

FICCI

Human Capital Development in India

SURVEY OF INDIA'S HIGHER EDUCATION AND OTHER INDICATORS

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Foreword

For the development of a nation and its society, three types of capital are essential - physical, financial, and human. Of these, in today's era of knowledge economy-led growth, human capital will have the greatest impact on socio-economic growth for decades to come. Developing physical capital today is a known cycle. The Government of India is leading several initiatives for strengthening financial capital via a digital-first strategy and developing the required infrastructure. Our society's efforts are now crucial in the realm of human capital development.

Every leading economy in the world is embracing knowledge economy-led growth. Where physical labour and assets characterize agrarian and industrial economies, **knowledge economies utilize information to augment goods and services rapidly. Knowledge-drivers are innovation, human capital, intellectual property, R&D, and focused creation of new specializations.** With the advent of the internet today, winning growth strategies leverage technology, data and analytics, connectivity, network effects, computation, artificial intelligence, machine learning, and other emerging forces to capture market share, destabilize incumbent institutions, and reap disproportionate gains.

Knowledge-driven fields accelerate value addition to the economy and drive GDP growth, especially in services sectors. For example, MOSPI CSO data indicates value-add of IT services is an incredible 70.6%, and that of financial services is 72%! Economies with substantial services contributions dominate global GDP – the US is a leading example. Companies built on knowledge-drivers like core IP, accelerated channel capture strategies, proprietary data, and embedded networks dominate global markets. Developing human capital to drive India's next wave of socio-economic growth is critical.

A country can truly rise when all its communities are economically empowered. Higher education is one of the most potent drivers toward economic empowerment. It unlocks new avenues for aspiring citizens to develop skills, access better employment and financial opportunities, and improve quality of life. Today, socio-economic growth is driven by the knowledge economy. The biggest benefactors of this new economy are people and countries that are focusing on human capital development.

The best indicator for India's progress in human capital development is surveying India's higher education base - enrolment, domain expertise, specialization, infrastructure, capacity, quality, equity and affordability of access, and follow-on employment opportunities. In this report, the authors study the extensive database collated by the Ministry of Human Resources Development (MHRD) - the All India Statistics on Higher Education (AISHE) reports - as well as other indicators on employment and economic growth to survey the state of India's human capital development and identify growth and focus areas.

On India's journey to a USD 5 trillion economy by 2025, and USD 10 trillion by 2030, the development of human capital is the best investment we can make today.

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Summary - Promising Progress with Room for Growth

India's higher education base is steadily growing. 3.74 crore students enrolled across India in 2018-19. Enrolment has been growing at 3.6% since 2011-12 and continues to rise. India's Gross Enrolment Ratio (GER) is only 26.3, indicating an underutilized capacity for higher education enrolment and human capital development.

The most studied fields today are arts, sciences, commerce, education and technology, and education. Enrolment in B.A. is reducing gradually whereas enrolment in B.E. and B.Tech. courses is reducing at negative 2% CAGR which is worrisome for India's scientific development. Enrolment in B.Sc., B.Com. and M.B.B.S. courses are increasing healthily, and can improve. B.Ed. enrolment is increasing at 12% CAGR; care must be taken to forecast requirements for teachers adequately and avoid over-staffing. 1.69 lakh students were enrolled in PhD programs, which amounts to only 0.45% of India's total enrollment. 5.86 lakhs were enrolled in PG programs; which amounts to 10.6% of India's total enrollment. **Building domain expertise, in both breadth and depth, is essential for our growing economy.** Policymakers must use data to forecast requirements in various domains and incentivize students to specialize accordingly. The report makes specific suggestions around follow-on employment and research opportunities.

In 2018-19, India registered 51,649 institutions of which 993 are universities and 127 are specially designated Institutes of National Importance. Today, since India's GER is low at 26.3, there is an average of 724 students/institution. Several stakeholders like FICCI in the **'Vision 2030 for Higher Education' 2013** and the **National Education Policy 2019** place India's potential to grow GER to 50 by 2030. With that target, enrolment projects to 7.24 crores where institutions would carry an average of 1400 students/institution. 1400/ institution is reasonable and indicates India has an adequate base infrastructure to support more enrolment.

While this differs vastly from state to state, on average, India has an adequate base infrastructure. We must now **focus on rapid brownfield expansion,** which is faster, productive, and more straight forward. Enhancing our current institutions and improving the quality of education and GER is the need of the hour.

A country can truly rise when all its communities and social groups are economically empowered. Higher education is one of the most potent drivers toward economic empowerment. It unlocks new avenues for aspiring citizens to develop their human capital, access better employment and financial opportunities, and improve quality of life. Today, socio-economic growth is driven by the knowledge economy and the biggest benefactors of this new economy are people and countries that are focusing on human capital development. AISHE data indicates women and social groups like SC, ST and OBC are faring well. **Women's GER, at 26.4, overtook men's GER, at 26.3, for the first time in 2018-19.** India's Gender Parity Index reached 1.0 for the first time, having risen from 0.88 in 2011-12. The status of women has dramatically increased in India. **The 2020-30 decade will see the rise of the Indian Woman; as more educated women join the workforce.**

All groups are seeing fantastic enrolment CAGRs - 6.3% (SC), 7.8% (ST), 6.3% (OBC), 7.7% (Muslims), and 7.5% (other minority communities), between 2012-13 and 2018-19. Representation from the population designated 'general merit' is regressing - enrolment decreased by four lakhs over six years at a CAGR of negative 0.5%. **NDA-II was probably responding to this decline when they instituted the 10% EWS reservation** to support low-income families in the general category. Meanwhile, enrolment proportions for the SC, ST and OBC communities in 2018-19 are close to their population composition - 14.9% enrolment against 16.6% of the population for SCs, 5.5% enrolment against 8.6% of the population

for the STs, and 36.3% enrolment against 40.9% of the population for OBCs. Towards the objectives of inclusive enrolment and coverage, affirmative action has indeed yielded results. The Government's focus on HE has benefitted previously disadvantaged classes who have developed dramatically.

The Muslim community is in the danger of being left behind. Estimated GER for the community is only 9.7 compared to the 26.3 all-India average. A special drive to increase capacity and number of schools and colleges in Muslim-dominated areas is necessary. The Central Government and State Governments where Muslims are in higher numbers must make it a mission to improve enrolment in the community. Targets to accelerate GER over the next five years must be set and executed. **The Ministry of Minority Affairs has sufficient budget of INR 4,700 crores year-on-year already allocated to implement this.** Priority to Muslims' higher education, especially women, must be executed in this budget.

A state-wise analysis of higher education indicates, on average, southern states and Maharashtra are faring well. GER, teacher-to-pupil-ratios, and number of institutions per capita are all higher than average indicating greater capacity building. States in the north-central regions and Gujarat have the potential to grow their higher education base better with focus on capacity-building and enrolment. States in the east are not doing well and need special programs to improve. Bihar, in particular, is a troubling case study in stagnation of human capital development. With increasing population growth and high fertility rates, this region must focus on human capital development otherwise it will lend up with a large young population with no employment prospects; a recipe for disaster.

A stellar education system must incorporate access to all, equity in opportunities and the highest quality of standards. For this, public-private partnerships are essential in education. Private education groups bring numerous advantages to the table - good industry partnerships, quality teachers, the ability to use funding better to set up research laboratories. Government is critical in improving the capacity of the education system and providing equity in opportunities to all students. Governments have large spending budgets to be able to do all this with ease compared to private players. On average, Government spending and institutions are low across India and must increase. In northern and eastern states, Government spending is required to build capacity. In southern states, Government spending can increase enrolment by providing assistance to students in need.

Low urbanization is arresting human capital development. Keeping India's population in villages while being unable to meet their economic and development needs has resulted in high inequity. Instead by developing 5000 towns all over India into a network of semi-urban towns connected with state-of-the-art infrastructure, we could create India's growth engine. Building industry clusters in and around these towns while placing special emphasis on higher education will enable India's youth to enrol in HE easier, and immediately find qualified jobs in industry close to them in the towns. Human capital development cannot happen in just the 5-6 major urban centres we have today; it has to be incentivized all across the country with relevant education and job opportunities.

India's population growth rates are slowing down, and our fertility rates have dropped dramatically from 3.39 in 1992 to 2.18 in 2015. This means already in 2015, we were below the average global replacement rate for emerging economies at 2.3. The number of children being born is reducing, and soon we will have an ageing population supported

by a gradually shrinking population. While our youth bulge is still active today, it is imperative that we focus on developing the human capital necessary to support a large ageing population. To do this, improving access, affordability and quality of our higher education is the biggest investment we can make today.

While preparing for our future, enrolment in higher education must go up. With the right investments and incentives, India can improve GER to 50% by 2030. Special focus is required in regions and communities with low GER; in states like Bihar and areas with high Muslim populations. Rapid brownfield expansion and consolidation of fragmented institutions into multidisciplinary universities is necessary. Special focus on staffing by forecasting requirements and ensuring quality of teachers is needed to improve the overall quality of the system. Follow-on employment opportunities in research and formal employment by building industry partnerships and understanding the needs of the industry is required so higher education graduates can apply themselves in well-qualified jobs.

Only 0.45% of enrolled students are in PhD programs; this needs to improve to increase the overall depth of specialization in India. Instituting a robust framework for effective collaboration between research, industry and academia, and incentives to conduct world-class research in India through state-of-the-art facilities, research grants and committed resources toward publishing articles in international research journals and toward filing intellectual property like patents will incentivize more students in higher education to specialize and conduct ground-breaking research in India for India. The move to build a National Research Foundation to fund long-term research projects and support our top research talent across the country must be executed immediately.

Harnessing the globalization trend by incentivizing more students to come to India to study while retaining India's talent is important; for this, several suggestions to improve quality have been made, including seeking collaborations with top foreign universities to set up satellite institutions in India. Further, our top universities have to aspire to be among the top 100 institutions around the world; for this, they must make the effort to understand the criteria of ranking systems and focus on improving areas where they score less. India's top 250 universities must be granted academic, administrative, and financial autonomy so they may innovate as required and build vibrant multidisciplinary universities that can compete with the world's best in quality.

India certainly has the potential and base infrastructure to rapidly improve its human capital. By focusing on higher education, and follow-on employment and research universities, we can quickly develop our human capital as India aims for USD 5 trillion GDP by 2025 and USD 10 trillion by 2030.

Survey of India's Higher Education

The best indicator of India's progress in human capital development is our higher education. Every year since 2011, MHRD compiles and presents data on India's higher education base through its AISHE reports - All India Statistics for Higher Education. The recently released 2018-19 report affirms India's rapid progression towards higher enrollment and inclusion. By harnessing this growth driver correctly, we can develop our human capital to accelerate economic growth.



