University of Baroda
- Mahatma Gandhi University
- Management Development Institute
- National Informatics Centre
- National Institute for Tuberculosis Research
- National Institute of Immunology
- National Institute Of Oceanography

- National Institute of Science Communication and Information Resources
- National Institute of Technology, Rourkela
- National Metallurgical Laboratory
- Osmania University
- Pandit Deendayal Petroleum University
- Raman Research Institute
- Sardar Vallabhbai National Institute of Technology
- Saurashtra University
- SDM College of Engineering and Technology Dharwad
- Thapar University
- University of Delhi
- University of Kashmir
- University of Mysore: Vidyanidhi
- V.V.Giri National Labour Institute
- Vidya Prasarak Mandal
- West Bengal Public Library Network

Appendix-II

Abstracting and indexing of Indian and Chinese publishing journals in economics, management, and related disciplines.

Publisher	India (n = 81)			China (n = 95)		
	Journal title	Scopus (●)	Impact factor (2016)	Journal title	Scopus (●)	Impact factor (2016)
Cambridge	Nil			Asian Journal of Law and Society	New	
				The China Quarterly	●	1.540
				Management and Organization Review	●	2.738
De Gruyter	Nil			Asia–Pacific Journal of Risk and Insurance		
Elsevier	IIMB Management Review#	●		Asia Pacific Management Review#	●	
				China Journal of Accounting Research#	●	
				China Economic Review	●	1.116
				Pacific Science Review#	New	
				She Ji: The Journal of Design, Economics, and Innovation#	New	
Emerald	Indian Growth and Development Review	●		Asian Education and Development Studies	●	
	Journal of Advances in Management Research			China Agricultural Economic Review	●	0.609
	Journal of Indian Business Research	●		China Finance Review International	●	
				Chinese Management Studies	●	0.379
				International Journal of Comparative Education and Development	New	
				International Journal of Educational Management	●	
				Journal of Chinese Economic and Foreign Trade Studies	●	
				Journal of Chinese Entrepreneurship		
				Journal of Chinese Human Resources Management	●	
				Journal of Entrepreneurship in Emerging Economies	●	
				Journal of Science and Technology Policy in China	●	
				Journal of Technology Management in China		
				Nankai Business Review International	●	
				Social Transformations in Chinese Societies	New	
InderScience	International Journal of Indian Culture and Business			International Journal of Automation and Logistics	New	
				International Journal of Chinese Culture and Management		
				International Journal of Internet Manufacturing and Services	●	
				International Journal of Manufacturing Technology and Management	●	
				International Journal of Mobile Learning and Organisation	●	
				International Journal of Project Organisation and Management	●	
				International Journal of Services, Economics and Management	●	
				International Journal of Shipping and Transport Logistics	●	1.493
				International Journal of Value Chain Management	●	
Informs	Nil			Nil		
John Wiley	Nil			China & World Economy	●	0.740

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Publisher	India (n = 81)			China (n = 95)		
	Journal title	Scopus (●)	Impact factor (2016)	Journal title	Scopus (●)	Impact factor (2016)
Oxford Journals	Nil			Chinese Journal of Comparative Law	New	
				Chinese Journal of International Law	●	1.186
				Chinese Journal of International Politics	●	1.594
Palgrave Macmillan	Nil			Nil		
Sage India	Agrarian South: Journal of Political Economy	New		China Information	●	0.966
	ANTYAJAA: Indian Journal of Women and Social Change	New		China Report	●	
	Asian Journal of Legal Education	New		Chinese Journal of Sociology	New	
	Asia–Pacific Journal of Management Research and Innovation	New		Modern China	●	0.535
	BioScope: South Asian Screen Studies	●				
	Business Perspectives and Research	New				
	Calcutta Statistical Association Bulletin	New				
	China Report	●				
	Contemporary Education Dialogue					
	Contemporary Review of the Middle East	New				
	Contemporary Voice of Dalit	New				
	Contributions to Indian Sociology	●	0.276			
	Emerging Economy Studies	New				
	Environment and Urbanization ASIA	●				
	Foreign Trade Review	New				
	Global Business Review	●				
	Higher Education for the Future	New				
	History and Sociology of South Asia					
	IIM Kozhikode Society & Management Review	New				
	India Quarterly: A Journal of International Affairs					
	Indian Historical Review					
	Indian Journal of Corporate Governance	New				
	Indian Journal of Gender Studies	●	0.231			
	Insight on Africa	New				
	International Journal of Rural Management	●				
	Jadavpur Journal of International Relations	New				
	Journal of Creating Value	New				
	Journal of Creative Communications	●				
	Journal of Development Policy and Practice	New				
	Journal of Education for Sustainable Development					
	Journal of Emerging Market Finance	●				
	Journal of Entrepreneurship and Innovation in Emerging Economies	New				
	Journal of Health Management	●				
	Journal of Heritage Management	New				
	Journal of Human Values	●				
	Journal of Infrastructure Development					
	Journal of Interdisciplinary Economics	●				
	Journal of Land and Rural Studies	New				
	Management and Labour Studies	New				
	Margin: The Journal of Applied Economic Research					
	Metamorphosis	New				
	Millennial Asia					
	Paradigm	New				
	Psychology and Developing Societies	●				
	Review of Market Integration					
	Science, Technology and Society	●	0.421			
	Social Change	●				
	Society and Culture in South Asia	New				
	South Asia Economic Journal	●				
	South Asian Journal of Business and Management Cases	New				
	South Asian Journal of Macroeconomics and Public Finance	New				
	South Asian Survey	●				
	Studies in History	●				
	Studies in Indian Politics	New				

