Higher Education Growth in India: Is growth appreciable and comparable?

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Abstract: The Indian higher education system is the largest in the world in terms of the number of institutions and second largest in enrollments. About 33.3 million students are currently enrolled in higher education institutions, but the Gross Enrollment Ratio (GER) is still very low at 23.6%. There are about 757 universities and 38,056 colleges in India. This mammoth network of higher education institutions include a large private sector that has emerged and experienced very rapid growth during last two decades. Despite this growth, Indian higher education is facing several challenges with regard to equity, efficiency and quality. It is still not inclusive, globally competitive, and innovative. The present paper examines the Indian higher education growth deception in this context and vindicate the imperative need for effective intervention policies.

Keywords: higher education, India, growth, quality, innovation, competitiveness

Introduction

The inquisitiveness to identify the factors responsible for growth of nations at different stages has led to development of growth theories. Recent empirical studies suggest that the growth of countries is associated with knowledge production largely sourced from developing human capital (Schultz, 1961; Mankiw, Romer & Weil, 1992; Romer 1986; Lucas, 1988; Spence, 1973). The contribution of education in availability of human capital and its enhancement through knowledge production and dissemination can increase the prospects of economic growth for an economy. The role of higher education in growth has been a recently-accepted phenomenon.

India has the demographic advantage of a huge and young population base. It is the world's second largest country in terms of absolute population. With 1.28 billion people, India accommodates 17.5 percent of the world population. A noticeable demographic aspect of the Indian population is that the median age population is 26.9. Moreover, the median age is expected to rise to

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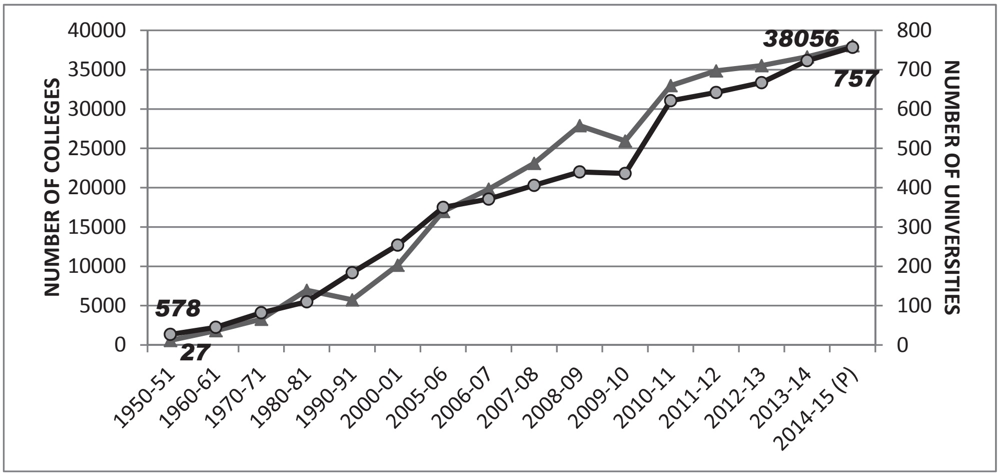
36.7 by 2050 (Worldometers, 2015). Thus, it implies that India can reap the benefits of a young population for at least another five decades, if it succeeds in imbibing apposite skills and access to quality tertiary education. If India could utilize its population to reap economic benefits then the population would truly be a dividend. In contrast, if India fails to do so the population would be a liability. Access to opportunities for gaining knowledge and skills would equip the people in India to contribute towards the growth of the nation. Knowledge production and dissemination largely happens in higher education institutions, thereby enhancing the ability of the human resource to indulge in productive work.

The present paper examines higher education growth in India in a broader perspective. It investigates whether the explicit growth is appreciable and comparable by international standards. The subsequent section of the paper discusses the comparative picture in context of global ranking; global innovation index; and global competitiveness index besides the absolute growth data.

Number of institutions

Indian higher education has witnessed mammoth growth in the number of universities and colleges since 1950-51. Notably, the astonishing growth took place in the post 2000-01 period. During 1950-51 to 2000-01, the number of universities and colleges grew at compound annual growth rate (CAGR) of 4.58% and 5.90%. However, during the 2000-01 and 2014-15 period, the universities and colleges grew at CAGR of 8.11% and 9.9% respectively. In 2014-15, the number of universities reached 757, and the number of colleges reached 38056 as shown in Figure 1 (MHRD, 2014a, 2015a, 2015b, 2015c).



Source: MHRD (2014a, 2015a, 2015b, 2015c)

Figure 1. Number of colleges and universities (1950-51 to 2014-15)

A major share of the growth in the number of universities and colleges during this period took place in private sector. Agarwal (2006) observed that the growth of institutions with public financing had almost stagnated (like public universities, deemed aided universities, government colleges and private aided colleges)[1] whereas the growth of institutions with private financing was observed to be rapid (like private universities, deemed unaided universities and private unaided colleges)[2]. As of 2014-15, about 35 percent of universities and about 76 percent of colleges were managed by private sector (MHRD, 2015c)

The growth of private higher education was paved by lack of sufficient public funding and increased demand for higher education. The expenditure on education as a percentage of GDP has remained below 4.5 percent of the GDP since 2006-07, and the expenditure on higher and technical education as a percentage of GDP has remained below 1.5 percent of GDP during the same period (Joshi & Ahir, 2015; MHRD, 2014b).