Higher Education Base Is Steadily Climbing

Table 1 shows key growth parameters within higher education - institution base, enrolment and GER, faculty and teaching staff, and the number of graduates - for 2011-12, 2015-16, and 2018-19. The number of institutions has grown from 46,651 in 2011-12 to 51,649 in 2018-19 at a compound annual growth rate (CAGR) of 1.5%. The number of registered institutions were reported as 51,793 in 2015-16, higher than that in 2018-19. The AISHE 2017-18 report noted that institutions not responding to the survey for 2+ years were removed from the database, which could explain the downturn. There has also been an ongoing effort to weed out fraudulent institutions and staff.

Growth Parameter	2011-12	2015-16	2018-19	7yr CAGR	3yr CAGR
				Base: 2011-12	Base: 2015-16
No. of Institutions	46,651	51,793	51,649	1.5%	-0.1%
No. of Universities	642	799	993	6.4%	7.5%
Enrolment	2,91,84,331	3,45,84,781	3,73,99,388	3.6%	2.6%
GER	20.8	24.5	26.3	-	-
Faculty/Teaching Staff	12,47,453	15,18,813	14,16,299	1.8%	-2.3%
No. of Graduates	73,61,050	88,49,357	90,91,898	3.1%	0.9%
18-23 year population	14,03,17,069	14,12,90,793	14,20,78,501	0.2%	0.2%

Table 1: Growth of key higher education parameters, data from AISHE

Institutions include universities, colleges and stand-alone institutions. In 2011-12, 642 universities were registered. This number increased to 799 in 2015-16, and 993 in 2018-19. 7-year CAGR in the growth of universities is 6.4%, and 3-year CAGR is even more impressive at 7.5%, indicating the growth of universities is speeding up.

Total enrolment increased from 2.91 crores in 2011-12 to 3.46 crore in 2015-16 and 3.74 crores in 2018-19. 7-year enrolment CAGR is 3.6% which has slowed to a 3-year CAGR of 2.6%. AISHE provides a yearly estimate of the 18-23-year population in India as eligible for higher education. Gross Enrolment Ratio (GER) is calculated as the ratio of the number of enrolled students to the eligible 18-23-year population for that year. In 2011-12 the estimate for 18-23-year population was 14.03 crore, bringing the Gross Enrolment Ratio (GER) to 20.8. In 2018-19, GER rose to 26.3, with an 18-23-year population at 14.2 crores.

Today, since our GER is low at 26.3, there is an average of 724 students/institution. Estimating at a higher GER of 50.0, enrolment amounts to 7.1 crore students where institutions would carry an average of 1350 students/institution. 1350/institution is reasonable and indicates India has an adequate base infrastructure to support more enrolment. Of course, this differs vastly from state to state, and the Government must focus on building new institutions in states and regions with low capacity. State-wise differences are discussed in detail later. On average, India has an adequate base infrastructure. We must now focus on rapid brownfield expansion, which is faster, productive, and more straightforward. Enhancing our current institutions and improving the quality of education and GER is the need of the hour.

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The number of faculty and teaching staff has increased from 12.47 lakh in 2011-12 to 14.16 lakh in 2018-19, at a CAGR of 1.8%. The total number of graduates in higher education has increased from 73.6 lakh in 2011-12 to 90.9 lakh in 2018-19, at a CAGR of 3.1%. As we put efforts toward increasing enrolment, we must also focus on improving the quality and skill levels of our graduates and provide them with adequate formal job opportunities.

Education Domains

Growing economies need expertise across all domains - science and technology, finance and commerce, culture and arts, education, healthcare and doctors, law, business administration, and so on.

So, what are our higher education students studying? Table 2(a) shows enrolment in the top five fields of study – Bachelor's in Arts, Science, Commerce, Technology and Engineering, and Education – for the past five years, and Table 2(b) shows the number of graduates from the same. In 2018-19, a total of 3.74 crore students enrolled in higher education with a breakup in the top five fields of 1.09 crore (B.A. and B.A. Hons), 52.6 lakh (B.Sc. and B.Sc. Hons), 40.3 lakh (B.Com.), 37.7 lakh (B.Tech. and B.E. combined), and 12.2 lakh (B.Ed.). M.B.B.S. students made up 2.7 lakh while the remaining fields made up 1.2 crores combined.

Enrolment in higher education fields

Year	Total	B.A. (+ Hons)	B.Sc. (+ Hons)	B.Com.	B.Tech + B.E.	B.Ed.	M.B.B.S	Others
2014-15	3,42,11,637	1,10,07,937	44,87,854	37,20,115	41,67,320	7,00,785	1,66,878	99,60,748
2015-16	3,45,84,781	1,12,71,733	47,96,869	38,57,438	41,84,892	5,37,401	1,90,145	97,46,303
2016-17	3,57,05,905	1,12,36,658	52,23,984	39,91,742	40,85,759	8,37,264	2,11,366	1,01,19,132
2017-18	3,66,42,378	1,09,94,571	53,62,700	40,13,379	39,40,097	10,41,952	2,41,601	1,10,48,078
2018-19	3,73,99,388	1,09,89,083	52,63,262	40,30,325	37,69,959	12,23,858	2,67,197	1,18,55,704
5-yr CAGR	1.80%	-0.03%	3.24%	1.61%	-1.98%	11.80%	9.87%	3.54%

Table 2(a): Enrolment in top HE fields studied over the last five years, data from AISHE

In 2018-19, a total of 90.9 lakh graduated from India's higher education base, with 23.3 lakh (B.A. and B.A. Hons), 11.65 lakhs (B.Sc. and B.Sc. Hons), 9.65 lakhs (B.Com.), 8.2 lakhs (B.Tech. and B.E. combined), 5 lakh (B.Ed.), and 51k (M.B.B.S.) graduates while the remaining fields made up 32.5 lakhs combined.

Over the last five years, enrolment in B.A. and B.A. (Hons) degrees – the most widely studied field in India - is reducing by a negative 0.03% CAGR. This may indicate that as the diversity of subjects offered by India's HE base increases, India's youth is diverging from traditional pursuits of previous generations. India has produced 1.22 crore B.A. and B.A. (Hons) graduates from 2014-15 to 2018-19. Going by the gradual -0.3% decline in enrolment, the number of B.A. graduates may slowly start reducing.

Graduates/pass-outs from top higher education fields

Year	Total	B.A. (+ Hons)	B.Sc. (+ Hons)	B.Com.	B.Tech + B.E.	B.Ed.	M.B.B.S	Others
2014-15	88,28,545	25,51,758	9,41,149	8,23,882	8,10,109	5,46,774	31,474	31,23,399
2015-16	88,49,357	25,02,405	9,72,132	8,59,175	8,41,743	5,46,233	34,424	30,93,245
2016-17	89,53,086	24,90,247	11,23,442	9,48,463	8,85,592	3,99,899	35,451	30,69,992
2017-18	89,68,546	23,89,001	11,51,903	9,39,107	8,62,746	4,43,704	38,107	31,43,978
2018-19	90,91,898	23,28,093	11,65,095	9,65,856	8,18,979	5,08,332	51,283	32,54,260
5-yr total	4,46,91,432	1,22,61,504	53,53,721	45,36,483	42,19,169	24,44,942	1,90,739	1,56,84,874

Table 2(b): Number of graduates (pass-outs) in top HE fields studied over the last five years, data from AISHE

Enrolment in B.Sc. and B.Sc. (Hons) degrees is growing at 3.24% CAGR. India has produced 53.5 lakhs B.Sc. and B.Sc. (Hons) graduates from 2014-15 to 2018-19. With enrolment rising at 3.24%, the country will produce more B.Sc. graduates in the coming years. Development of scientific expertise is useful for India's innovation engine. Care must be taken to provide graduates with adequate follow-on opportunities in research and post-graduation

A worrisome trend is the negative 2% CAGR in enrollment in B.Tech. and B.E. courses over five years. Scientific and technological development is amongst the most decisive drivers of socio-economic growth, and India needs more engineers and technologists. Number of B.Tech. and B.E. graduates peaked at 8.85 lakhs in 2016-17 and declined to 8.18 lakhs in 2018-19. With -2% enrolment CAGR, an immediate focus is required to increase the number of high-quality engineering and technology graduates in India. Better quality engineering colleges and institutions are necessary; poor quality might be leading to colleges being shut down and decline in capacity and enrolment.

India needs engineering institutions at scale with increased capacity, research and laboratories, and skilled teachers. Curriculum must focus on breadth and depth and provide an interdisciplinary education. Strategies to incentivize high-potential youngsters to enroll more in these courses can include scholarships, better laboratories in school, more application-based project work, and platforms like Atal Tinkering Labs (ATL) to develop an innovation mindset in school students.

Enrolment in B.Com. is increasing at 1.6% CAGR and we have produced 45.36 lakh B.Com. graduates over five years. India is among the world's most exciting financial development sandboxes, and specialists in finance are essential. Now we must focus on introducing more graduates to out-of-the-box opportunities in FinTech and other new frontiers.

Healthcare is a significant concern for every country in the world. India, with its 130+ crore population, is building an extensive healthcare infrastructure network for its citizens; the country needs a critical mass of doctors to do so. Enrolment in M.B.B.S. has grown from 1.7 lakh in 2014-15 to 2.7 lakhs in 2018-19, at a promising 9.9% CAGR. We need to incentivize more enrolment. There have been 1.9 lakh graduates in five years, most of whom are pursuing P.G. degrees in medicine. We have to increase the capacity of not only M.B.B.S. degrees but P.G. degrees as well

B.Ed. enrolment is growing at a fast pace – 11.8% CAGR. On the other hand, M.H.R.D. data shows the number of children enrolling in school has stabilized. Census data shows the number of children aged 0-6 years peaked in 1991-2001 at 164 million and reduced to 159 million in the 2001-11 decade. Births from the Civil Registration System shows this number might fall to 156 million in the ongoing 2011-21 decade. It follows that the requirement for teachers in schools is stabilizing and will fall soon.

Table 3 shows the number of teachers across various school institution types in 2015-16, totaling to 86.9 lakhs. Pupil-Teacher Ratio (PTR) is 23 for primary, 17 for upper primary, 27 for secondary, and 37 for senior secondary. Only PTR for senior secondary is over the recommended PTR of 30. All other groups have sufficient teacher capacity. In a few years, there will not be a requirement to increase school staff in primary and middle school except to fill vacancies due to retirement of teachers. There is an urgent need to study staffing requirements and adjust B.Ed. enrolment accordingly, otherwise we may soon find that we have excess qualified teachers and no place to staff them.

