

Indian universities and colleges, where do they fall short, with respect to world best?

Teaching of Research & Innovation skills in universities & colleges is the major handicap

If India ignores, future Generations will not pardon us.

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“What drives employment in 21st century is the Research and Innovation. They disrupt the existing knowledge & skills in ongoing professions and vocations. People must upskill themselves and build capability to cope with changing scenario in emerging high end employment, and low end employment. Resources in research ,innovation and education are the most important growth stimulating instruments today.”

Abstract

The article presents in brief, an Introspection of higher & technical education in India, vis-à-vis institutions elsewhere ranking high in the world list. Absence of Research and innovation in curriculum of Indian universities & colleges is the major, structural weakness, on account of which they have become godowns, i.e. store houses of old outdated knowledge. They are not the fountain heads of new knowledge and new technology, much needed in competitive world. How do you expect them to teach latest? So thousands of students every year are going abroad to learn latest in higher education. Indian universities and colleges lack infrastructure like

innovation centre ,Research Park, start-up centre, incubation centre, entrepreneurship centre, etc. Students are intelligent, hardworking and ambitious who do not want to waste their prime youth in rote learning of unproductive, irrelevant subjects. Today, educated unemployment is a wide spread and serious problem in India. What is wanted is not taught and what is taught is not wanted. Students want to make most of their youthful time to acquire capabilities and become competitive in global market. India in spite of abundant natural resources and brilliant people has remained a developing country with huge population living below poverty line. Purpose of the study is to transform Indian universities and colleges in to world class institutions and make India a developed country by 2022 as declared by government. Suggestions like professors need to be deputed to world best institutions to study their policies and practices, visions and missions are made. No reform in India is more urgent than reform in higher and technical education. This has to be realised, so as to secure the future of young generation.

1 Introduction

Indian universities and colleges today do not stand high in the world list. Thousands of students every year go abroad for higher education to improve their knowledge and capability by spending huge sums of money. They are rejecting best of Indian universities and even IITs. Can Indian universities not be revamped and be brought at par with world best? Where do the Indian universities fall short with

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respect to the world best? What needs to be done to improve? We have too much of rote learning, they have more of research and innovation. So they are far too ahead in brain race. Foreign Universities have become birth place of New Technology based Firms [NTBFs] . For example, Stanford university has given birth to as many as 3000 firms, and they get royalty from them in millions of dollars, which is ploughed back from year to year. Our Apex bodies regulating higher education honestly are behind time, and in fact so India is failing in creating vibrant educational ecosystem that supports cutting edge research and in turn high and low end jobs. Service conditions of professors are primitive

Consequently, professors are pigmy in state of the art knowledge and do not grow to world standard. Professors are not having research fund. How can then they conduct research? They have become teaching professors, teaching yesterday's knowledge today. Consequently, graduates have degrees in hand but no jobs. Educated unemployed is a major problem. They work hard but fruitlessly. Innovation and creativity is our weakness.

They need to install Innovation centres, Incubation centres, Patent and IPR centres, Research Parks, Technology Transfer centres, Life Long continuing education centres, start-up centre etc, This has to be the main agenda for new India. Should the Government ever ignore it at what cost, and who pays?

These centres are existing in foreign universities from more than fifty years and it is more on account them that they have improved the quality of education, productivity and became developed. India must have to learn from other countries, preferably through collaborations to go in a massive manner. No reform is more urgent for India than this today. If we fail in doing this future generations will not pardon us. Installation of all these centres on campus costs, but not installation is far more costly. Youths remain less competitive in global competition. Can the youths afford to remain behind?

Indian universities are not short of money, they are short of new visions of new world. A paradigm shift in universities and colleges in respect of research and innovation is the need of the hour. Can youths make bright future without transforming universities to world class level, i.e. higher orbit? Are universities

behind time? Honestly far too behind. Lack of Research and innovative culture so far led to brain drain and also money drain. Lack of innovation in the past has thrown India behind in development race. India remained developing country, low income economy, in spite of all things in its hands, except world class universities and colleges. How can India strengthen, research, innovation, creativity in higher education, the article explains the things in details.