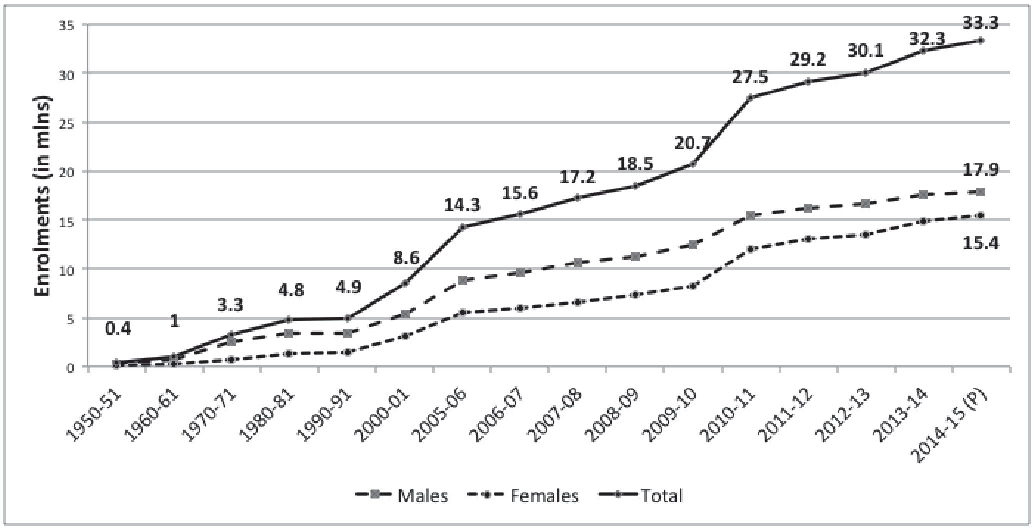
Enrollments

Absolute enrollments

In absolute terms, the number of enrollments increased from 0.4 million in 1950-51 to 33.3 million in 2014-15. Analogous to the rise in the number of institutions, enrollments too witnessed a notable upsurge since 2000-01. They rose from 0.4 million to 8.6 million in five decades from 1950-51 to 2000-01, i.e. a rise of about 8.2 millions in five decades, with a CAGR of 6.33%. On the other hand, enrollments rose from 8.6 million to 33.3 million in less than one and a half decade from 2000-01 to 2014-15 (CAGR of 10.15%) as shown in Figure 2 (MHRD, 2014a, 2015a, 2015b, 2015c).

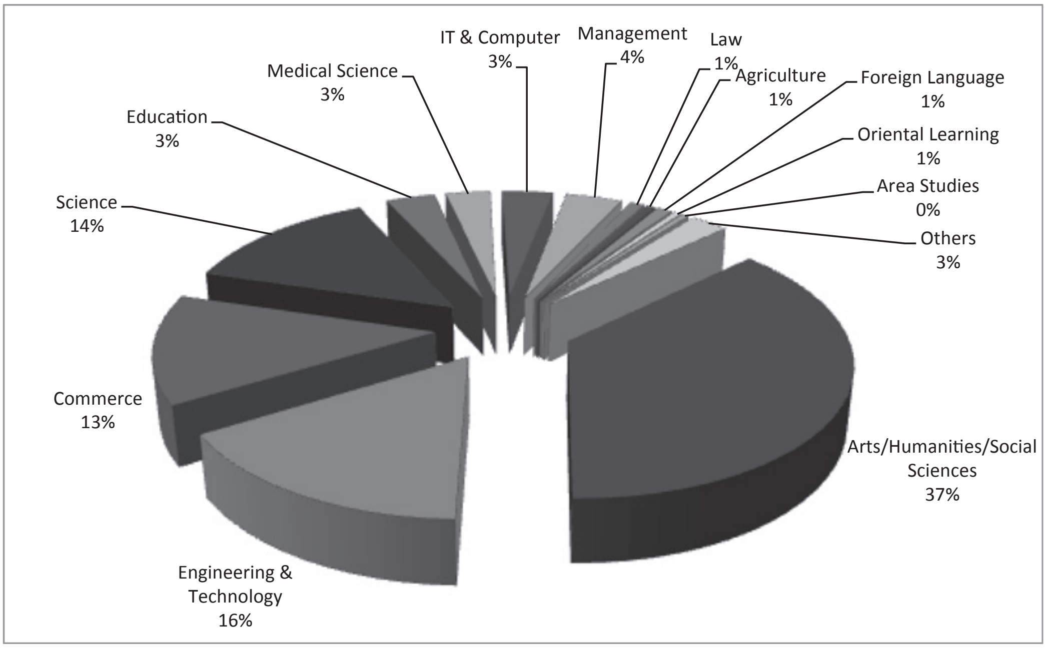
[1] The public universities include Central Universities, State Universities and Deemed aided Universities. A Central University is established or incorporated by a Central Act. A State University is established or incorporated by a Provincial Act or by a State Act. A Private University is established through a State/ Central Act by a sponsoring body viz. a Society registered under the Societies Registration Act 1860, or any other corresponding law for the time being in force in a State or a Public Trust or a Company registered under Section 25 of the Companies Act, 1956.
A Deemed University refers to a high-performing institute, which has been so declared by Central Government under Section 3 of the University Grants Commission (UGC) Act, 1956. Currently many private institutions have also acquired the status of private deemed university although they are not high performing institutions and are not aided deemed universities. The government colleges are managed by the government and funded by it. But private aided colleges are not managed/owned by the government, rather a private trust/individual manages the college and it receives financial assistance from the government.

[2] Private universities (including private deemed universities) and private unaided colleges do not receive financial support from the government.