Institution Type	Number of teachers	PTR
Primary	26,06,120	23
Upper Primary	26,12,347	17
Secondary	14,31,591	27
Senior Secondary	20,41,864	37
Total	86,91,922	-

Table 3: Number of teachers by institution type, and pupil-teacher ratio (PTR) in 2015-16
Data from MHRD

Specialization – PhDs and Postgraduates

Specialization is crucial for a growing economy. It enables productivity improvements in society, an increase in innovation, and the ability to produce world-class products and services domestically to, both, meet our growing needs and capture global markets.

1.69 lakh students were enrolled in Ph.D. programs in 2018-19, while 39.8 lakhs were enrolled in postgraduate programs. This amounts to 0.45% (Ph.D.) and 10.6% (PG) of total enrolment. The breakup in select fields shows 6k Ph.Ds. and 27.8k P.G.s in agriculture, 5.4k Ph.Ds. and 4.5 lakh P.G.s in commerce, 6.2k Ph.Ds. and 2 lakh P.G.s in education, 41.9k Ph.Ds. and 1.82 lakh P.G.s in engineering and technology, 2.87k Ph.Ds. and 1.97 lakh P.G.s in I.T. and computers (in addition to computer engineers in the engineering and technology category), 7.4k Ph.Ds. and 1.59 lakh P.G.s in medical sciences, and 44.7k Ph.Ds. and 5.87 lakh P.G.s in sciences.

A total of 40,813 Ph.Ds. and 15 lakhs postgraduate degrees were awarded in 2018-19, as shown in Table 4. The breakup in select fields shows 4.7k Ph.Ds. and 11.4k P.G.s in agriculture, 1.6k Ph.Ds. and 1.56 lakh P.G.s in commerce, 2.2k Ph.Ds. and 93.2k P.G.s in education, 7.2k Ph.Ds. and 74k P.G.s in engineering and technology, 500 Ph.Ds. and 71.2k P.G.s in I.T. and computers (in addition to computer engineers in the engineering and technology category), 1.6k Ph.Ds. and 48.3k P.G.s in medical sciences, and 10k Ph.Ds. and 2.3 lakhs P.G.s in sciences.

Field	Ph.D.		Postgraduate	
	Enrolled	Graduated	Enrolled	Graduated
Agriculture	6,056	4,692	27,805	11,445
Commerce	5,351	1,560	4,50,333	1,56,407
Education	6,200	2,221	2,09,336	93,264
Engineering/Tech	41,869	7,160	1,82,187	74,076
IT and Computers	2,865	499	1,97,049	71,157
Medical Sciences	7,473	1,606	1,59,250	48,246
Science	44,702	10,023	5,87,592	2,30,833
Total	1,69,170	40,813	39,75,286	15,00,064

Table 4: Ph.D. and post-graduate degree graduates in select fields in 2018-19, data from AISHE

India needs more quality researchers with Ph.Ds. to lead research and innovation efforts across several disciplines. Agriculture innovation will be an essential factor in India's reorganization of sectoral workforces; Commerce, in India's financial infrastructure development strategies; Education, in determining new ways to educate, upskill, and enable continuous learning; Medical sciences, as we re-engineer our healthcare delivery; Scientific and technological development, and others. The low number in I.T. and Computers is troubling; with the world's advancements in artificial intelligence, machine learning, quantum computing, data analytics, and others related to I.T. and Computers, we need to be more aggressive in this field.others related to I.T. and Computers, we need to be more aggressive in this field.

India must study domestic and global scenarios to understand domains that will be valuable going forward and invest in building competencies there. China has set a great example in the realm of quantum computing and artificial intelligence. With in-depth investment strategies and incentives for their top talent, China is surpassing even the United States in this field. If India doesn't start investing in domain expertise, we risk being left behind in the new world.

Institutes of National Importance

Under the Universities umbrella, some higher education institutes are given a special place of National Importance (INI). INIs include the Indian Institutes of Technology (IIT), the National Institutes of Technology (NIT), the All India Institutes of Medical Sciences (AIIMS), the National Institutes of Design (NID), the Indian Institutes of Information Technology (IIIT), among others. In 2017, GoI declared Indian Institutes of Management (IIM) as INIs as well.

INIs are considered top-quality higher education institutions in India and hold some of the most competitive entrance exams in the world. Graduates from these institutions have long been recognized as some of the most valuable hires globally. AISHE 2018-19 indicates there are 127 INIs across the country. States with the highest number of INIs are Andhra Pradesh (9), Uttar Pradesh (9), Madhya Pradesh (8), Tamil Nadu (7), West Bengal (7), Kerala (6), and Maharashtra (6).

Year	Enrolment in INIs				Number of Institutions
	Ph.D.	Post Graduate	Under Graduate	Total	
2018-19	31,706	50,201	1,23,460	2,28,431	127
2016-17	26,012	41,330	1,13,685	1,96,664	100
2014-15	22,342	41,261	1,07,789	1,86,966	75
2012-13	14,227	37,106	81,402	1,42,551	62
CAGR	14.3%	5.2%	7.2%	8.2%	12.7%

Table 5: Enrolment in INIs, data from AISHE

The number of INIs has been increasing at a 6-yr CAGR of 12.7%; grew from 62 in 2012-13 to 127 in 2018-19. All of these are not newly built institutions and include existing institutions newly declared as INIs. By consolidating and improving the caliber of our top institutions, this is a great move to increase capacity in our best institutions.

Total enrolment in INIs across the country was 2.3 lakhs in 2018-19, which is 0.61% of all-India HE enrolment. Men constituted 1.74 lakh while women constituted 54.6k students - only 23.8% which is less than half the enrolment percentage of women for all-India HE at 48.6%.

Enrolment in INIs is increasing across all levels. Ph.D. enrolment rose at 14.3% CAGR from 14.2k in 2012-13 to 31.7k in 2018-19. In the same period, enrolment of PGs went from 37.1k to 50.2k at 5.2% CAGR, and enrolment of UGs went from 81.4k to 1.23 lakh at 7.2% CAGR. Total enrolment in INIs rose 8.2% CAGR from 1.42 lakh to 2.3 lakhs. INIs together employ 14k teachers. Focusing on expansion while retaining quality in INIs will improve access to high-quality education to the country's brightest.

Driving India's Enrolment Ratios

Enrolment in higher education (HE) rose from 2.91 crores in 2011-12 to 3.74 crore in 2018-19 at a 7-yr CAGR of 3.6%. With 3.6% CAGR, enrolment is projected to be 5.5 crores in 2029-30. In the same period, the 18-23-year population grew from 14 crores to 14.2 crores at a CAGR of 0.2%, which projects to 14.5 crores in 2029-30. Accordingly, the Gross Enrolment Ratio (GER) rose from 20.8 to 26.3. With these projections, GER will only rise to 38.1, as shown in Table 6. India must focus on increasing enrolment.

GER Projection to 2030

Growth Parameter	2011-12	2018-19	7yr CAGR Base: 2011-12	2029-30 Projected	2029-30 Accelerated
Enrolment	2,91,84,331	3,73,99,388	3.6%	5,52,24,340	7,24,45,623 (CAGR @ 6.2%)
18-23 year population	14,03,17,069	14,20,78,501	0.2%	14,48,91,247	14,48,91,247
GER	20.8	26.3	-	38.1	50.0

Table 6: Projection of GER to 2030, data from AISHE, projections by authors

FICCI report on **'Vision 2030 for Higher Education' 2013** places India's potential to grow GER to 50 by 2030. With this vision, we can back-calculate what enrolment looks like in 2030. At an enrolment ratio of 50% and the eligible 18-23-year population at 14.5 crores, enrolment in HE will be 7.24 crores. Enrolment must grow at 6.2% CAGR starting now to arrive at 7.24 crores in 2030, which is 2.6 percentage points higher than the current 3.6% growth rate.

Today we have 51,649 institutions. Since our GER is low at 26.3, there is an average of 724 students/institution. At the projected 50 GER and 7.24 crore students enrolled in 2030, if we retain the 51,649 institutions, that amounts to 1400 students/institution. With the right kind of management, 1400 students/institution is reasonable and indicates India has an adequate base infrastructure to support more enrolment. We must now focus on rapid brownfield expansion, which is easier, quicker and more effective. **The need of the hour is to expand and enhance our current institutions and improve the quality of education and GER.**

Formal Employment Opportunities for Graduates

While India is yet to create a comprehensive database for estimating formal employment, the Employees' Provident Fund Organization (EPFO) serves as a useful starting point. EPFO is a national organization applicable to entities employing 20+ people across 190 industry classifications. New employment is recorded every month upon payment of contribution and classified by age group, industry and state. EPFO has been publishing monthly reports, with disaggregated data from Sep 2017.

EPFO's methodology was recently rectified. In the old MOSPI format, subtraction of exiting employees included those that had joined before the FY started instead of only those who had registered in the FY. **The methodology was revised to count the number of exits, as well as those who rejoined in the same FY, correctly.** Accounting for people who joined and then exited, and in some cases rejoined in the same FY, **the net number of new subscribers is 1.12 crore** - representing the net number of people who got a new job during the year.

Age	Net New EPF Subscribers
< 18	1,01,851
18-21	27,77,760
22-25	28,63,278
26-28	13,86,142
29-35	19,99,329
35+	21,21,854
Total	1,12,50,214
Exc. Formalization	1,00,32,534
Old MOSPI format total	61,12,223
EPFO 18-28 total	70,27,180
2017-18 graduates	**89,68,546**
Coverage ratio	78.35%

Table 7: Correlating EPFO new employment data in 2018-19 to graduation data in 2017-18
Data from AISHE and EPFO

On crossing the 20-employee mark, an applicable entity is inducted into EPFO. One criticism is that EPFO does not indicate new jobs but only formalization because existing employees are inducted in this manner. This criticism doesn't hold because we can easily account for this. 60,884 establishments remitted their first electronic challan (ECR) in 2018-19; factoring this by 20 gives us 12.17 lakh new subscribers which are existing employees getting formalized. Subtracting 12.17 lakh from the net number yields just over one crore new jobs (Table 7). Further, new employees over the 20-employee minimum of existing entities count as new jobs.

Of 1.12 crore (Table 7), the highest number is 28.6 lakh in the age bracket of 22-25. A very close second is 27.8 lakh in the 18-21 bracket. In the below-18-years group, the record is 1.01 lakh. The sum of net new subscribers in these three groups, till age 25, is 57.4 lakh. Census data shows over the last 30 years, 2.5 crore babies were born every year on average. With approximately 2.5 crore people attaining the age of 21 every year, of which let us assume 60% look for employment, across levels of education – we arrive at 1.5 crores needing jobs incrementally every year. With a total of 42.5 lakh new subscribers in the 22-28 age bracket, we can correlate the number of pass-outs from college who enter the job market. A majority in the 18-25 category could have either graduated from high school or progressed substantially in higher education. The 26-28 age bracket recorded 13.9 lakh new subscribers who could either have post-graduate degrees or maybe took a break and started a second job.

