Improving the Quality of Indian Higher Technical Education System: An Analytical Approach

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ABSTRACT

India's higher education system is one of the largest systems of the world and has grown at a jet speed since independence (Next to US and China only). However, it is very complex comprising of Ministry of Human Resource Development, Government of India as the apex body and other regulatory institutions like AICTE, AIU, UGC, NAAC, NBA, etc. to support the system. It is strongly felt by all the stake holders that with the increasing demand for quality in university system in higher education in the country, it has become imminent that a consistent plan is to be laid for the growth and enhancement of quality in the system.

The author in this paper deals with the following four major aspects:

- Growth of higher education system in India since independence
- Present global ranking of various Indian universities by major international organizations
- Reasons for low ranking
- Various steps to be taken by various stake holders to improve the quality of Indian higher education system.

With the emergence of India as a knowledge-based economy, human capital has now become its major strength. This has put the spotlight on severe inadequacies of India's infrastructure for delivery of higher education and our universities have to rise to the occasion to meet the needs of Indian society inline with international standards.

Indian higher education sector has shown impressive and exponential growth in the number of institutes and students enrollment in the country; but it still faces challenges on several fronts like:

- Low and inequitable access to higher education (Low GER) Acute shortage of faculty.
- Deficient and low quality infrastructure except in few IITs and IIMs. Low and inequitable access to higher.
- Lack of mind set of owners of pvt. Institutes to undertake consultancy, patenting and invest in research, development & innovation.
- Outdated curriculums which are not in line with the current industry demands, needs and aspirations.

INTRODUCTION

The progress of higher education in any country can be measured by its institutional capacity. The educational institutional capacity is measured by number of educational institutions, namely universities and colleges, number of teachers, number of students seeking post-higher secondary education etc. We look at the growth of some of these parameters since 1950 onwards:-

Table 1: Growth of Higher Education Institutions (HEIs)

Sr. No.	*Years*	*Number of Colleges*	*Number of Universities*
1.	1950–51	685	30
2.	1960–61	1542	55
3.	1970–71	3604	129
4.	1980–81	4732	133
5.	1990–91	7346	190
6.	2000–01	12806	256
7.	2010–11	32564	564
8.	2011–12	35638	645
9.	2012–13	38690	700

Table 2: Growth of Students Enrolment ('000) in Higher Education

Sr. No.	*Years*	*Enrolment Number ('000)*		
		Girls	*Boys*	*Total*
1.	1950–51	43	307	350
2.	1960–61	170	880	1050
3.	1970–71	435	1519	1954
4.	1980–81	743	2009	2752
5.	1990–91	1437	3488	4925
6.	2000–01	1906	6489	8395
7.	2010–11	7748	10922	18670
8.	2011–12	8672	14655	23327

Table 3: Growth of Teaching Staff in Universities/Colleges

Sr. No.	*Year*	*Number of Teaching Staff*	*Fold (Number of Times) Increase over 1950–51*
1.	1950–51	23543	–
2.	1960–61	59673	2.53
3.	1970–71	128876	5.47
4.	1980–81	193341	8.21
5.	1990–91	263125	11.18
6.	2000–01	411638	17.48
7.	2010–11	893462	37.95
8.	2011–12	933761	39.66

PRESENT STATUS OF QUALITATIVE ASPECTS OF HIGHER EDUCATION

Let us examine the status on the following major parameters, which play very important role in determining the status of quality of higher education: -

Faculty

Availability of good quality faculty is a critical input in the functioning of a sound higher education system. While there has been a consistent growth in the faculty strength in higher education, it has not matched the growth in student enrolment numbers. While the student enrolments have gone up by approximately 66 times between 1950-51 and 2011- 12, the number of teachers has gone up by 40 times only. The student teacher ratio has come down from 15 to 25. This has also led to the country's poor performance on student-teacher ratio at the international level, as can be seen in the figure below:-

Table 4: Comparison of Student Teacher Ratio

Sr. No.	*Period*	*Number of Students ('000')*	*Number of Teachers*	*Ration*
1.	1950–51	350000	23543	15
2.	1960–61	1050000	59673	18
3.	1970–71	1954000	128876	15
4.	1980–81	2752000	193341	14
5.	1990–91	4925000	263125	19
6.	2000–01	8395000	411638	20
7.	2010–11	18670000	893462	21
8.	2011–12	18670000	933761	25

[1] For Tables 1 to 4, UGC Document (June 2013) – Higher Education in India at a Glance.