Source: MHRD (2014a, 2015a, 2015b, 2015c)

Figure 2. Enrollments 1950-51 to 2014-15



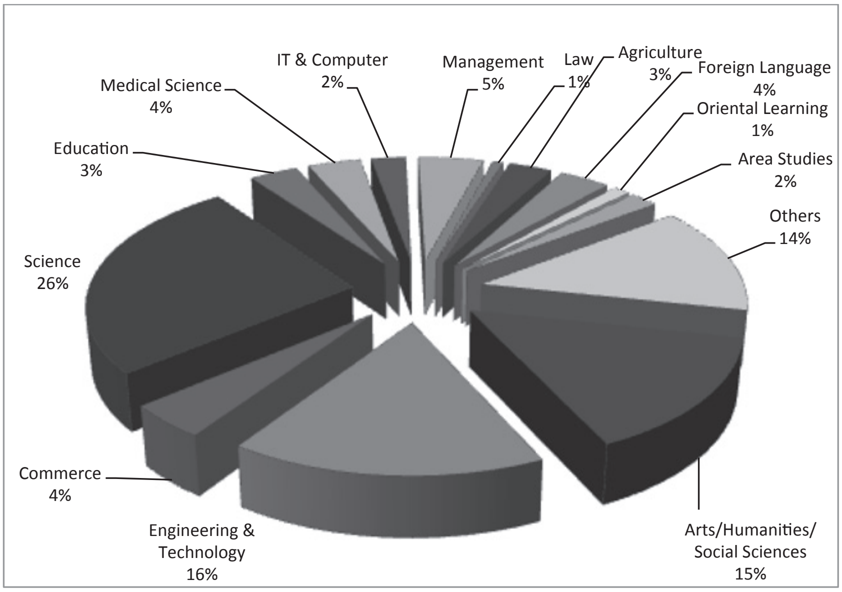
Source: Calculated by authors from MHRD (2015b)

Figure 3. Discipline-wise enrollments in undergraduate and postgraduate level programs combined

The growth in enrollments and Gross Enrollment Ratio (GER) can be attributed to increased transition rates from secondary to tertiary education at 67.5 percent (MHRD, 2013); higher private rates of returns for graduates (15.87 percent) (Agrawal, 2011); growing aspirations of the people to participate in the national growth trajectory and expectations of people that higher education leads to an ascent in the social status. The enrollments of females have remained lower than males since decades, but the enrollment gap has been narrowing with the passage of time. More females are now being enrolled in higher education as compared to the past. But a gender bias can be observed with respect to the choice of disciplines, with females more in favor of disciplines like education, home sciences, cultural studies, etc. and less in disciplines like engineering and technology, law, and agriculture, etc. (Joshi & Ahir, 2016).

Collectively undergraduate and postgraduate courses accounted for 91.2 percent of the total students pursuing higher education in India in 2014-15 (MHRD, 2015c). As shown in Figure 3, about 37% of the students are pursuing higher education in Arts/ Humanities/ Social Sciences courses, followed by about 16% in Engineering and Technology, about 13% in Commerce and about 14% in Science. While the percentage of students who opted for engineering and technology almost doubled by 2013-14 as compared to 2005-06, the percentage of enrollments in Arts/ Humanities/ Social sciences and Science has declined. Most of the growth of enrollments and institutions in professional courses like engineering and technology, education, and medicine occurred in the private sector.

Despite an increase in the share of professional courses in higher education, the unemployment rate for graduates and above in the age cohort of 18-29 years was about 28% percent during 2013-14 (Ministry of Labor and Employment, 2015). The unemployment rate data for the various levels of education for this age cohort show that the higher the level of education, the higher is the unemployment rate. We can infer that the labor market needs and the higher education programs are not synchronized. There is sufficient empirical evidence to suggest that a large section of Indian graduates lack employment skills and in particular in professional courses like engineering and management (Gowsalya & Ashok Kumar, 2015; Chandna, 2013; Blom & Saeki, 2011). Research suggests that graduates largely lack language skills; problem solving and analytical skills; innovation and creativity involving high order thinking skills. Most research findings suggest stronger industry-institute linkages to provide more hands on experiences to the graduates to enhance analyzing and creative problem solving skills rather than only remembering and understanding the knowledge imparted during the education tenure. Recent policy directives emphasize the enhancement of employment skills as an inherent part of the higher education system to assure increased employment at various levels of higher education.



Source: Calculated by authors from MHRD (2015b)

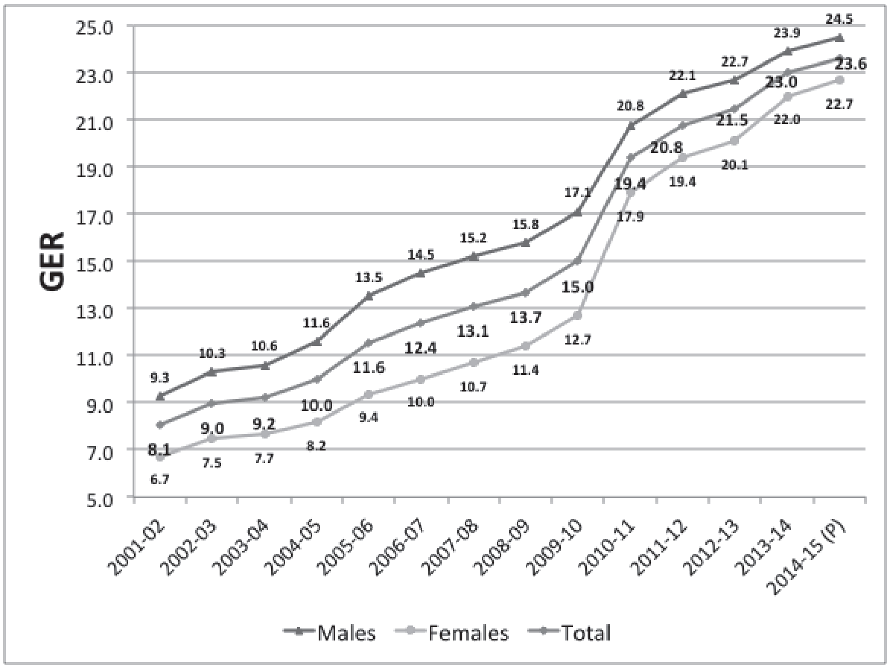
Figure 4. Discipline-wise enrollments in M.Phil. and Ph.D. Combined

Enrollments in research-based programs like M.Phil. and Ph.D. was 0.49% of the total in higher education in India in 2014-15 (MHRD, 2015c). A large share of enrollments in M.Phil. and Ph.D. were in disciplines like Science (about 26%), Arts, Humanities and Social Sciences (about 15%), Engineering and Technology (about 16%), Management (about 5%), Medical Science (about 4%), Foreign Language (4%) and Commerce (about 4%). These disciplines together contribute a major share of about 74% of the enrollments in M.Phil. and Ph.D. as shown in Figure 4 (MHRD, 2015b)

Gross Enrollment Ratio (GER)

In India, the GER in higher education considers enrollments as a percentage of population belonging to the relevant age cohort, 18-23 years.