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Publisher	India (n = 81)			China (n = 95)		
	Journal title	Scopus (●)	Impact factor (2016)	Journal title	Scopus (●)	Impact factor (2016)
	Studies in Microeconomics	New				
	Studies in People's History	New				
	The Indian Economic Journal	New				
	The Indian Economic & Social History Review	●	0.278			
	The Journal of Entrepreneurship	●				
	The Medieval History Journal	●				
	Urbanisation	New				
	Vikalpa	New				
	Vision	New				
Springer	Decision#	New		Annals of Data Science	New	
	Global Journal of Flexible Systems Management#	●		Asia Pacific Journal of Management	●	2.135
	Indian Journal of International Law#	New		China Accounting and Finance Review	New	
	Jindal Global Law Review#	New		China Finance and Economic Review	New	
	Journal of Social and Economic Development#	New		China Journal of Economic Research	New	
	OPSEARCH	●		Customer Needs and Solutions	New	
	Psychological Studies#	New		Financial Innovation	New	
				Fudan Journal of the Humanities and Social Sciences	New	
				International Communication of Chinese Culture	New	
				Journal of Chinese Management	New	
				Journal of Chinese Political Science	●	
				Journal of Computers in Education	New	
				Smart Learning Environments	New	
				The Journal of Chinese Sociology	New	
Taylor & Francis	India Review	●		Asia Pacific Journal of Public Administration	New	
	Innovation and Development	●		Asia Pacific Journal of Tourism Research	●	1.290
	Journal of the Indian Ocean Region	●		Asia–Pacific Journal of Accounting & Economics	●	0.067
	Macroeconomics and Finance in Emerging Market Economies	●		China Economic Journal	●	
	Strategic Analysis	●		China Journal of Accounting Studies		
	Tourism Recreation Research	New		China Journal of Social Work	●	
				Chinese Economy	●	
				Chinese Education and Society	●	
				Chinese Journal of Communication	●	0.261
				Chinese Journal of Population Resources and Environment	New	
				Chinese Law and Government	●	
				Chinese Sociological Review	●	1.226
				Enterprise Information Systems	●	2.269
				International Journal of Management Science and Engineering Management		
				International Journal of Rail Transportation	New	
				International Journal of Sustainable Development & World Ecology	●	1.609
				International Journal of Sustainable Transportation	●	3.209
				Journal of Asian Public Policy	●	
				Journal of China Tourism Research	●	
				Journal of Chinese Economic and Business Studies	●	
				Journal of Comparative Asian Development	●	
				Journal of Contemporary China	●	0.933
				Journal of Management Analytics	New	
				Journal of Marketing Channels	●	
				Journal of Quality Assurance in Hospitality & Tourism	●	
				Journal of Teaching in Travel & Tourism	●	
				Journal of Transportation Safety & Security	●	
				Journal of Travel & Tourism Marketing	●	1.741
				Peking University Law Journal	New	
				Social Sciences in China	●	
				World Leisure Journal	●	

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Publisher	India (n = 81)			China (n = 95)		
	Journal title	Scopus (●)	Impact factor (2016)	Journal title	Scopus (●)	Impact factor (2016)
World Scientific	Nil			Advances in Adaptive Data Analysis	●	
				Annals of Financial Economics		
				China Economic Policy Review		
				China Quarterly of International Strategic Studies		
				Chinese Journal of Urban and Environmental Studies		
				International Game Theory Review	●	
				International Journal of Information Technology & Decision Making	●	1.183
				Journal of Financial Engineering		
				Journal of International Commerce, Economics and Policy		
				The Hong Kong Journal of Social Work	●	

Notes:
(1) # refers to whether that journal is published based on hosting and distribution agreement between publisher and sponsor. Similarly, Sage India publishes Indian journals at low-cost pricing under a memorandum of understanding with the respective promoting educational institution/organization.
(2) Impact factor: SSCI/SCI for 2015 was published by Thomson Reuters, July 2016.
(3) New: It refers to whether the journal is newly launched (fewer than ten issues), newly acquired by the publisher, or new to the publisher based on pricing and distribution agreement.
(4) A journal is included in the list when its sponsor, association, or editorial board (editor-in-chief, associate editors, but not regional editors) represents either China or India.
(5) A journal is included in the list when its scope, mission, or an objective represents either a Chinese or Indian perspective. For example, Sage India publishes *China Report*, which is included in both sampling lists. It is not necessary that a sampling journal be published by an institution or university associated with sampling countries.
Source: Authors have personally browsed publishers' online portals and figured out the journal information, including the editorial board, sponsor of the journal, and abstracting and indexing. The survey is restricted to the browsing periods such as April 2015 and July 2016. A list of other publishers like MIT Press, Project MUSE, and local publishers such as Indianjournals.com are not covered in the list.

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