2. Discussions

2.1 Research is a wealth creating activity. Benefits from scientific, technological and industrial research far outweigh the costs. Nations are flourishing which lead in Research and Innovation, others trail behind.

Research is not a fancy affair. It is the seed corn for the harvest of benefit. Research provides fuel for education and makes it quality and cost competitive. Research gives joy and sense of achievement. It provides economic security to a nation and confidence to youths. It enhances the rate of return on investment made in colleges and generates jobs to educated graduates. It enriches human civilization. Therefore it is advisable to provide Industry oriented research and Innovation skills to students:

Without research & innovation base in universities and colleges, students although educated have become misfit for present and future. If India does not introduce research in universities and colleges in a big way, higher and technical education in India is impossible to be competitive by global standards, in turn India will continue to remain a poor developing country. Students then in spite of high potential will lag behind. Those who can afford will continue to go abroad to receive higher education. Research is a profit making activity and not a financial liability. Research creates wealth for the nation, enables college, professors and India to earn wealth from world over, besides credit. It creates joyful atmosphere in an institution, and improves the quality and relevance of education. It goes far beyond to improve competitiveness of industry. A student learns best by researching. He learns to create a brand new technology which gives him competitive edge in global market place. The mindset of the key people in both industry and institutes is behind time. Full scope of research and innovation in India, and their deeper purposes are less understood, resulting in low priority in government budget. India is spending only 0.45 %

of GDP on research, when others are spending 5% i.e. ten times more. No wonder if the Research output from 800 universities in India is equal to only two universities in USA. India to become technological power, which it dreams of, ought to spend more on research. Education without learning skills of research & skills for innovation remains incomplete and irrelevant in modern sense. The interaction between industry and institute for research in India is far too weak adversely affecting competitiveness and growth of both. That political party which will care for reforms in R & D in universities will win election. Dr Saraswat from Niti Ayog is planning to increase budget for research in coming time. If it is done it will be good.

2.2 Nations are developed only when they have world class universities and colleges, not otherwise even if they have all other things. In other words India is behind because its universities are behind, India can go ahead only if universities go ahead. Do we realize this? Capability and competency of graduates coming out of universities matters more than physical resources.

Third American president [1801 to 1809] Thomas Jefferson gave a message to USA that US universities would have to go ahead of European universities, if it wants to be better in respect of economy, industry than Europe. He started many schemes to modernize universities. From the time American universities went ahead of European, USA became a power in world. Today first eight universities out of best ten are American. That is the prime reason that USA is a world power. 90 % of the patents earned in world are from USA. India would have to transform its universities to world class standard, if it wants to go with the world.

2.3 World Best Universities and colleges are fostering cultures of innovation, creativity, entrepreneurship and risk taking. They are creating ecosystems for "Disruptive Economic Development" which works as "Powerful Engine of Change.". This is the latest world development trend. Human capital is produced in these universities competent by global standards to harness opportunities anywhere in world. Many leaders, many Nobel Laureates, and technology pioneers from many countries have received education in US universities. US universities are attracting best talent from world over and Universities are categorized as world class only when they stand

high in world ranking. Necessarily they have to be generating high quality research output and technologies for the welfare of human kind providing competent men with path breaking knowledge and skills to whole world. Regions, cities are developed where people are educated and universities are world class, not otherwise even if they are endowed with abundant natural resources. Silicon valley is developed mainly because of knowledge center at Stanford university. Industries are developed in Boston because of MIT at Boston. Research Triangle Park at Raleigh is developed because of Duke University. Most of the universities in all east and west developed countries are always innovating and innovating like doing organizational innovation, technological innovation, and financial innovation etc. It is observed that innovative nations take away jobs from less innovative. Small countries like New Zealand, Singapore, Switzerland have world class universities, and on account of them they could become developed. Why a big country cannot? Money is not in short supply. Many universities have ample money. What is not available is the global visions and missions, policies and practices. Our rules and regulations, in respect of research and innovation are backward and outdated. Professors retire at the age of sixty, they are then disconnected from students for PhD. In foreign they guide up to the time they can and wish. So most of the Nobel Laureates are in age of 70-75 years.