The GER in Indian higher education has shown a consistent rise since independence. The GER increased at a faster pace in particular since 2000-01. In 2000-01, GER was 8.1 and increased to 23.6 in 2014-15, with CAGR of 8.57% as shown in Figure 5. The rise in the GER coincides with a parallel rise in the number of higher education institutes and enrollments since 2000-01 (MHRD, 2014a, 2015c). It is significant because it shows that the growth of enrollments occurred at a faster pace than the growth of the population belonging to the relevant age cohort. While the GER for both males and females has increased, the rise in the GER for females has been slower than that of males. Unfortunately, the gap between the male and female GER has not narrowed substantially with the passage of time.



Source: MHRD (2014a, 2015a, 2015b, 2015c)

Figure 5. Gross enrollment ratio for males, females, and total (2001-02 to 2014-15)

In light of Trow's definition (1974), India has moved from an elite system to a system of massification, but the universalization of higher education at par with developed countries is yet too far from accomplishment.

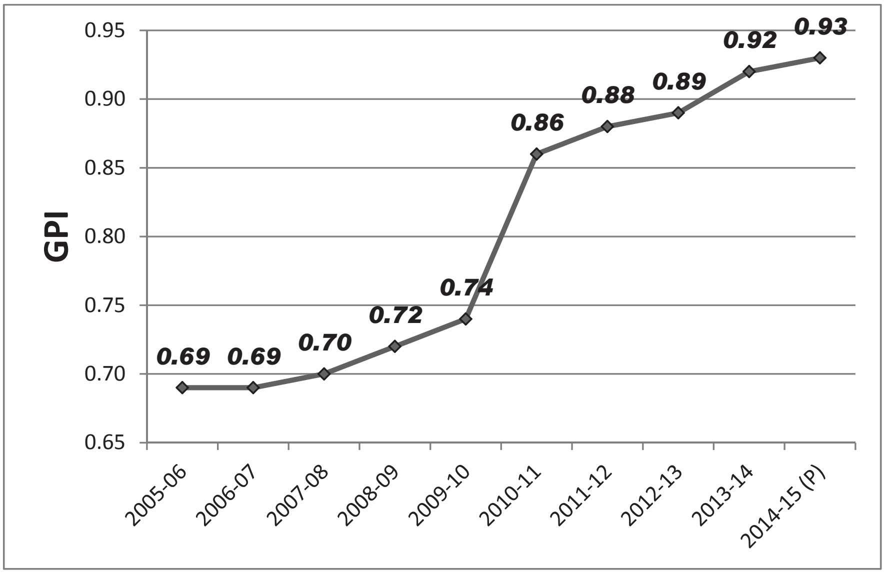
Table 1. Comparison of enrollments and GER for selected countries

Country name	Enrollments in million (2013)	GER (2013)
Brazil	7.3	NA
Russia	7.5	78
India	28.2	23.89
China	34.1	30.16
South Africa	1.0	19.7
United States	19.9	88.8
United Kingdom	2.4	56.9
Developed countries	47.2	74.1
Developing countries	137.7	26.7
World	198	32.8

Source: UIS (2015)
Note: NA is 'Not available'

As can be observed in Table 1, China ranks first in absolute enrollments with 34.1 million, India second at 28.2 million and United States third at 19.9 million. It connotes that China and India alone account for more than a quarter of tertiary global enrollments, about a quarter more than the enrollments of all developed countries combined and almost half of the developing countries combined. The enormous size of enrollments asserts that the higher education systems of China and India are very huge. At the same time, the challenges posed by the mammoth size of the system are unique to both. Despite the increase in enrollments, the flow of enrollments of the eligible age cohort could not keep pace with the rising population. This resulted in low GER, far from being ‘universal’.

The GER for India is lower than China, Russia, the United States, and the United Kingdom. It is lower than the GER of developed countries, global GER, and GER of developing countries. In India, increased opportunities of access to higher education is required to keep pace with the rising population of the eligible age cohort and their aspirations to pursue higher education. Besides lower GER, the disparity in terms of access to higher education between males and females is also an issue of concern. The disparity has also narrowed over the period of time with effective policy measures and social outlook, which is depicted in Figure 6. The upward movement in the Gender Parity Index reflects a better and near equal opportunity of access to higher education for males and females.



Source: MHRD (2014a, 2015a, 2015b, 2015c)

Figure 6. Gender Parity Index (2005-06 to 2014-15)

The interprovincial (better known as interstate) disparity in terms of GER is also noteworthy. Some provinces like Chandigarh (GER－55.6), Tamil Nadu (GER－44.8), and Delhi (GER－43.3) are either approaching or have achieved 'universalization' comparable to developed countries. But unfortunately, some provinces like Bihar (GER－12.9), Chhatisgarh (GER－14.4), and Jharkhand (GER－13.4) still have an elite higher education system (MHRD, 2015c). Disparities among various socio-religious-economic groups too highlight the unequal access to higher education.

Knowledge production – Patents and publications

One of the core functions of a higher education system is to contribute in knowledge production through research. The variables that capture contributions in this regard are: patent filing, research publications and citations by higher education institutions.