In spite of the above quantitative phenomenal growth in the education system, the GER (Gross Enrolment Ratio) as compared with some of the developed economies, is low as is evident from the following table.

Table 5: GER in Higher Education

Country	*GER (%)*
South Korea	93
US	89
Russia	76
UK	59
France	55
Malaysia	40
China	24
India	19.4

UNESCO Institute for Statistic Database.

Research

Research is an essential component of a higher education system to ensure it remains vibrant and is quick to respond to and anticipate changes arising in the contextual Conditions. One of the input parameters to ascertain progress in research is the quantum of spending on research and development activities.

Expenditure on R&D

Expenditure on R&D by a nation is often used as a proxy to the importance given by a nation to develop its technological capacity. The share of R&D expenditure from private sources is a good indicator of the dynamism of the private sector. It shows as to how the private sector uses innovation to drive national competitiveness. Table 6 shows expenditure incurred on R&D activities by ten-top economies and India. It is seen that expenditure on R&D in India is merely 0.78 per cent, in comparison; Finland is highest at 3.96, followed by 3.62 – Sweden.

Table 6: Expenditure Incurred on R&D Activities by Top Ten Economies and India (2011-2012)

Sr. No.	*Country*	**GERD/GDP%*
1.	Finland	3.96
2.	Sweden	3.62
3.	Denmark	3.02
4.	Switzerland	3.00
5.	USA	2.88
6.	Germany	2.78
7.	Austria	2.75
8.	France	2.21
9.	Canada	1.92
10.	UK	1.85
11.	India	0.78

* GERD – Gross Expenditure on R&D [3] www.nsf.gov

Scientific Publications

Table below gives a comparison among various developed countries and India with respect to scientific publications:-

Table 7: Scientific Publications

Sr. No.	*Country*	*Scientific Publications*	
		Nos.	*Ranking*
1	USA	272,879	1
2	Germany	76368	3

Sr. No.	*Country*	*Scientific Publications*	
		Nos.	*Ranking*
3	Japan	74618	4
4	UK	71,302	5
5	France	57133	6
6	Italy	45273	7
7	Canada	43539	8
8	India	36261	9
9	Spain	35739	10
10	Australia	28313	12

[4] UNESCO global science report 2010 & http://www.nstmis-dst.org

GLOBAL RANKING OF INDIAN UNIVERSITIES

Introduction

The global ranking methodology used by Times – Thomson Reuters Group is based on the following indicators:

Table 8: List of Indicators

Overall Indicators	*Percentage Weightings*
Industry Income – Innovation	2.5
International Diversity	5
Teaching – The Learning Environment	30
Research – Volume, Income and Reputation	30
Citations – Research Influence	32.5

[5] Times Higher Education World University Rankings

World University Rankings by Times Group, UK

Out of the total of 400 universities ranked during the year 14-15 by the Times Higher Education Group, UK, 146 (36%) universities are from USA followed by 78 (20%) from UK. Indias' first institute appears in the E&T group at 99 number and IIT Madras in 351-400 range.

It is to be noted that not a single Indian university appears in the first 75 rankings,

Asia University Rankings

While India had only three universities in the top 100 last year of Asian universities rankings (13–14), this year it has jumped to nine (14–15) . However, out of the nine, seven are IITs, highest ranking 34 by IISc Bangalore, followed by IIT, Delhi.

Ranking of BRICS Universities

The Times Group also ranks separately the universities of BRICS nations. Out of 200 universities ranked, China has highest number at 65, followed by Russia 53 India 31 universities, Brazil 40 and SA 11.