2.4 Do Indian universities have innovation centers? Why Indian universities are not taking lessons from world best universities? Why apex bodies are closing eyes towards these developments in other countries? Why our campuses although huge are dull and behind time in advanced knowledge. By one estimate it is said, five IITs could be established by the foreign exchange students spend each year in foreign universities. There is a huge drain of money besides brain drain. It is reported that research output of our more than 800 Indian universities is equivalent to only two universities of USA. Government and universities do not attach due importance to research and innovation. They feel expenditure on research is unproductive, whereas in reality it is most productive.. Students learn only known knowledge, mostly yesterday's knowledge coming from abroad and do not widen their imagination, beyond text books. Indian universities do not yet have knowledge and technology springs like well water springs.

2.5 Research Park is a proven model in developed world for hi-tech job generation and high income. Research based universities have become a magnet for high tech Industries.

Industry so as to remain competitive globally needs access to first class research in universities. So also the first class researchers in universities need access to industry so as to commercialise their research findings. This is the underlying principle of Research Park.

The author has visited many university related research parks [URRP] in USA, Canada, Germany, UK etc. Every university has a research park. There is a University Related Research Parks, [URRP] Association of University Research Parks [AURP] in USA which gives guidance to universities to install parks and to improve working. They are running courses and holding conferences every year. There is almost no university abroad without a research park. In India, only a few institutes like IIT Chennai have established research park. This model must have to be adopted in every university, without which research and innovation culture and in turn employment is less likely to grow.

They generate high end jobs, with high pay with lucrative job conditions. Industries need new knowledge, new technology, new ideas to win in global competition. Where are they available? They are generated by young talent in research based universities. So the industries are flocking round innovative universities.

2.6 Universities can and should become “Light House” for industry.

Which government does not want to generate hi-tech employment, high pay international jobs, spur industrial growth, and make education globally competitive? Then it must install research/technology parks, incubators, Patent & IPR to facilitate commercial exploitation of sunrise technologies. Class room teaching is good but not enough. Industries, world over, are seen flocking round the advanced knowledge centers to obtain brand new ideas for global competitiveness. Institutes must have original knowledge springs like well water springs. They must have a mechanism to convert intellectual strength in to usable goods and services. Role of higher education through research has emerged

central to industrial and economic development, in creating India's future. Association with industry, venture capital firms, international agencies who succeeded in this cause is essential.

The paper prescribes “dream big” for universities and colleges. They should aim at technology generation, technology diffusion, which is achieving high significance in enabling a nation to win. The paper emphasizes adoption of new organizational inventions like Research Park-Technology Park, which when implemented will contribute to India's international competitiveness. The institutions should have now to look beyond the traditional lines of teaching and learning and adapt to corporate development, and help industry to win. They should have to restructure themselves to become fountain heads of new knowledge and new technology. They should deserve the status of “Light House” for industry. People demand world class education. How can this be done? Synergy between industry and academics in this cause is vital. Parks play a middleman's role in this. They have enhanced the scholarship of universities. They jointly can give economic and political stability to India. Will industry- institute interaction become a national priority? The paper recommends reforms in the light of experience elsewhere in the world.

2.7 Universities Abroad have transformed them selves in to Birth places, maternity homes of New Technology Based Firms.

MIT Boston is giving birth to as many as 60 firms every year. Microsoft Bill Gate company was born in Harvard university, Tesla Electric Car company of Elon Musk was born in Stanford, There are more than 3000 firms which owe their origin to MIT Boston, and another 3000 companies born in Stanford university. These universities have their own Venture Capital Firms, giving financial support to start-ups. When these companies become big and earn profit they pay royalty to the university, which now amounts to millions of dollars. This royalty is ploughed back in research and innovation. Australian universities are giving birth to 40 companies every year. Chinese universities are not behind they are giving birth to 40 New Technology Based Firms. Why Indian universities cannot? They can also do this, but they have to have this vision. Bombay IIT has started doing this. It is giving birth to research based companies, generating high end jobs, hi tech, high pay, ultimately

leading to many more low end jobs and high income jobs. It is these research based companies which provide life and blood to the Indian industries, and keep them technologically up to date. A new mechanism to spin-off NTBFs has to be installed in each university. This requires a massive program for research and innovation. Educated unemployment will then be wiped out or substantially reduced.