According to World Intellectual Property Organization (WIPO, 2014), India ranked 22nd in the world with total 49,272 patents in force. In India, the Office of the Controller General of Patents, Designs, Trade-marks and Geographical Indication, (CGPDTM) under the Ministry of Commerce and Industry of the Government of India is responsible for filing and supervising the implementation of Acts related to various forms of intellectual property like patents, designs, trademarks and geographical indication. CGPDTM (2014) in 2013-14 reported a total of 611 filings of applications by the top ten Indian applicants for patents from scientific and research and development organizations and 689 filings by the top ten Indian applicants for patents from educational institutes and universities out of a total 10,941 patent applications filed: The Council of Scientific and Industrial Research (CSIR－267 applications), the Defense Research and Development Organization (DRDO－116 applications) and the Indian Council of Agricultural Research (ICAR－71 applications) were the top three scientific and research and development organizations to file patent applications. IITs collectively (342 applications), Amity University (92 applications) and Saveetha School of Engineering, Saveetha University (74 applications) were the top three educational institutions and universities to file patent applications. The maximum patents were filed in the fields of chemicals, computer science/ electronics, mechanical, drugs / medicines, electrical, biotechnology, etc. (CGPDTM, 2014). In contrast, according to a report by WIPO (2012) comparing global higher education institutes, United States ranked first with 30 out of 50 universities among the top patent filers followed by Japan (7), South Korea (7), Israel (2), and Australia, China, Denmark and Singapore with one each. With 277 published patent applications the University of California topped the list of universities followed by the Massachusetts Institute of Technology (179) and the University of Texas System (127) (WIPO, 2012). Indian universities failed to endorse its presence.

The poor global performance of Indian higher education reflects the overall non-appreciable performance of India in the context of protecting Intellectual property rights. The Global Intellectual Property Center International IP index (GIPC index) developed by the United States Chamber of

Commerce (2015) provides an overview of the overall IP environment in thirty economies. The challenges that India faces in the context of maintaining intellectual property are many. India scores lowest with weak patenting environment (score 1 out of 7); third lowest in copyright environment (score 1.47 out of 6); fourth lowest in trademark environment (score 2.75 out of 5); and low performance with trade secrets too (score 0.5 out of 2).

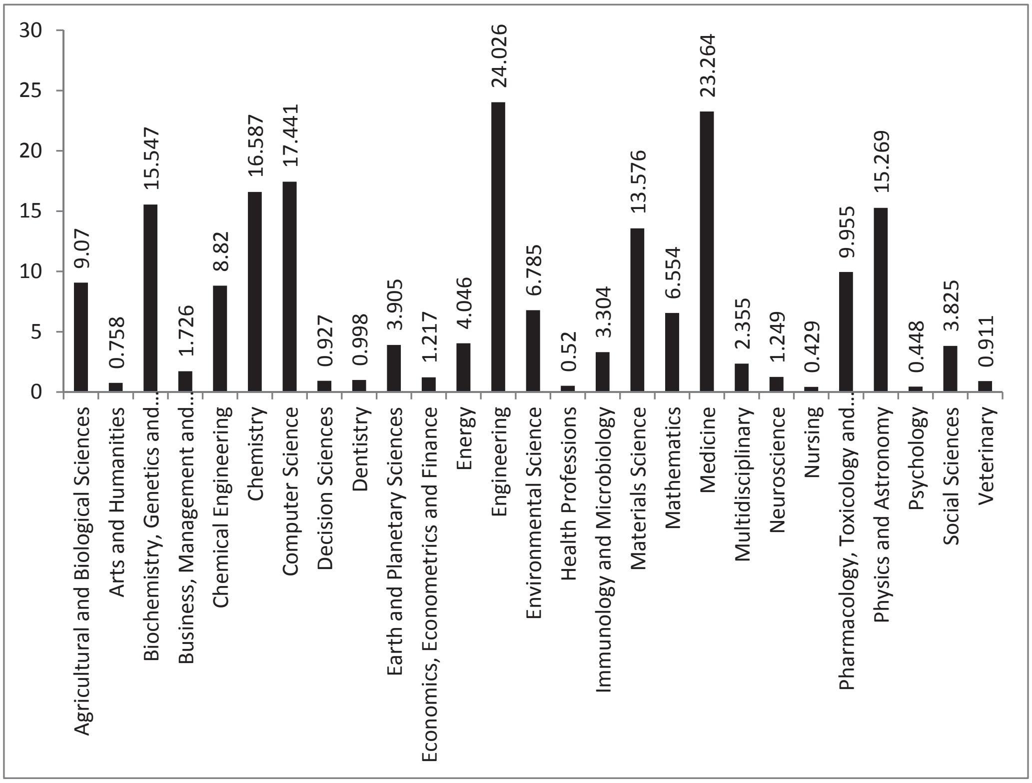
In terms of research output, India has had remarkable quantitative growth but quality concerns persist. SCImago Journal & Country Rank 2014 ranked 239 countries on the basis of research publications and citations (SCImago, 2015). The ranking for India largely ranged from 6 to 12 for most of the criteria for 2014, except H-Index (22) and Citations per document (184) as shown in Table 2. Thus, in terms of research output the performance of India has improved since 1996. Citations per document shows average citations per document published during the source year to documents published during the year. The citable documents comprised of 92.69 percent and non-citable documents comprised of 7.31% in 2014 for India. However, 16.21% documents were cited whereas 83.79% were uncited. In contrast in 1996 the cited documents comprised of 79.14% and 20.86% were uncited. However it should be noted that the documents in 1996 were 20,625 whereas in 2014 were 114,449—more than a five-fold rise in less than two decades. Therefore, with a five-fold rise in the number of documents the cited documents percentage declined by one-fifth. Similar trends can also be observed for China and the United States as well, with the United States performing better than China and India. Further, only 16.36% of documents had more than one country in terms of international collaborations for India. This implies that the research output of India in terms of documents published is appreciable, but the quality of research papers as measured by citations needs to be further enhanced for an improved rank in research output.