Ranking by other International Organizations

In addition to Times UK Group, Jiao Tong University at Shanghai also ranks various universities and presents their rankings as Academic Ranking of World Universities. Out of 500 universities ranked by them only Indian Institute of Science Bangalore appears within the band 301- 400

Ranking by NAAC, India

Ranking by National Assessment and Accreditation Council's (NAAC) assessment is no better, with 62% of universities accredited rated average or below average. Moreover, the actual picture on the ground is likely to be even worse since only 179 varsities and 5,224 colleges have valid accreditation out of a total of 700 varsities and 39000 colleges. Only 10 of our accredited institutions are 'A' grade, while 71% are 'B' grade. The remaining 19% are in the lowest 'C' grade.

REASONS FOR LOW RANKING

We have seen above that the position of ranking of Indian universities which constitute Indian higher education system by various ranking organizations is dismissal. We identify below some of the reasons for such a low low ranking:-

IITs indifference to the ranking process:

When the ranking process was underway, IITs sent only the names of fulltime faculty members who are on their roles at a particular time, whereas on the other hand, US universities included research associates, people from industry, part-time faculty — everyone, who has taught even for a short time. This had a bearing on the rankings as faculty-student ratio was given a 20% Weight age.

Similarly for citations, which contribute around 30% of the overall score, and is calculated using data from Sci Verse Scopus, a database of academic journal articles, foreign universities put in all possible permutations and combinations of the faculty member/institute's name to facilitate an easier search. Indian institutes were unaware of the need to do this.

As regards for feedback from connected people, the story is similar as any institute could send names of people associated with the institute to help the evaluators to send questionnaires to the right people. Foreign institutes sent 400-500 names where as IIT Kanpur, for instance, sent only 28 names.

In some cases, the correct data was not furnished to the ranking agencies. We took the matter lightly

Growth of a large number of new self-financing private universities who have demonstrated interest only in respect of enrollment and number of courses often at the cost of quality. It is a pity that

private sector organizations which have made a lot of money have not made any major effort in setting up universities equivalent to Stanford or Harvard except few industrial groups like THAPAR, TATA and BIRLA etc.

Quality cannot be simply improved by regulatory bodies. Regulatory bodies at best can carry out some evaluation and grade institutions to some extent. The real challenge is to develop a culture which does not accept mediocrity in all walks of life. While it is the primary responsibility of the regulatory bodies such as the AICTE and the UGC to ensure compliance of a benchmark quality, the system in India is dependent on the inputs provided by the Visiting Committees comprising of Professors and retired expert members. These expert academicians, who should have the courage to say NO for approval when it comes to a 'poor quality' institutions, find it difficult to say NO for obvious reasons best known to them. System of approval by regulatory bodies does not currently involve a detailed assessment of quality parameters such as the quality of faculty, quality of teaching learning processes and that of research and innovation environment in the institution or a university. There is no benchmark specified for quality. The system thus leaves a large scope for subjectivity and lacks the requisite rigor of assessment,

Structure of our institutions is also important and there is need for major structural changes. Our universities act as affiliating bodies and take pride in giving examinations to thousands of undergraduate students every year. This should not be the role of universities. Universities should worry about higher education and research.

It is important that we continually focus on assessing our standards of education. While many, including like Thapar University, BITS and IITs etc, have built-in processes to review on a continuing basis our curriculum, and assess the quality of teaching and research at the each of each year, not all universities are similarly focused upon assessing outcomes. It is for this purpose that the concept of "accreditation" has been institutionalized. However, accreditation is not taken very seriously, whether it is by publicly-funded universities or those in the private sector.

One of the major deficiencies on part of the universities and institutions in India is in respect of contributions to intellectual property and quality of research publications. For this reason, despite India's emergence as a major destination for outsourcing of ICT services, the universities and institutions are not able to stand in the international rankings

Strong interface with industry for relevant research and innovations have not been on the agenda of most universities in India. Needless to say that quality of research and research integrity of the researchers have emerged as a major concern as our current interest for research is largely dominated by publications to comply the requirement for career advancements rather than attaining eminence in specific research areas.

Thanks to the assured career advancement schemes in Indian universities which has taken away whatever little or more peer pressure has existed in Indian universities and institutions during 60's and 70's. We must recognize that mediocrity breeds further mediocrity and often throttles the talents till it either submits to mediocrity or decides to take a graceful exist to some other country abroad. We need to nurture talent and scholarships in our universities and come heavily on mediocrity to win back India the international eminence for its universities.