In 2018-19, EPFO recorded 70.3 lakh new jobs in the 18-28 age bracket. In 2017-18, 89.7 lakh higher education graduates who are potentially incoming to the job market were recorded. Assuming that most of the new jobs recorded in the 18-28 age bracket were taken up by HE graduates, the **coverage ratio of graduates getting formal jobs is 78.35% average across India.** This is a rough estimate since these new jobs could also include those taken up by high school graduates, especially in the 18-21 age bracket. Policymakers must start mapping HE graduates to formal employment databases like EPFO to get accurate coverage ratios. Connecting these extensive databases will help immensely in policy planning to increase employment capacity.

Social Equity

A country can truly rise when all its communities and social groups are economically empowered. Higher education is one of the most potent drivers toward economic empowerment. It unlocks new avenues for aspiring citizens to develop their human capital, access better employment and financial opportunities, and improve quality of life. Today, socio-economic growth is driven by the knowledge economy and the biggest benefactors of this new economy are people and countries that are focusing on human capital development. We can understand how India's various social groups – women, traditionally disadvantaged groups like SC, ST and OBC, and minorities – are faring through the data in the AISHE reports.



Women's Enrolment Is Rising Fast

Total enrolment in higher education (HE) in 2018-19 was 3.74 crore, with 1.92 crore men and 1.82 crore women, as shown in Table 8(a). Since 2011-12, enrolment has increased by 82.2 lakh at 3.6% CAGR, with 30.4 lakh men at 2.5% CAGR and 51.8 lakh women at an incredible 4.9% CAGR. Women enrolment is rising faster, demonstrating that women are increasingly turning toward HE with clearer aspirations.

Enrolment	2011-12	2015-16	2018-19	7yr CAGR	3yr CAGR
				Base: 2011-12a	Base: 2015-16
Total	2,91,84,331	3,45,84,781	3,73,99,388	3.6%	2.6%
Male	1,61,73,473	1,85,94,723	1,92,09,888	2.5%	1.1%
Female	1,30,10,858	1,59,90,058	1,81,89,500	4.9%	4.4%
% Female	44.6%	46.2%	48.6%	-	-

Table 8(a): Higher education enrolment across male and female categories, data from AISHE

Male enrolment has slowed from a 7-year CAGR of 2.5% to a 3-year CAGR of 1.1%. **Between 2017-18 and 2018-19, male enrolment only moved by 5,000 whereas women enrolment rose by 7.5 lakh.** Women enrolment has also slowed from a 7-year CAGR of 4.9% to a 3-year CAGR of 4.4% but is nevertheless encouraging. Women are now 48.6% of enrolled students, up from 44.6% in 2011-12. This is not the case in India's top Institutes of National Importance (INI) though – Of the total 2.3 lakhs enrolled in INIs, men constituted 1.74 lakh while women constituted 54.6k students - only 23.8% which is less than half the enrolment percentage of women for all-India HE at 48.6%. There is need to drive women's enrolment in these institutions as well.

India's Gender Parity Index reached 1.0 for the first time, having risen from 0.88 in 2011-12 as shown in Table 8(b). Female Gross Enrolment Ratio (GER) jumped from 19.4 in 2011-12 to 25.4 in 2017-18 and then by another whole point in 2018-19 to 26.4. **This is the first year that the all-India female GER has risen above male GER, which stagnated at 26.3.**

How is it that even though women enrolment in absolute numbers is lesser than men enrolment, female GER is higher? GER is calculated as the ratio of students enrolled to those in the eligible 18-23 age bracket – in which there are fewer women, also at 48.6%, than men. Interestingly, in the seven years between 2011-12 and 2018-19, the number of women in the eligible 18-23 age population increased from 6.7 crores to 6.9 crores. In contrast, the number of men decreased from 7.33 crore to 7.3 crores. These dynamics, combined with the rapid increase in women enrolment, is yielding a female GER that is overtaking male GER. **The 2020-30 decade will see the rise of the Indian Woman;** as more educated women join the workforce.

GER	2011-12	2015-16	2018-19
Total	20.8	24.5	26.3
Male	22.1	25.4	26.3
Female	19.4	23.5	26.4
Gender Parity Index	0.88	0.92	1.00

Table 8(b): GER across male and female categories, data from AISHE

The status of women has dramatically increased in India. At the time of Independence, policymakers did not focus on educating women. As a result, household income and India's GDP did not grow as much as it could have. Contrast this with China - with the establishment of the People's Republic of China in 1949, Chairman Mao famously said, 'Women hold up half the sky' and instituted strict policies to educate women. The result is evident today in women's workforce participation, and contribution to China's GDP and outstanding rise as a Top 2 economy. With India's women pursuing higher education in larger numbers, they must be empowered to contribute to the nation's growth. It is opportune for **India to leverage this economic multiplier to its GDP as it sets course to the USD 10 trillion mark.**

The need of the hour today is to provide the educated population with quality employment prospects. These must include incentives for the participation and traction of women in the workforce. Many women in India are primary caregivers of their children and other family members. Employment policies must take these constraints into account so women can have the flexibility to work around their schedules. **Otherwise, well-educated women will have no option but to drop out of the workforce**, which is a loss for everyone - from the individual to her family to the nation.

Fertility survey data indicates there will be fewer young people twenty years from now. This will result in India's workforce shrinking rapidly while supporting an ageing population. **Instead, if more women are incentivized to work, they will contribute to society and the GDP for a long time,** especially given that Indian lifespans and general wellbeing are also increasing. everyone - from the individual to her family to the nation.

Labour Force Participation

Periodic Labour Force Survey (PLFS) 2017-18 reported labour force participation rate (LFPR) in the 15-29 age group as 16.4% for women and 58.8% for men; down from 24.4% and 63.6% respectively in 2011-12. By extrapolating AISHE data for the 18-23 age population to the 15-29 bracket (with a factor of three to adjust for the 5- to 15-year window), we arrive at rough estimates of the 15-29 population for 2011-12 and 2017-18 as shown in Table 9. The corresponding LFPR indicate that approximately 14 crore men and 4.9 crore women were in the workforce in 2011-12, which dropped to 12.9 crores and 3.4 crores respectively in 2017-18 – a drop of 1.09 crore men and 1.52 crore women. In the same period, AISHE data shows college enrolment rising from 1.62 crore men and 1.3 crore women in 2011-12 to 1.92 crore men and 1.74 crore women in 2017-18 – an increase of 30.3 lakh men and 44.3 lakh women.

Population, workforce and HE enrolment (in lakhs)

Year	LFPR (15-29 years)		(18-23) age population		Estimated workforce in 15-29 bracket*		AISHE enrolment	
	Men	Women	Men	Women	Men	Women	Men	Women
2011-12	63.6%	24.4%	733.33	669.84	1,399.20	490.32	161.73	130.11
2017-18	58.8%	16.4%	731.21	687.08	1,289.86	338.04	192.05	174.38
Delta	-	-	-2.12	17.24	-109.34	-152.28	30.31	44.27

Table 9: Correlation of workforce to higher education enrolment, data from PLFS, AISHE (* calculated by authors as LFPR x (18-23) popn. x 3)

PLFS must consider that the 15-29 years' workforce could have seemingly shrunk because more are in school and college. In the 18-23 bracket alone, AISHE data demonstrate increased enrollment year-on-year in colleges. MHRD data shows enrolment in secondary school and pre-university is also growing, which means more children in the 15-18 age bracket are in school. Putting the two together, more than half of the 15-29 age bracket surveyed by PLFS is increasingly in school/college, which could account for the perceived drop in workforce participation. Secondly, after receiving an education, many women do not get employment opportunities in their home states. On average, men are more mobile than women and can move elsewhere in search of skilled work. Both these counts could explain the increase in unemployment rates among women as reported by PLFS. Today, PLFS is only conducted across 1.02 lakh households; there is a need to expand the sample size while also considering education as a factor for perceived non-participation in the workforce

Social Groups Faring Well in Higher Education

The recently released AISHE 2018-19 report indicates tremendous change among all communities except for those designated 'general merit'. Table 10 shows the compound annual growth rates (CAGR) of enrolment in different communities are 6.3% (SC), 7.8% (ST), 6.3% (OBC), 7.7% (Muslims), and 7.5% (other minority communities), between 2012-13 and 2018-19.

Community	AISHE 2018-19 (lakh)		Population %	AISHE 2012-13 (lakh)		HE Enrolment 6-yr CAGR
	Enrolment	% of total	Census 2011	Enrolment	% of total	
SC	55.67	14.9%	16.6%	38.48	12.8%	6.3%
ST	20.68	5.5%	8.6%	13.2	4.4%	7.8%
OBC	135.92	36.3%	40.9%*	94.16	31.2%	6.3%
Muslims	19.59	5.2%	14.2%	12.52	4.2%	7.7%
Other Minorities	8.68	2.3%	6.0%	5.64	1.9%	7.5%
General Merit	133.45	35.7%	13.6%	137.52	45.6%	-0.5%
All	373.99	100.0%	100.0%	301.52	100.0%	3.7%

Table 10: Population data from census 2011, * from NSSO, HE data from AISHE

Representation from the population designated 'general merit' is regressing. Between 2012-13 and 2018-19, other groups increased by 17.2 lakh (SC), 7.5 lakh (ST), 41.8 lakh (OBC), and 10.1 lakh (minorities). 'General merit' enrolment decreased by four lakhs – from 45.6% representation to 35.7% in six years – at a CAGR of negative 0.5%. **NDA-II was probably responding to this decline when they instituted the 10% EWS reservation** to support low-income families in the general category.

Table 10 also compares population distribution with enrolment in HE. The 2011 census provides the composition of all groups except OBCs, which we obtain from NSSO. The upcoming 2021 census will provide updates. Enrolment proportions for the SC, ST and OBC communities in 2018-19 are close to their population composition –

For the SC community, enrolment went up from 12.8% in 2012-13 to 14.9% enrolment against 16.6% of the population; remarkably close
For the ST community, enrolment went up from 4.4% in 2012-13 to 5.5% enrolment against 8.6% of the population; this, too, is quite close
For the OBC community, enrolment went up from 31.2% in 2012-13 to 36.3% enrolment against 40.9% of the population; close, as well

Towards the objectives of inclusive enrolment and coverage, affirmative action has indeed yielded results. The Government's focus on HE has benefitted previously disadvantaged classes who have developed dramatically.