Table 2. Performance of India and the best performers in the respective categories of research output in 2014

Indicator	India's Performance	India's Rank	Best Performance (Country)
Documents	114,449	6	552,690 (United States)
Citable Documents	106,078	6	494,790 (United States)
Citations	34,961	12	352,934 (United States)
Self-Citations	15,607	9	194,831 (United States)
Citations per Document	0.31	184	6.8 (Saint Lucia)
H-Index	.383	22	1.648 (United States)

Source: SCImago (2015)

But compared to the United States and China, the Indian publications are far fewer. Both the United States and China lead the league tables in terms of research publications and citations on almost all criteria except citations per documents.



Source: SCImago (2015)

Figure 7. Research documents published in various fields in India in 2014

In India in 2014, the maximum documents were published in the fields like engineering, medicine, computer science, chemistry, biochemistry, genetics and molecular biology, physics and astronomy and materials science as shown in Figure 7.

The overall low quality of research output and fewer patent filings can be attributed to insufficient public funding to sponsor research, inadequate university-industry linkages, lack of appropriate infrastructure, etc.

Availability of teachers and quality of teaching are required to maintain the quality of higher education. With the growing enrollments, the number of teachers has also registered a continuous rise: from 0.024 million in 1950-51 (UGC, 2013) to 1.41 million in 2014-15 (MHRD, 2015c). The rise is about 59 fold. Even though the number rose sharply, the pupil teacher ratio for India was 21.5 in 2013. The pupil-teacher ratio for Brazil was 19.9 (2013), Russia 14.4 (2012), the United Kingdom 16.4 (2013), the United States 12.8 (2013) and for China 19.5 (2011) (UIS, 2015). It is difficult to trace accurate and updated data for faculty shortage, but an estimate by UGC (2011) showed that the shortages in various State universities was over 40%, Central universities 35%, Deemed universities about 25% and affiliated colleges about 40%. Such faculty shortages impair quality education and burden existing faculties with additional workload. Moreover, financial constraints also restrict the provision of temporary faculty appointments, in particular when freezing of permanent appointments is extended for a longer duration.

Global ranking, competitiveness and innovation

The performance of a country's various higher education institutes is analyzed by Global University Rankings. It is assumed that high-ranking higher education institutes can provide a conducive environment for the growth of knowledge economies. Such growth is propelled by innovation, thereby increasing the competitiveness of an economy.

Various stakeholders of higher education are increasingly using Global University Rankings as they present comprehensive and comparative analysis. Methodological issues continue to pose challenges, but they have successfully presented a performance evaluation along common criteria to compare global universities. Hence, such global university rankings show the performance and position of various universities and their potential to compete globally. The three widely discussed global university rankings for analysis here include Times Higher Education (THE) World University Rankings 2015-16 (THE, 2015); QS World University Rankings 2015/16 (QS, 2015); and Academic Ranking of World Universities (AWRU) 2015.

Table 3. Number of Indian universities in three global university rankings

	THE	QS	AWRU
Institutions in top 100	None	None	None
Institutions between 100-200	None	Two	None
Institutions between 200-500	Five	Nine	One

Source: THE (2015); QS (2015); AWRU (2015)

For most of the Global University Rankings, the highest scoring institute was the Indian Institute of Science (IISc). But the rank of even IISc is not appreciable (THE between 251-300, QS-147th and AWRU between 301-400). Four Indian Institutes of Technology (IITs) appeared in the top 500 in THE rankings. IIT Delhi appeared in 100-200 ranking while six more IITs along-with University of Delhi appeared in 200-500 ranks in QS rankings.

Most of the top five frequently globally ranking higher education institutions have a large number of student enrollments and also offer a large number of undergraduate and postgraduate courses as shown in Table 4. Due to these features, a lot of diversity exists in these institutions, facilitating and encouraging multidisciplinary knowledge sharing, production, and dissemination. On the other hand, the top ranking Indian institutions have comparatively fewer student enrollments. They are also largely specialized in specific disciplines and so offer very limited undergraduate and post-graduate courses. The top five frequently globally high ranking higher education institutions, are able to attract international students comprising approximately 20% to 35% of their total students. In context of faculty, such institutions are able to attract about 40% to 55% of international faculty or faculty of international standards. The knowledge and experience sharing among such a diverse group of students and professors create a multicultural learning environment for students. It creates a very conducive environment for innovations and research that can provide solutions to global issues. Subsequently, knowledge production and dissemination undertake a global outlook.

Table 4. Comparison of certain attributes of selected global universities with top Indian universities

Name of the Institution	Students Enrollments	No. of Faculties	Undergraduate Programs	Graduate/ Masters Programs	Doctoral Programs
Harvard University	21,708 (23%)	4184 (52%)	50	118	11
Stanford University	16,407 (22%)	3844 (47%)	66	81	NA
The Massachusetts Institute of Technology	11,051 (33%)	2980 (56%)	44	124	NA
The University of California, Berkeley	37,210 (24%)	3392 (42%)	83	99	87
The University of Cambridge	18,977 (35%)	5084 (41%)	50	99	106 (+47 research programs)
IISc, Bangalore	3,512 (1%)	504	6	9	NA
IIT, Delhi	7,399 (1%)	444 (<1%)	12*	56*	25*
IIT, Bombay	9,870 (<1%)	669 (2%)	NA*	NA*	NA*

Source: QS & AWRU
Note: 1. Numbers in the parentheses represent respective international participation.
2. Numbers with an asterisk (*) sourced from respective institute's websites.
3. NA represents not explicitly available.

Analysis of global university rankings by fields of study highlights that in THE, only IISc ranked 99th in engineering and technology. In AWRU ranking none of the universities rank in top 100 rankings for various fields. In QS rankings 5 IITs score in the top 100 universities for engineering and technology.