All the major global ranking systems, attach substantial weighting to research performance, and almost all top-ranking universities are research- led universities.

Unfortunately, the research performance of even the IITs, considered being our 'best' institutions, falls short of world-class standards. We don't produce enough good-quality PhDs; that teaching and research are not attractive to our young professionals; our R&D budgets are too small etc.

We need to re-define the needs of students and teachers. Professors from outside are not invited to teach and train. While the ones working in the country are not engaged in meaningful research, so it has become a chain where nobody wants to change. Selection of vice chancellors of government controlled universities is more political than on merit. Governing bodies are in tune with the party in power - Left, Right or Centre.

Innovation requires collaboration. Hardly very few Universities has any innovation centres; we live in an age of stark contradictions.

It is also a fact that our universities lack academic, administrative and financial freedom, insufficient funding, lack of infrastructure, lack of support in research, non- availability of quality teachers etc. Practically, there is no autonomy for running the educational institutes. Most of our universities are starving for funds. The universities of foreign countries have academic freedom and are heavily funded. Most of the funding by central government goes to IITs, IIMs or IISc and state universities get almost negligible amount of fund.

The present systems through which these rankings are done are most suited to the western countries and US. They give 25 per cent weight-age to noble laureates and 75 per cent to research while we focus on employability. They should consider different countries' education system in mind before ranking the universities. The parameters used for ranking do not suit us thus our universities do not get place in the list of select top 200 universities. For example we do not have noble laureates. Universities in India do not do the research neither quantity nor quality wise. We have some very good institutions like colleges of Delhi University, they have very good under graduate courses but they do not do research, so they would not figure in these rankings."

The world famous universities such as Oxford and Cambridge exploit students' potential and inspire their creativity. Our universities are teachers focused rather then students. In many universities there is no system of evaluation of faculty by students. Even where it is, it is not given any serious weightage at the end of the year while evaluating the performance of a faculty member.

Other reasons of low ranking are:

- Lack of Motivation for Faculty
- Lack of Innovative Practices in Teaching Methodologies
- Lack of TQM in education
- Profit Mainly Motive for Private Sector
- Few PPP Models
- Lack of High Tech & Digital Libraries.

HOW TO IMPROVE THE QUALITY INDIAN HIGHER TECHNICAL EDUCATION

1. Instead of multiplicity of regulatory institutions like AIU, AICTE, UGC, NBA, NAAC etc., create one central agency as National Commission for Higher Education & Research (NCHER) covering AICTE and UGC Act.

2. Accreditation to be made mandatory for all universities and affiliated colleges.
3. In order to make our universities world class and centres of excellence, three major success factors must be aligned viz concentration of talent, availability of resources in abundance and favorable governance.
4. Governance Issues.
5. Ranking system evolved by National Institutional Ranking Framework (NIRF) recently evolved by Min of HRD, GoI -must be made mandatory for all institutions to follow with in next two to three years maximum. But we have to be careful that this body also does not become another inspection agency like AICTE etc.

   Following are the key governance issues to be addressed by various stake holders:

   – The Governmental control in the Universities must be reduced, so that the University autonomy and accountability are strengthened and academic decisions are taken independently and expeditiously
   – New methods and procedures of financial regulations should be devised and direct interference of the finance department in the financial management of Universities, which is counterproductive, should be stopped.
   – As the Colleges are the feeding sources of the Universities, a better coordination in their working and activities is very much required. The participation of the teaching faculty through a democratic process should be ensured.
   – Complete transparency should be maintained in the working of Executive/Academic Bodies and other Governing Councils of the Universities. There is an urgency to review the University Acts in different States and revise the same in the light of the new requirements and the challenges being faced by the Universities.. New technologies of information and communication should be utilized for obtaining administrative efficiency.
   – Higher Education should be developed as an infrastructure for social and economic growth of the Country.
   – Student's involvement in the area of University/College governance should be encouraged.
   – Political interference in the appointment of University teachers and administrators should be totally stopped.
6. Identify few universities and institutes which have potential for excellence and classify them as Universities with Potential for Excellence (UPE). Such UPEs should be eligible for enhanced funding to augment their academic and research infrastructure and also to evolve innovative approaches towards the teaching learning process. Also in parallel identify the various areas on which these UPEs must focus particularly R&D, consultancy, patenting and above all close coordination with industry.