Minorities, however, have not demonstrated the same progress. Minorities constitute 20.2% of India's population but only 7.5% in HE enrolment. AISHE only tracks Muslims separately, who represent 5.2% of HE enrolment against 14.2% of the population. All other designated minority religions are jointly categorized - Christians, Sikhs, Jains, Buddhists, and others – and are collectively at 2.3% of total enrolment against 6% of the population. The upcoming 2021 census will inform us of the latest composition

Impact of Education and Literacy on Fertility and Population Growth Rates

Education impacts access to employment opportunities, quality of life, development of human capital, and the ability to uplift communities. Education and literacy, especially women's, have a significant impact on population growth and fertility rates as well.

Table 11 shows data from the National Fertility and Health Survey – 4 (NFHS-4) which indicates that in the period between NFHS-3 (2003-05) and NFHS-4 (2013-15) with a 10-year gap, literacy rates for women went up from 55.1% to 68.4%, a jump of 24%. In that same period, India's Total Fertility Rate (TFR) dropped 18.7% from 2.68 to 2.18. This is consistent with the population dynamics of most big countries around the world wherein as more women become literate and educated, fertility rates and population growth rates slow down.

This inverse dynamic of literacy and TFR are evident across all Indian communities, as seen in Table 11, but at different rates. The Muslim community had the highest TFR in 2003-05, at 3.4, and experienced one of the steepest drops at 23% to 2.62 in 2013-15. This correlated with the largest increase in women's literacy over the same period – 30%, from 49.5% in 2003-05 (the lowest) to 64.2% in 2013-15. Other communities, too, experienced steep drops in TFR but given that the Muslim community had the highest fertility rate, by far, the impact is greater. Higher education of the Muslim community, especially among women, will take this progress further.

Literacy (Percentage of population)

Survey Period	NFHS-3 (2003-05)		NFHS-4 (2013-15)		% Increase in 10 years	
Community	Male	Female	Male	Female	Male	Female
Hindu	78.9	54.9	86.4	68.3	9.5%	24.4%
Muslim	70.2	49.5	80.3	64.2	14.4%	29.7%
Christian	84.6	75.9	89.4	80.8	5.7%	6.5%
Sikh	83.6	71.9	88.3	81.1	5.6%	12.8%
Buddhist / Neo-Buddhist	87.3	63.9	94.2	81.1	7.9%	26.9%
Jain	99.6	97.1	97.1	97.5	-2.5%	0.4%
All-India	78.1	55.1	85.7	68.4	9.7%	24.1%

Table 11(a): Increase in literacy amongst Indian communities between 2005 and 2015, data from NFHS-4

Total Fertility Rate (TFR)

Survey Period	NFHS-3 (2003-05)	NFHS-4 a (2013-15)	Survey Period
Hindu	2.59	2.13	17.8%
Muslim	3.4	2.62	22.9%
Christian	2.34	1.99	15.0%
Sikh	1.95	1.58	19.0%
Buddhist / Neo-Buddhist	2.25	1.74	22.7%
Jain	1.54	1.2	22.1%
All-India	2.68	2.18	18.7%

Table 11(b): Decrease in fertility rates amongst Indian communities between 2005 and 2015, data from NFHS-4

The Minority Report

Table 12 shows enrolment of minorities in HE, with details for the Muslim community and Other Minority communities separated as well as across gender. Enrolment of Muslim women in higher education rose faster than men's between 2012-13 and 2018-19 – 8.7% vs 6.9%. Total enrolment increased from 5.85 lakh to 9.66 lakh for women and 6.67 lakh to 9.93 lakh for men, almost normalizing. In the 'Other Minorities' communities combined, women lead men in enrolment – 4.71 lakh vs 3.97 lakh in 2018-19. As analysed previously, it seems women across all communities are enrolling in larger numbers with clear aspirations. Now growth rates must accelerate to improve Gross Enrolment Ratios (GER) within communities.

Year	Muslim Enrolment (in lakh)			Other Minorities (in lakh)		
	Male	Female	Total	Male	Female	Total
2018-19	9.93	9.66	19.59	3.97	4.71	8.68
% of total	5.2%	5.3%	5.2%	2.1%	2.6%	2.3%
2012-13	6.67	5.85	12.52	2.53	3.12	5.64
% of total	4.0%	4.3%	4.2%	1.5%	2.3%	1.9%
CAGR	6.9%	8.7%	7.8%	7.8%	7.1%	7.4%

Table 12: HE enrolment amongst minority communities, data from AISHE

Focus on Muslim-Dominated Areas

For rapid improvement of human capital development amongst the Muslim community, it will help to focus on areas with larger populations. Table 13 shows the five states with the highest number of Muslims along with erstwhile J&K, which had a Muslim majority population at 68.3%. Uttar Pradesh is first with 3.84 crore Muslims at 19.3% of its population. These six states together have 11.3 crores Muslims, 66% of the India total. This data is per 2011 census; the upcoming 2021 census will provide an update.

GER is an excellent indication of human capital development within a community. Since AISHE does not provide GER estimations for Muslims and other minority communities, the authors have made estimations. Muslim GER was calculated using census 2011 compositions in each state, and the eligible 18-23 years population and number of Muslims enrolled from AISHE. **In all six states and India total, there is a stark difference between the overall GER and estimated Muslim GER.** For example, Uttar Pradesh's GER is 25.8, but estimated Muslim GER is only 6.6. Surprisingly, even J&K being a Muslim-majority state has a low Muslim GER, 18.1, compared to the state GER of 30.9. It speaks volumes of the failure of the state to provide adequate opportunities for development to its citizens.

State	Census 2011 Population (lakh)			AISHE 2018-19 (lakh)			Muslims in HE Estimation (lakhs)*		AISHE
	Muslim Population	% of Total	18-23 yr popn.	Total Enrolled	Muslims Enrolled	% of Total	18-23 yr popn.	GER	State GER
UP	384.8	19.3%	250.9	64.7	3.2	4.9%	48.3	6.6	25.8
WB	246.5	27.0%	108.5	21.0	2.3	11.1%	29.3	7.9	19.3
Bihar	175.6	16.9%	118.1	16.1	1.5	9.4%	19.9	7.6	13.6
MH	129.7	11.5%	132.3	42.3	1.5	3.6%	15.3	10.0	32
Assam	106.8	34.2%	37.4	7.0	1.0	13.9%	12.8	7.6	18.7
J&K	85.7	68.3%	12.8	3.9	1.6	40.0%	8.7	18.1	30.9
Sub-total	1,129.1	-	660.2	155.0	11.1	7.2%	134.4	8.3	-
All India	1,719.4	14.2%	1,420.8	374.0	19.6	5.2%	201.8	9.7	26.3

Table 13: Population data from census 2011, HE data from AISHE, * denotes estimations by authors

Low GER amongst the Muslim community across India, at 9.7, indicates the need for a different approach. A special drive to increase capacity and number of schools and colleges in Muslim-dominated areas is necessary. Further, focused training toward competitive exams for government jobs and skill development programs such as NSDC will provide opportunities for educated Muslims to utilize their skills in the workforce. The Central Government and State Governments where Muslims are in higher numbers must make it a mission to improve enrolment in the community. Targets to accelerate GER over the next five years must be set and executed. T**he Ministry of Minority Affairs has sufficient budget of INR 4,700 crores year-on-year already allocated to implement this.** Priority to Muslims' higher education, especially women, must be executed in this budget.

The Muslim community must take charge of improving their human capital. When other groups like SC/ST/OBCs have demonstrated such rapid improvement, there is no reason the Muslim community cannot. In this world where the velocity of change is unprecedented due to technology, the internet and other drivers, every community must focus on its human capital development. The Indian Muslim community must utilize every advantage they possess to ensure their children are not left behind in this new world dynamic. Focusing on higher education is one of those compelling advantages.

How Are India's States Faring?

India is an incredibly diverse country with high variance across economic indicators – state GDP, per-capita income, fertility and population growth rates, urbanization, and education and skill development. In this report we pick representative states in the North-Central, East, South, and West zones in the country to analyze their higher education base and human capital development in detail.



Higher Education Snapshot 2018-19

A snapshot of the HE bases across representative states in the four zones are shown in Table 14, with leading indicators in 2018-19 – total enrolment, GER, number of graduates, number of teaching staff, pupil-teacher ratio (PTR), and number of institutions and universities.

Zones	Enrolment	GER	Graduates	Teachers	Pupil-Teacher Ratio	Number of Institutions	Number of Universities
North-Central							
Uttar Pradesh	64,69,367	25.8	15,29,193	1,41,839	46	8,077	79
Rajasthan	20,84,413	23.0	6,42,288	71,088	29	3,723	83
Madhya Pradesh	19,29,344	21.5	5,98,971	59,185	33	2,595	65
Punjab	9,19,576	29.5	2,35,194	51,575	18	1,493	32
East							
Jharkhand	7,39,484	19.1	1,67,887	12,366	60	415	25
Odisha	10,19,192	22.1	2,29,708	38,097	27	1,462	28
Bihar	16,07,008	13.6	3,81,228	26,450	61	1,023	33
West Bengal	20,97,410	19.3	3,92,362	60,076	35	1,872	45
South							
Tamil Nadu	34,14,196	49.0	8,64,455	1,95,993	17	3,443	59
Andhra Pradesh	17,60,830	32.4	3,95,995	99,398	18	3,540	41
Telangana	14,26,461	36.2	3,20,038	80,318	18	2,515	24
Karnataka	19,88,494	28.8	5,29,026	1,33,337	15	5,028	65
West							
Maharashtra	42,30,326	32.0	9,48,142	1,58,939	27	6,662	62
Gujarat	14,78,052	20.4	3,68,849	57,529	26	2,634	72
All-India	3,73,99,388	26.3	90,91,898	14,16,299	26	51,649	993

Table 14: Snapshot of states' HE bases in 2018-19 across indicators like enrolment, GER, number of graduates, teachers, institutions and PTR, data from AISHE

Uttar Pradesh's higher education base tops the country, by far, in enrolment, number of graduates, and number of institutions. The state accounts for 17.3% of India's enrolled students (64.7 lakh of 3.74 crore), 16.8% of graduates (15.3 lakh of 90.9 lakh), and 15.6% of HE institutions (8,077 of 51,649). Maharashtra comes next with 11.3% of India's enrolled students (42.3 lakh of 3.74 crore), 10.4% of graduates (9.5 lakh of 90.9 lakh), and 12.9% of HE institutions (6,662 of 51,649). Tamil Nadu comes in third with 9.1% of India's enrolled students (34.1 lakh of 3.74 crore), 9.5% of graduates (8.6 lakh of 90.9 lakh), and 6.7% of HE institutions (3,443 of 51,649).