The quality of higher education greatly influences the growth of knowledge economies. The Knowledge Economy Index (KEI) prepared by the World Bank (2012) represents for 146 countries their economies readiness to compete in the knowledge economy. KEI is an average of four sub-indexes, Economic and institutional regime index and the three sub-indexes collectively termed as the Knowledge Index comprising of the Education Index, the Innovation Index, and the ICT index. Each of the four sub-indexes are based on four indicators further derived from 148 structural and comprehensive variables. The scores are normalized on a scale of 0 to 10. Out of the 12 indicators, three are largely associated with tertiary education, namely Tertiary GER, Patents granted by USTPO per million people and S and E journal articles per million people. Besides these, many variables accommodated in the 12 indicators are largely linked with tertiary education: the Human Development Index; science and engineering enrollment ratios; researchers in R and D; total expenditure in R and D as a percentage of GDP; university-company collaboration; high technology exports; capital goods imports; S and E articles; its citations and international co-authorships; employment in industry and services; professional and technical workers as a part of the labor force; brain-drain; professional management reliability; localized availability of specialized research and training services; labor force; and unemployment with tertiary education and many more. India ranked 110th with a score of 3.06 in the KEI 2012. The score for Brazil was 5.58, Russia 5.78, China 4.37, and South Africa 5.21. India ranked the lowest amongst the BRICS nations. India's performance on 'innovation and technological adaptation' was appreciable with a score of 4.5, in 'economic incentive and institutional regime' it was 3.57 and in 'information and communications technology infrastructure' it was the least at 1.9. The score for 'education & training' was 2.26. Sweden received the highest score (9.43) in KEI 2012. India's score was about one-third of Sweden's.

Knowledge generation has a direct impact on the innovation capabilities of a country that further lead toward the growth of knowledge economies. The Global Innovation Index (GII) 2015 provides detailed metrics for 141 countries, while analyzing 79 indicators for each contained in seven innovation sub-indexes, also reflects the nature of tertiary education in these economies. India ranked 81 in GII with a low score of 31.74 out of 100. However, GII tagged India as an outperformer to its peers on various parameters. It identified the top Indian universities like IISCs; IITs and IIMs; and citation of publications as the areas of strength to facilitate innovation. It was suggested that admissions for students in such institutes like the IITs (1 out of 50) and IIMs (one out of 150) was more fierce than even the top American institute with one out of ten admitted students of those who applied. The Indian contributions in the top one percent ranking journals have quadrupled and the citation impact has increased, but in relative terms, they still present a gloomy picture. However, the issues related to higher education access and very low inbound mobility of foreign students in Indian institutions needs to be addressed to enhance the position of India in GII rankings. Along with improving university-industry partnerships, enhancing the quality of professors is further expected to contribute to an improvement in GII. India has shown better performance in the context of certain indicators like the average score of the top three QS university ranking institutions; high-technology exports; creative exports; citable documents H index; and 'innovation efficiency ratio' (innovation output derived from innovation input). The efforts focused on enhancing skills through recent national policies are appreciable. In terms of the quality of innovation, India's position is less than half (less than 100 score for quality of innovation) compared to the high-income groups (above 200) in terms of scores, whereas China (crossed 150) is soaring upwards narrowing the gap to get closer to the high-income groups' scores. It is important to note that the success drivers identified for top ranking economies like the United States and the United Kingdom are largely associated with higher education institutions like world class universities, high citation and impact scholarly research publications and filing of patents (Cornell University, INSEAD & WIPO, 2015).

The Global Competitiveness Report 2015-16 by the World Economic Forum (WEF, 2015) reveals the competitiveness of 140 countries, accounting for 98.3% of the world GDP. 'Higher education and training', and 'innovation' are two of the 12 pillars used to measure competitiveness that is linked with higher education. India ranked 55th (score 4.31) on a scale of 1 to 7, an improvement from 71st rank in 2014-15. India ranked 90th in 'higher education and training' with a score of 3.87 and 42nd in 'innovation' with a score of 3.65. Within the pillar of higher education and training, the 'gross percentage of tertiary education enrollment' was ranked 86th and 'quality of management schools' was ranked 55th (score 4.4). Amongst various aspects of the pillars of innovation, India ranked 50th for 'university-industry collaboration in R&D' (score 3.9), 49th for availability of scientists and engineers (score 4.2) and 45th for quality of scientific research institutions (score 4.1). Despite improvement, more efforts are required to be globally competitive. Effective and relevant higher education policy can contribute significantly to enhancing India's position globally in research, innovation, and competitiveness.

Conclusion

The Indian economy is witnessing a decisive demographic phase that presents historic opportunities along with imperative challenges. As a labor abundant economy India can reap enormous economic benefits by leveraging upon its population. The creation of a skilled workforce can give a great impetus to India's development in the race of knowledge economies, in which higher education will have to contribute significantly.

The Indian higher education system is the largest in the world in terms of institutions and second largest in terms of enrollments. Despite enormous growth, it faces many challenges related to equity, efficiency, and quality. The GER in higher education is 23.6, which means that a large segment of the eligible age cohort is still out of higher education ambit.

Inequity with respect to gender, economic condition, spatial (rural-urban), inter-state, ethnicity and religion is also persisting. This connotes that the higher education growth is still not being served by higher education, although the system has transformed from an elitist to a system for the masses. Policy efforts to enhance access to higher education for impoverished groups of the society has helped in narrowing the gap between impoverished and advantaged groups.

In the context of quality; issues like availability of qualified and experienced faculty; lack of infrastructure to facilitate the delivery of quality higher education; lack of improvement in curriculum, pedagogy and evaluation; the disconnect between higher education institutes and industry; non-cited research; insufficient patent filings, etc. are collectively responsible for poor performance.

Enhancing access to financial resources—public, private and philanthropic—is vital to enhance quality. Appropriate and effective policy measures can address the issues of equity, efficiency and quality of the Indian higher education system in a pragmatic manner. Indian higher education will have to transform itself at a rapid pace to be globally competitive and innovative.

References

Agarwal, P. (2006). *Higher education in India: The need for change*. ICRIER Working Paper, 180. New Delhi: Indian Council for Research on International Economic Relations.