   The annual performance of various colleges affiliated to such a universities must be monitored and reviewed for continual improvement. The parameters should be defined which are measurable.
7. In the following table we give below an integrated four year plan for improving the ranking of Indian universities by collaborating with foreign universities.

Table 9: Integrated Action Plan

Sr. No.	*Parameter*	*Time Plan (Months)*
1.	MHRD, GoI to form a National Commission for Higher Education & Research (NCHER) under GoI to act as the nodal centre for the scheme having full academic and administrative powers to execute and monitor the scheme and merging all existing bodies under NCHE like AICTE, NAAC, NBA, AIU, UGC etc	0–3
2.	Identify top ten Indian Universities/Institutes to participate in the above scheme for improving the ranking of the Indian Universities like IIT. Also identify a nodal officer in each of these universities to coordinate the scheme.	4–6
3.	Identify top ten global ranking universities from abroad out of the top 50 universities ranked by the Times Higher Education and Thomson Reuters group during 2013–2014 for benchmarking	7–9
4.	Work out 1:1 MOUs for a minimum period of 5 years validity between identified Indian Universities and Foreign Universities under 2& 3 above covering all aspects of academic administration & stake holders like curriculum, infrastructure, faculty exchange, students exchange, method of delivery etc.	9–12
5.	Identified Indian Universities should review all the above areas, carry out changes and implement the plan as per MOU	13–24
6.	Carry out periodic reviews with the collaborators every two months	15, 17, 19, 21,23
7.	Efforts should be made to make the necessary changes in the questionnaires by holding discussions with the concerned officers of Times UK Group to suit Indian conditions e.g. India do not have noble laureates -- by which category they should be replaced in the rankings	In 12th month itself
8.	The identified nodal officer must start participating in the global rankings and fill their questionnaires seriously and strictly as per their requirements	In 18 month
9.	At the end of 24 month, each of the ten Indian Universities/Institutes must identify in their regions ten another Universities/ Institutes (create clusters) and act as their nodal centre so that at the end of 36th month, there are 110 universities in total who will be able to participate in world rankings surveys seriously.	24–36
10.	In three to four years time, about 110 Indian universities/Institutes would be ready to globally compete	36–48

[6] NAFEN self analysis.

8. It is also observed that there are no standard Indian parameters to assess the rating of Indian universities like international parameters. It is, therefore, essential that Indian prospective should be reflected properly so that Indian universities are not put at any disadvantage while comparing globally. India must take new initiatives and develop its own parameters enabling better ratings for Indian institutes. Our universities/institutes are having many unique characteristics/ features which are very good but international rating agencies do not consider them like strength of alumni, feedback from current studying students, profile of professors in terms of their total teaching experiences and not publications alone. Further, some procedures should be developed for comparing IQ level testing of Indian faculty and Indian students and

compare it with some international faculty and students. Similarly, as a substitute to noble laureates, some top awardees of Bhatnagar awards and high level Indian industrialists running multi level enterprises should be considered for rating.

9. The regulatory bodies should be well advised to emulate some of the best practices for assessment of the institutions and universities prevalent in advanced countries such as US, Europe and even in neighboring countries like Singapore, Korea and China.
10. Our education system is best suited for our country. If we really want to improve our rankings we need to invest heavily on research. If we look at the Nobel laureates they are innovators and researchers not academicians, we need to build a community, a generation of researchers and innovators to compete with best institutions around the world and this will improve our ranking
11. Biometric system of attendance for faculty and staff including head of the university/institutes/college must be introduced as early as possible.
12. On the lines of US, 3 year contractual system of appointment for the faculty should be considered with a clear provision of removable in case of poor performance.
13. Running same module by different faculty members in the same semester be introduced giving a clear choice to the students to join any class of their choice.
14. Depending upon the aptitude of a student, modules on sports, music, art, culture, etc. be introduced in technical courses and given full weight age in the evaluation.
15. Norms must be evolved for the welfare of the faculty and staff working in various private institutes.

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