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Rajasthan has the highest number of universities, 83, followed by Uttar Pradesh at 79 and Gujarat at 72. Karnataka and Madhya Pradesh follow at 65 each, with Maharashtra next at 62. The National Education Policy 2019 recommends the consolidation of fragmented institutions into multidisciplinary universities of 3000+ students. States with active university systems can quickly grow them into large multidisciplinary universities. Telangana has the smallest number among the large states, at 24, but since it is a new state and all other indicators are above average, no doubt the state will rally quickly. Eastern states like Jharkhand at 25, Odisha at 28, and Bihar at 33, must start focusing on building university systems quickly to improve access and enrolment ratios.

In terms of GER, Tamil Nadu by far leads the country with 49.0. No other big state has even crossed 40.0 in 2018-19. In general, all southern states including Maharashtra have good GERs above the all-India average. Karnataka, at 28.8, is the only laggard below 30. GER is calculated as the ratio of the number of enrolled students to the eligible 18-23-year population. As discussed in detail later, southern states have substantial enrolment numbers as well as lower 18-23-year populations compared to northern states, both of which contribute to higher GERs.

All the states in the north-central-east zones, and Gujarat in the west, have GERs below 30. Given its large population, Uttar Pradesh has an impressive GER of 25.9, tracking very close to the all-India average of 26.3. Punjab, at 29.5, is the only northern state above the all-India average and impressively close to 30. Unfortunately, eastern states like Bihar, Jharkhand, and West Bengal have not crossed GER of 20. Eastern states also have very low number of institutions, which contributes to low enrolment, and indicates lack of drive to develop human capital. Immediate planning is required to bring GERs in these states to at least the all-India average of 26.3

Tamil Nadu leads by teaching staff as well, with 1.95 lakh, followed by Maharashtra with 1.58 lakh, Uttar Pradesh with 1.41 lakh, and Karnataka with 1.33 lakh. These are the only states with lakh+ teaching staff base in HE. Andhra Pradesh comes close with 99.4k. Southern states have impressive average pupil-teacher ratios (PTR) of below 20, led by Karnataka at 15 and Tamil Nadu at 17.

On the other end, eastern states like Jharkhand and Bihar have absurdly high PTR of 60+. Uttar Pradesh comes next at 46, but given the large population and enrolment base, the state is showing promising results compared to other population-dense states like Bihar and Jharkhand. States with moderate PTRs are Gujarat (26), Maharashtra (27), Odisha (27), and Rajasthan (29). Of these, Maharashtra is the only state that has moderate PTR despite having a great teaching base because its enrolment base is also large. The other three – Gujarat, Odisha, and Rajasthan – have moderate PTRs because their enrolment base is lower than average as indicated by low GERs and their teaching base is also low. Intensive effort to improve both must commence soon.

Gender, Enrolment and Growth

Total enrolment in India grew from 2.91 crore in 2011-12 to 3.74 crore in 2018-19 at 3.6% CAGR. As discussed earlier, women enrolment is galloping at 4.9% CAGR, and this paradigm is reflected in all the representative states but at different rates, as seen in Table 15. The biggest difference in enrollment CAGRs of genders is in the north-central zone - in Rajasthan and Madhya Pradesh, the enrolment CAGRs differ by a whopping 5 points. The difference is more moderate in Uttar Pradesh and Punjab but clear, nevertheless. Moreover, in both Uttar Pradesh and Punjab, number of women enrolled exceeds men's enrolment.

Jharkhand is reporting the highest CAGRs across India for both genders – 10.4% for men and 11.7% for women. Odisha has almost the same CAGR for both – 3.87% and 3.81%. Irrespective of how bleak Bihar's HE base seems to be, women's enrolment at 3.9% is higher than men's enrolment at 2.3%. This indicates that India has now progressed to an era where all citizens understand the potential of higher education as an aspirational lever.

Enrolment (lakhs)

Zones	2011-12			2018-19			7-yr CAGR		
	M	F	T	M	F	T	M	F	T
North-Central									
Uttar Pradesh	22.47	18.77	41.24	31.90	32.80	64.69	5.13%	8.30%	6.64%
Rajasthan	9.00	6.06	15.06	10.82	10.02	20.84	2.67%	7.44%	4.75%
Madhya Pradesh	10.02	5.83	15.85	10.28	9.02	19.29	0.37%	6.42%	2.85%
Punjab	4.15	3.71	7.86	4.37	4.83	9.20	0.74%	3.83%	2.27%
East									
Jharkhand	1.89	1.67	3.56	3.78	3.62	7.39	10.37%	11.71%	11.01%
Odisha	4.28	3.55	7.83	5.58	4.61	10.19	3.87%	3.81%	3.84%
Bihar	7.84	5.24	13.09	9.20	6.87	16.07	2.31%	3.93%	2.98%
West Bengal	8.56	6.41	14.97	10.57	10.41	20.97	3.05%	7.17%	4.94%
South									
Tamil Nadu	16.75	14.30	31.05	17.37	16.77	34.14	0.52%	2.30%	1.37%
Andhra Pradesh*	8.96	6.78	15.75	9.65	7.96	17.61	1.24%	2.70%	1.88%
Telangana*	7.73	6.09	13.82	7.01	7.25	14.26	-1.61%	2.95%	0.53%
Karnataka	9.48	8.13	17.61	9.93	9.95	19.88	0.67%	2.93%	1.75%
West									
Maharashtra	20.14	15.32	35.46	23.24	19.06	42.30	2.07%	3.17%	2.55%
Gujarat	6.85	4.90	11.75	8.33	6.45	14.78	2.83%	4.01%	3.34%
All-India	161.73	130.11	291.84	192.10	181.90	373.99	2.49%	4.90%	3.61%

Table 15: Total enrolment across genders in representative states for 2011-12 and 2018-19, data from AISHE
[* data from 2012-13 used for AP and Telangana instead of 2011-12, CAGR adjusted accordingly]

In the southern states as well, female enrolment CAGRs are higher than male. All the female enrolment CAGRs are below 3% whereas male enrolment CAGRs are below 1.25%. Karnataka and Telangana have more women enrolled than men. Telangana has a negative 1.6% male enrolment CAGR. It seems like enrolment in southern states is stabilizing, and a look at GERs across the states will allow us to analyze trends further.

Western states have higher enrolment CAGRs than southern states, for both men and women. Here too, women's enrolment CAGR's are higher than men, consistent with the rest of the country.

GER and Gender Parity

India's GER grew from 20.8 in 2011-12 to 26.3 in 2018-19, as shown in Table 16. In the same time period, male GER moved from 22.1 to 26.3 while female GER grew from 19.4 to 26.4 – overtaking male GER for the first time. This clearly indicates aspirations of women are on the rise. All-India gender parity index (GPI) reached 1.0 for the first time, rising from 0.88 in 2011-12. These trends of female GER rising faster than male GER and GPI normalizing are reflected across most states as well.

Zones	GER						Gender Parity Index	
	2011-12			2018-19			2011-12	2018-19
	M	F	T	M	F	T		
North-Central								
Uttar Pradesh	17.5	17.2	17.4	24.2	27.5	25.8	0.98	1.14
Rajasthan	20.6	15.5	18.2	23.1	23.0	23.0	0.75	1.00
Madhya Pradesh	22	14.6	18.5	21.8	21.2	21.5	0.67	0.97
Punjab	22.4	23.6	23.0	25.5	34.3	29.5	1.05	1.35
East								
Jharkhand	10.2	9.5	9.9	19.5	18.7	19.1	0.93	0.96
Odisha	18.3	15	16.6	24.2	20.0	22.1	0.82	0.82
Bihar	14	10.8	12.5	15.1	12.0	13.6	0.77	0.79
West Bengal	15.4	11.8	13.6	20	18.7	19.3	0.76	0.94
South								
Tamil Nadu	43.2	36.8	40.0	49.8	48.3	49.0	0.85	0.97
Andhra Pradesh*	31	23.6	27.3	35.8	29.0	32.4	0.76	0.81
Telangana*	36.9	29.3	33.1	35.8	36.5	36.2	0.79	1.02
Karnataka	24.9	22.7	23.8	28.2	29.4	28.8	0.91	1.04
West								
Maharashtra	28.1	24.3	26.3	33.5	30.3	32.0	0.86	0.90
Gujarat	18.1	14.7	16.5	22	18.7	20.4	0.81	0.85
All-India	22.1	19.4	20.8	26.3	26.4	26.3	0.88	1.00

Table 16: GER and GPI in representative states for 2011-12 and 2018-19, data from AISHE [* data from 2012-13 used for AP and Telangana instead of 2011-12]

Uttar Pradesh had an impressive GER equality in 2011-12 itself – 17.5 (male) and 17.2 (female) – which has increased to 24.2 (male) and 27.5 (female). GPI jumped from 0.98 to 1.14. Focus on learning has seemingly always been part of the state's ethos and is a significant step towards human capital development. Rajasthan's female GER started off at 15.5 in 2011-12 and has increased quickly to 23.0, equalizing with male GER. This is reflected in the GPI rising from 0.75 to 1.0 in seven years; quite an achievement. Madhya Pradesh also reflects the same paradigm – female GER quickly rising and equalizing with male GER, and GPI rising from 0.67 to 0.97 in seven years. Punjab started off with higher female GER (23.6 compared to 22.4) in 2011-12 and the gap has widened to 9 points (34.3 vs 25.5) in 2018-19. GPI rose from 1.05 to 1.35.

In the eastern zone, Jharkhand's GPI is impressive but GER is low – 19.5 (M), 18.7 (F), and 19.1 (T). However, given that it started off with low GERs in 2011-12 at 10.2 (M), 9.5 (F), and 9.9 (T), the growth in seven years is impressive compared to its neighbors in the east. Odisha's male GER is stagnating but female GER is growing. West Bengal has driven its GPI from 0.76 to 0.94 in seven years, reflecting the aggressive jump in female GER from 11.8 to 18.7. Bihar remains a tragic case – GER across the board has hardly moved by 1 point in seven years.

In the south too, women's GER is growing faster than men. In 2011-12, Tamil Nadu had 43.2 (M) and 36.8 (W) which has almost equalized in 2018-19 with 49.8 (M) and 48.3 (W). The state sets the standard in India today for aggressive growth in enrolment. GPI rose from 0.85 to 0.97 in seven years. Though Karnataka's overall GER is low, women's GER has grown very fast from 22.7 to 29.4 while men's GER moved from 24.9 to 28.2 in seven years – correlating with a growth in GPI from 0.91 to 1.04.