Agrawal, T. (2011). *Returns to education in India: Some recent evidence*. WP-2011-017. Mumbai: Indira Gandhi Institute of Development Research.

AWRU. (2015). *Academic World University Rankings 2015.* Shanghai: Shanghai Ranking Consultancy. Retrieved December 5, 2015 from http://www.shanghairanking.com/ARWU2015.html

Blom, A., & Saeki, H. (2011). *Employability and skill set of newly graduated engineers in India*. Policy Research Working Paper 5640. Washington: The World Bank.

Chandna, R. (2013). *83% of Indian engineering graduates unfit for employment: Survey findings!* Learnhub. Retrieved December 5, 2015 from http://engineering.learnhub.com/lesson/21444-83-percent-of-indian-engineering-graduates-unfit-for-employment-survey-findings

The office of the Controller General of Patents, Designs, Trademarks and Geographical Indication. (CGPDTM)(2014). *Annual Report 2013-14 – Intellectual Property India.* Ministry of Commerce & Industry Department of Industrial Policy & Promotion, Government of India, New Delhi: Author.

Cornell University, INSEAD & WIPO. (2015). *The global innovation index 2015: Effective innovation policies for development.* Fontainbleau, Ithaca & Geneva: Author. ISSN 2263-3693. ISBN 978-2-9522210-8-5

Gowsalya, G., & Ashok Kumar, M. (2015). Employability skill: A literature review. *International Journal of Advance Research in Computer Science and Management Studies, 3*(3). ISSN 2321-7782 (online).

Joshi, K.M., & Ahir, K.V. (2015). Higher education in India: Retrospections on advent and growth of private sector. In K.M. Joshi, & S. Paivandi, (Eds.), *Private higher education – A global perspective* (pp. 271-311). New Delhi: B.R. Publishing Incorporation. ISBN 9789350502075.

Joshi, K.M., & Ahir, K.V. (in press 2016). Equity in Indian higher education – Issues and challenges in access and participation. In K.M. Joshi, & S. Paivandi (Eds.), *Equity in higher education – A global perspective.* Delhi: Studera Press.

Lucas, R.E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*, 3-42.

Mankiw, N.G., Romer, D., & Weil, D.N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics, 107*, 407-437.

Ministry of Human Resource Development. (MHRD)(2013, September). *Rashtriya uchchatar shiksha abhiyan (National higher education mission).* Ministry of Human Resource Development in association with Tata Institute of Social Sciences, New Delhi: Author.

MHRD. (2014a). *Educational statistics at a glance 2014*. Government of India, New Delhi: Author.

MHRD. (2014b). *Analysis of budgeted expenditure on education: 2010-11 to 2012-13*. Government of India, New Delhi: Author.

MHRD. (2015a). *All India survey on higher education 2012-13 (Final).* Government of India, New Delhi: Author.

MHRD. (2015b). *All India survey on higher education 2013-14 (Final).* Government of India, New Delhi: Author.

MHRD. (2015c). *All India survey on higher education 2014-15 (Provisional).* Government of India, New Delhi: Author.

Ministry of Labour and Employment. (2015). *Report on employment and unemployment- 2013-14* Vol.-2, Chandigarh: Ministry of Labour and Employment, Government of India. Retrieved September 21, 2015 from http://labourbureau.nic.in/Report%20Vol%202%20final.pdf

QS. (2015). *QS world university rankings 2015/16.* Retrieved December 6, 2015 from http://www.topuniversities.com/university-rankings/world-university-rankings/2015#sorting=rank+region=+ country=+faculty=+stars=false+search

Romer, P.M. (1986). Increasing returns and long-run growth. *Journal of Political Economy, 94*, 1002-1037.

Schultz, T.W. (1961, March). Investment in human capital. *American Economic Review,* 13-33.

SCImago. (2015). SJR- SCImago journal and country rank. Retrieved December 7, 2015 from http://www.scimagojr.com

Spence, A.M. (1973, August). Job market signaling. *The Quarterly Journal of Economics,* MIT Press, vol.87 (3), 355-374.

THE. (2015). *Times Higher Education World University Rankings 2015-16.* In partnership with Elsevier. Retrieved December 6, 2015 from https://www.timeshighereducation.com/world-university-rankings/2016/world-ranking#!/page/0/length/25

Trow, M. (1974). Problems in the transition from elite to mass higher education. In *policies for higher education* from General Report on the Conference on Future Structures of Post Secondary Education, 5-101. Paris: OECD.

Retrieved March 27, 2014 from http://escholarship.org/uc/item/96p3s213#page-65

UIS. (2015). *Education.* UNESCO Institute for Statistics. Retrieved December 3, 2015 from http://data.uis.unesco.org

UGC. (2011). *Report of the task force on faculty shortage and design of performance appraisal system.* University Grants Commission, New Delhi: Author.

UGC. (2013, June). *Higher education in India at a glance*. University Grants Commission, New Delhi: Author.

US Chamber of Commerce. (2015, February). *Unlimited potential: GIPC international IP index*. Third Edition, Global Intellectual Property Center: Author.

World Bank. (2012). *Knowledge Economy Index (KEI) 2012 Rankings*. Washington: World Bank. Retrieved December 7, 2015 from www.worldbank.org/kam

WEF. (2015). *The Global Competitiveness Report 2015-16.* World Economic Forum, Geneva: Author. ISBN-13: 978-92-95044-99-9 ISBN-10: 92-95044-99-1.

WIPO. (2012). *International patent filings set new record in 2011.* Geneva: World Intellectual Property Organization. Retrieved December 5, 2015 from http://www.wipo.int/pressroom/en/articles/2012/article_0001.html

WIPO. (2014). *Statistical country profiles – India.* WIPO statistical database. Geneva: World Intellectual Property Organization. Retrieved November 22, 2015 from http://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=IN

Worldometers. (2015). *Real time world statistics.* Retrieved December 7, 2015 from http://www.worldometers.info/world-population