2.8 Service conditions of professors must improve.

World experience tells us that unless a professor is involved in industry oriented research, he has very little current and relevant knowledge to teach. He tends to teach otherwise, sunset knowledge incompatible to global opportunities. Class room teaching gets a force, depth and sharp edge if professors are engaged in research and innovation. They become imaginative, remain ahead of time and update their own capacities, which are needed to capitalize on technology ahead of others. How long Indian industry can be run on borrowed knowledge and borrowed technology? Visions and missions of universities and colleges should essentially include corporate development to make industry win in globalized world. This alone will make education relevant and purposeful. If all the professors of college decide and make effort in this direction, undoubtedly quality of education will be superb.

2.9 Shortage of research and innovation skills in teaching of universities and colleges is a major barrier in employment generation.

The key factor behind unemployment, increasing dependence on foreign is insufficient research and insufficient innovation. Shortage of people with research and innovation skills is a major barrier in professional development. Universities and colleges have a major influence on India's capacity for innovation. Colleges therefore should have to resort to these new strategies to induct research and innovation skills in economy. They would have to adopt corporate development as a vision and mission. They should provide new ideas and new technology to keep industry competitive in world market. They are like heart to our body, which pumps new fresh blood to keep body alive. Indian higher education would have to recognize full scope of research and innovation phenomenon. They must provide captains and professional leaders of world standard to industry, and all walks of life.

Those nations which introduce research and innovation are found to win jobs in competition from those who lag. Can Indian professors not teach innovation skills by international standard. Can they give birth to NTBFs? We essentially need a swimming pool to learn swimming, i.e. innovative culture.

3 Conclusion

There is no reform more urgent in India than the reform in higher and technical education. Future depends on knowledge and technological capability of men and women, rather than natural resources. A realization that universities and colleges are the main drivers of development and not driven by development, is lacking in the minds of planners. Will the Indian planners attach due importance to higher education and research and innovation in universities and colleges? Future of India depends on research and innovation in universities and colleges.

1. Key people in government, apex bodies who matter most must wake up to the challenge. They do not see the opportunities being lost, because of lack of proper steps they should take to educate and impart skills to people.
2. World is changing fast but most of our people are working with traditional skills which are no more in demand, and so they are becoming job less. Common man is suffering,
3. Many people as a result live below poverty line, rich students are going abroad for studies by paying huge sums of money. India remains a technology follower and importer.
4. Research and innovation centers, Research Parks etc. are our weak points. So as to strengthen, India must depute its hundreds and thousands of professors to similar centers in world best universities for six months period to study establishment and functioning of these centers. Association of University Research Parks is offering courses of 3-4 week duration to those who wish to start the centers. We must take advantage of these courses.
5. If research and innovation reforms are carried out India will win in globalized market, otherwise it will lose. This is a bold writing on wall.

6. Educated unemployment is a big problem, solution for which lies in installation of innovation centers and Research Parks.
7. If India succeeds in transforming some universities to world class status, then India will have better future, it will be categorized as developed nation. otherwise it will continue to remain a developing country, with low income economy.
8. World class universities and colleges are very critical to wellbeing of people. They produce globally competent leaders for professions, politics and all walks of life.
9. The IIT and NIT system of education is good for bright students and bright professors. It should not be thrust on state colleges. They should be allowed to evolve their own model with practical skills and knowledge. Focus of these colleges should be on professional practices, and innovations in them.
10. Quality of education can be enhanced to world class standard by introducing research and innovation in universities and colleges. Colleges must have to become light house for industry.
11. Impact of research on life of individuals can be huge. It is in these colleges that the impact is discussed, debated and openly tested by opposing groups.
12. If India does not create research based universities

and colleges, if industry does not synergies with academia, the colleges will be providing graduates far too low by international standard to run its national and international affairs. Indian people are then destined to lag behind in world brain race.

13. Research, innovation, and creativity is today's Guru Mantra.

14. How to produce more entrepreneurs and how to encourage more firms to grow should be the main vision and mission of universities.

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