In 2011-12, Andhra Pradesh and Telangana's statistics are joint as one undivided state, so we track their statistics from 2012-13. Telangana is ahead in GER at 36.2 and GPI at 1.02, compared to Andhra Pradesh at 32.4 (GER) and 0.81 (GPI), respectively. Andhra Pradesh is one of the few states where male GER is significantly ahead of female GER at nearly 7 points. In the west, both Maharashtra and Gujarat have higher male GERs than female GERs by 3+ points, and lower GPIs at 0.9 and 0.85 respectively.

Research and Specialization

Total enrolment in Ph.D. programs across the country was 1.69 lakh in 2018-19, where 40.8k graduated, as shown in Table 17. Only 0.45% of enrolled HE students in India are Ph.Ds. and 0.45% of 2018-19 graduates were Ph.Ds. In various post-graduate programs (not including Ph.Ds.), total enrolment in India was 40.4 lakhs with 15 lakhs graduates in 2018-19. This amounts to 10.8% of total HE students enrolled and 16.5% of total HE graduates in 2018-19.

Tamil Nadu tops the list for enrolled Ph.Ds. at 25.8k, followed by Uttar Pradesh at 19k and Karnataka at 13.3k. In terms of Ph.D. graduates or pass-outs in 2018-19, Tamil Nadu tops the list at 5.8k, and Karnataka comes next at 5k, though the number of enrolled is lesser than that of Uttar Pradesh which comes in third at 4k. Except for Andhra Pradesh at 2.6k, no other state produced more than 2,000 Ph.D. graduates in 2018-19.

Of total state enrolment in HE, no state crosses 1% in terms of Ph.Ds. enrolled except for Punjab at 0.99% enrolled, followed by Tamil Nadu at 0.76% and Karnataka at 0.67%. In terms of Ph.D. graduates, Karnataka is the only state that gets close to 1% with 0.95%. A distant second is Tamil Nadu at 0.68%, followed by Andhra Pradesh at 0.66%, and Punjab at 0.6%.

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Zones	Ph.D.						Post Graduate	
	Enrolled	% of total	Graduates	% of total	Enrolled	% of total	Graduates	% of total
North-Central								
Uttar Pradesh	19,119	0.30%	3,996	0.26%	5,97,049	9.23%	2,37,468	15.53%
Rajasthan	10,441	0.50%	1,913	0.30%	1,90,827	9.15%	1,04,386	16.25%
Madhya Pradesh	4,093	0.21%	1,491	0.25%	2,22,161	11.51%	73,244	12.23%
Punjab	9,095	0.99%	1,401	0.60%	1,05,932	11.52%	46,065	19.59%
East								
Jharkhand	2,903	0.39%	360	0.21%	81,739	11.05%	23,086	13.75%
Odisha	3,722	0.37%	1,179	0.51%	83,077	8.15%	20,714	9.02%
Bihar	3,362	0.21%	856	0.22%	1,28,212	7.98%	41,904	10.99%
West Bengal	11,731	0.56%	1,898	0.48%	1,61,654	7.71%	73,409	18.71%
South								
Tamil Nadu	25,820	0.76%	5,844	0.68%	4,44,388	13.02%	1,54,458	17.87%
Andhra Pradesh*	4,981	0.28%	2,615	0.66%	2,11,292	12.00%	82,854	20.92%
Telangana*	3,430	0.24%	1,043	0.33%	1,88,751	13.23%	63,656	19.89%
Karnataka	13,300	0.67%	5,020	0.95%	2,11,941	10.66%	96,892	18.32%
West								
Maharashtra	8,796	0.21%	1,613	0.17%	4,61,243	10.90%	1,41,092	14.88%
Gujarat	5,917	0.40%	1,469	0.40%	1,47,428	9.97%	56,513	15.32%
All-India	1,69,170	0.45%	40,813	0.45%	40,42,522	10.81%	15,00,064	16.50%

Table 17: Ph.D. and PG data to identify rate of specialization between states, data from AISHE

Uttar Pradesh tops the list for enrolled PGs at 6 lakhs (9.23% of state enrolment), followed by Maharashtra at 4.6 lakhs (10.9% of state enrolment) and Tamil Nadu at 4.4 lakhs (13% of state enrolment). The highest percentage of PG enrolled to total state enrolment is in Telangana at 13.2% followed by Tamil Nadu at 13%. All the southern states, Maharashtra, Jharkhand, Punjab and Madhya Pradesh have 10%+ PGs enrolled compared to total state enrolments. The all-India average is 10.8%.

In terms of PG graduates or pass-outs in 2018-19, Uttar Pradesh tops the list at 2.4 lakhs (15.5% of state total), followed by Tamil Nadu at 1.5 lakh (17.9% of state total) and Maharashtra at 1.4 lakh (14.9% of state total). Except for Rajasthan (1 lakh amounting 19.6% of state total), no other state has more than 1 lakh PG graduates in 2018-19. The highest percentage of PG graduates to total state graduates is in Andhra Pradesh at 20.9% - the only state above 20%. Telangana and Punjab come close at 19.9% and 19.6% respectively, followed by West Bengal at 18.7% and Karnataka at 18.3%. Odisha is the only state below 10%; even Bihar has a 11% ratio of PG graduates to total graduates, which is an encouraging sign. The all-India average is 16.5%.

Public-Private Partnerships in Higher Education

A stellar education system must incorporate access to all, equity in opportunities and the highest quality of standards. Providing access to all means the system must have enough capacity. Equality in opportunities has been addressed in the Social Equity section of the report. It includes providing educational opportunities to all communities and regions of India. Quality of education includes excellent teachers, ample research opportunities for creative students, and the ability to train students to work in professional environments while providing follow-on opportunities for them.

A study of India's education system and global systems indicates that a sound system that incorporates access, equity and quality is best built by a partnership between private players and government. Private education groups bring numerous advantages to the table – good industry partnerships, quality teachers, the ability to use funding better to set up research laboratories. All in all, they have a better focus on human capital development.

Government is essential in improving the capacity of the education system and providing equity in opportunities to all students. Governments have large spending budgets to be able to do all this with ease compared to private players. To understand the effect of government vs private players better, Table 18(a) analyzes the number of private-unaided, private aided, and government colleges by state in 2011-12 and 2018-19.

Zones	Colleges 2011-12			Colleges 2018-19		
	Pvt Un-Aided	Pvt Aided	Government	Pvt Un-Aided	Pvt Aided	Pvt Un-Aided
North-Central						
Uttar Pradesh	1,157	346	403	5,036	623	788
Rajasthan	787	58	261	2,056	210	610
Madhya Pradesh	664	135	450	1,089	200	606
Punjab	217	41	83	630	179	199
East						
Jharkhand	20	9	72	132	27	149
Odisha	139	191	172	279	426	347
Bihar	33	38	477	227	100	513
West Bengal	283	194	372	627	249	494
South						
Tamil Nadu	1,739	240	285	1,884	247	331
Andhra Pradesh*	1,689	166	228	2,061	162	298
Telangana*	1,446	121	193	1,585	115	276
Karnataka	1,942	402	596	2,462	461	671
West						
Maharashtra	1,211	670	643	2,562	1,027	751
Gujarat	674	403	587	1,403	498	313
All-India	13,515	3,498	6,190	24,541	5,148	8,490

Table 18(a): Private (aided and unaided) and government colleges, data from AISHE

The all-India number rose from 13.5k in 2011-12 to 24.5k in 2018-19 for private-unaided colleges. In the same time period, number of private-aided colleges rose from 3.5k to 5k, and number of government colleges rose from 6.2k to 8.5k. To understand the effect of different types of colleges on GER, Table 18(b) examines the data as percentages with two combinations – one, to count private-aided colleges as private, and two, to count private-aided colleges with Government colleges – to understand the effect of private education on GER by state.

Zones	GER		% Private (w/o Aided)		% Private (w/ Aided)		% Government Only	
	2011-12	2018-19	2011-12	2018-19	2011-12	2018-19	2011-12	2018-19
North-Central								
Uttar Pradesh	17.4	25.8	60.7%	78.1%	78.9%	87.8%	21.1%	12.2%
Rajasthan	18.2	23.0	71.2%	71.5%	76.4%	78.8%	23.6%	21.2%
Madhya Pradesh	18.5	21.5	53.2%	57.5%	64.0%	68.0%	36.0%	32.0%
Punjab	23.0	29.5	63.6%	62.5%	75.7%	80.3%	24.3%	19.7%
East								
Jharkhand	9.9	19.1	19.8%	42.9%	28.7%	51.6%	71.3%	48.4%
Odisha	16.6	22.1	27.7%	26.5%	65.7%	67.0%	34.3%	33.0%
Bihar	12.5	13.6	6.0%	27.0%	13.0%	38.9%	87.0%	61.1%
West Bengal	13.6	19.3	33.3%	45.8%	56.2%	63.9%	43.8%	36.1%
South								
Tamil Nadu	40.0	49.0	76.8%	76.5%	87.4%	86.6%	12.6%	13.4%
Andhra Pradesh*	27.3	32.4	81.1%	81.8%	89.1%	88.2%	10.9%	11.8%
Telangana*	33.1	36.2	82.2%	80.2%	89.0%	86.0%	11.0%	14.0%
Karnataka	23.8	28.8	66.1%	68.5%	79.7%	81.3%	20.3%	18.7%
West								
Maharashtra	26.3	32.0	48.0%	59.0%	74.5%	82.7%	25.5%	17.3%
Gujarat	16.5	20.4	40.5%	63.4%	64.7%	85.9%	35.3%	14.1%
All-India	20.8	26.3	58.2%	64.3%	73.3%	77.8%	26.7%	22.2%

Table 18(b): Percentage of private and government colleges, data from AISHE

Share of Government-only colleges across India reduced from 26.7% in 2011-12 to 22.2% in 2018-19. This is not a good sign; the only way access to HE is improved is through Government spending and setting up institutions all over India. To get an idea of total spend from Government's side, we can count the share of private-aided colleges under the Government umbrella – share decreased from 41.8% in 2011-12 to 36.6% in 2018-19. The only way to increase capacity and equity to higher education, and GER, is for government spending to increase and provide opportunities for access.

Except for marginal increases in Tamil Nadu, Andhra Pradesh, and Telangana, government share of colleges has decreased in all states. In states with low GERs like Bihar, Jharkhand, West Bengal, Rajasthan, Madhya Pradesh, and Gujarat, this is especially worrisome.

Southern states with higher GERs face another type of problem – sections of the society that can pay for an education have stagnated. GER can be increased only by improving access to those in need. To do this, Government spending by either setting up and improving capacity in its own colleges or contributing more to aided colleges must increase.

An ideal combination may be a 40-60 government-private share in order to improve quality, capacity and equity.

Formal Employment by State

Table 19 shows 2018-19 EPFO data, disaggregated by state and age group, correlating with 2017-18 AISHE graduation data. This is the old MOSPI format with new subscribers totaling 61.1 lakh. **Applying the corrected methodology across brought the number of net new subscribers to just over 1 crore, as shown above. Doing the same across state data might reveal new patterns.** India's GER in 2017-18 was 25.8, and 89.6 lakh students graduated in total. These are people who completed college and maybe seeking formal employment. The **coverage ratio of new jobs in the 18-28 age bracket in 2018-19 to graduates in 2017-18** is also presented.

Zones	EPFO 2018-19					AISHE 2017-18		Coverage ratio
	Age 18-21	Age 22-25	Age 26-28	Age 18-28	Total (all ages)	GER	College Pass-out	Age 18-28 jobs to pass-outs
North-Central								
Uttar Pradesh	1,03,205	68,444	21,601	1,93,250	2,52,773	25.9	17,01,557	11.4%
Rajasthan	66,163	44,997	12,502	1,23,662	1,77,332	21.7	6,86,995	18.0%
Madhya Pradesh	49,644	38,571	16,030	1,04,245	1,42,061	21.2	4,63,449	22.5%
East								
Jharkhand	15,760	14,737	8,008	38,505	55,616	18.0	1,51,724	25.4%
Odisha	17,882	16,129	4,289	38,300	35,489	22.0	2,14,911	17.8%
Bihar	13,167	16,992	12,143	42,302	88,293	13.0	3,76,973	11.2%
West Bengal	73,101	79,502	36,094	1,88,697	2,63,553	18.7	3,85,507	48.9%
South								
Tamil Nadu	2,60,699	1,26,990	26,479	4,14,168	5,02,020	48.6	8,77,008	47.2%
Andhra Pradesh	45,100	36,978	17,495	99,573	1,51,024	30.9	3,85,572	25.8%
Telangana	1,28,393	1,23,214	42,274	2,93,881	4,04,079	35.7	3,19,539	92.0%
Karnataka	2,65,827	2,19,708	53,295	5,38,830	6,18,080	27.8	5,06,839	106.3%
West								
Maharashtra	5,31,060	4,86,518	1,68,034	11,85,612	15,75,943	31.1	8,67,599	136.7%
Gujarat	2,29,793	1,37,373	50,496	4,17,662	5,55,525	20.1	3,55,305	117.6%
All-India	23,42,998	17,71,705	5,78,759	46,93,462	61,12,223	25.8	89,68,546	52.3%

Table 19: Formal employment and coverage ratios across states, data from AISHE, EPFO

In the representative states in the North-Central-East zones, total new subscribers in the 18-28 age bracket were 7.3 lakh while the number of college pass-outs is nearly 40 lakhs. Uttar Pradesh is a significant contributor here – it has an impressive GER of 25.9 and 17 lakh graduates – but the coverage ratio is only 11.4%. States like Bihar, Jharkhand and Rajasthan have low GER and low coverage ratios. West Bengal has a higher coverage ratio, 49%, but low GER of 18.7, which must be improved along with formal job creation.

Even in the more industrialized South-West, some states are unable to provide formal employment on par with graduation rates. Tamil Nadu, with India's highest GER at 48.6, has a coverage ratio of 47% while Andhra Pradesh is at 25.8%. Karnataka and Maharashtra have 100%+ coverage ratios, which is a good sign - representative of economies that have a substantial services contribution. It also indicates sizeable migration towards Bengaluru and Mumbai as zones of high employment. The same could account for Telangana at 92% with Hyderabad. Gujarat remarkably also has a 100%+ coverage ratio. However, GER is 20.1 - lower than all-India GER - and can be improved to feed Gujarat's formal job creation engine.

Low Urbanization is Arresting Human Capital Development

Development and urbanization are two sides of the same coin. No society in recent history remained agrarian while adequately providing for its population. Urbanization aggregates human activity. Aggregation leads to specialization, specialization to increased productivity and development of human capital; enabling greater availability of goods, delivery of services, increased wages, and job opportunities. Urban areas are engines of growth in any modern economy.

The world on average is at 55.3% urbanization, whereas India lags at 34%. India has been slow to urbanize because of the fixation on being a village-based society. Most planners still look to Gandhiji's sentiments on this topic – 'The future of India lies in its villages', he said in 1947. This is no longer true - complexity has increased, and people's economic needs and aspirations have grown. It is impossible to develop human capital when the population is spread across six lakh villages. Keeping India's population in villages while being unable to meet their economic and development needs has resulted in high inequity.



This dynamic causes three significant issues:

1. **Industry and services, not agriculture, drive human capital development:** Rural employment is mostly in agriculture. 42.7% of India's workforce in 2016-17 was engaged in the agriculture sector crawling at a 3.4% growth rate and contributing only 17.3% to the GDP (Table 20). Meanwhile, 57.3% of the workforce was engaged in industry and services growing at 5.5% and 7.6%, respectively. The income differential is very high, the ratio being 1:3:4 for the average wages of dependents on agriculture to industry to services. Left unaddressed, this large group of agricultural dependents will always be condemned to a sub-aspirational existence - with increasing distress, perpetually dependent on subsidies from the Government, and no means to develop their human capital.

Sector	% GVA	GVA growth rate	Workforce distribution	Per-capita GVA (INR)
Agriculture	17.3%	3.4%	42.7%	1.5%
Industry	29.0%	5.5.%	23.8%	1.5%
Services	53.7%	7.6%	33.5%	6.4%

Table 20: 2016-17 data comparing agriculture, industry and services sectors in India across share of Gross Value Added, GVA growth rate, workforce distribution and per-capita numbers. Data from RBI, MOSPI and World Bank

2. **Few urban engines unable to provide for all of India's aspirations:** Lack of opportunities is also accelerating large-scale internal migration towards India's few urban growth engines - such as Mumbai, Bengaluru, Delhi, Hyderabad, and others. Large cities are reeling under the strain of overpopulation, with problems like inadequate infrastructure, congestion and rocketing living costs. Employment is unable to keep up with the inflow. Due to high costs, it is uncompetitive to set up industries in cities. Without industries to absorb the incoming rural population, they are mostly making low wages as contract labour. Even if they earn higher wages than in their hometowns, they can't keep up with living costs - resulting in a growing urban population with unfavourable living conditions.

3. **Industry and services jobs suitable for graduates are not available all over India:** They are available only in 5-6 prominent areas, and mostly in the south. Even though more youngsters are enrolling in higher education and earning degrees, most of them do not find suitable jobs in their hometowns or near their villages. They are either forced to migrate or, more often than not, stay in their hometowns and villages either doing work that is below their qualifications or staying unemployed. In particular, educated women face this problem because they are not as mobile as men and have a larger share of caregiving duties. Inaccessibility of suitable jobs close to them is rendering them unemployed with no opportunities to improve their human capital beyond a HE degree.

In this manner, low urbanization is arresting India's human capital development.

Case for Systematic Urbanization

A compelling solution to this unstable situation is the **systematic shift of people from rural to urban areas.** The 2011 census indicates there are 7,933 towns/cities housing 31.16% of the population, with an average population of 47,536. Of these, 465 towns have a population over one lakh and 53 cities, over ten lakhs. On subtracting these, the remaining 7,468 towns must have significantly lesser populations than the 47,536 average. The upcoming 2021 census will inform us of the current situation.

Census data must be used to **suitably identify 4000-5000 smaller towns all over India and develop them to absorb the rural-to-urban shift sustainably.** By setting up this sustained urbanization model, it is easier for India to develop its human capital:

1. **Infrastructure and Planning:** These 5000 towns can be planned from the beginning with state-of-the-art infrastructure, renewable technologies for energy and other demands, and detailed expansion plans for capacity. Not only is state-of-the-art infrastructure crucial for quality of life, it also provides the logistical backbone for a productive industrial environment.

2. **Delivery of higher education:** Higher education institutions could be one of the factors in deciding which 5000 towns to develop into these semi-urban centers. This will make higher education more accessible for youth in and around these towns to enroll and get educated. Following the move to increase industries around these towns (discussed below), these higher education institutions can place special focus on courses that will train youth to enter the local industry and utilize their higher education degree in a meaningful way.

3. **Labour-intensive industry (LII) clusters:** Creating many LIIs in and around the 5000 towns is the best way to provide gainful employment to the transitioning population. **By focusing on the right type of industries - garments, fabrication, electronics assembly, automobiles, so on – this move will also boost India's export capabilities.** With focused skilling programs, LIIs will offer excellent income opportunities to the incoming population. Even a lower wage than cities will go a long way towards quality of life, especially since living costs are lower in towns.

4. **Human capital development through LIIs:** LIIs are an excellent means to provide mass employment. Moreover, the management of these industries will need specialized graduates to ensure quality standards, constant innovation, and other factors. In this manner, LIIs can absorb part of the graduates coming out of higher education institutes and provide them with gainful employment all over India. Different specializations from sciences and technology to commerce, accounting, and business administration are useful here. This offers one way to improve India's human capital development downstream of higher education.

5. **Specialized industry clusters:** While labour-intensive industries are required to provide mass employment and dominate large-volume export markets, specialized industries which require significant research, intellectual property generation, and specialized workforces are equally essential. Focusing on innovation spending like the US and China have will feedforward into growing new manufacturing capabilities, and domestic and export markets

Some industries worth investing in are:

a. Electronics component design
b. Hardware design and manufacturing
c. Renewable energy innovation, development and infrastructure
d. 3D printing
e. Robotics
f. Defence parts manufacturing
g. Medical devices
h. New materials innovation that can feed into construction, 3D printing, renewables, semiconductors, and others

Specialized industries can utilize even more higher education graduates, from all realms including niche fields in research, engineering, technology, sciences, and computing.

Systematic urbanization, apart from having many other benefits, will have a tremendous feed-forward effect on India's human capital development. This network of semi-urban towns can be developed into India's growth engine.

Population Downturn is Underway

India's fertility has dropped dramatically. Data from the National Fertility and Health Survey (NFHS) shows India's Total Fertility Rate (TFR) decreased from 3.39 in 1990-92 (NFHS-1) to 2.18 in 2013-15 (NFHS-4). This means already in 2015, we were below the average global replacement rate for emerging economies at 2.3. Following the linear trend projections indicate TFR in India might fall to 1.95 in 2019 and might be as low as 1.86 in 2021.

To study the effects of the fertility downturn on our population growth rates, we have to go beyond the available Census 2011 data. There is a wealth of official data in the Civil Registration System (CRS). CRS maintains a database of the number of registered births and deaths in the country, and state-wise. The latest CRS report based on 2017 data marks the level of registration of births at 85% and of deaths at 80%. With this, we can estimate the number of births and deaths per year, and the population growth barring immigration, with actual data up to 2017 and trend projections till 2021.

With the addition of annual net populations based on CRS data, the projection for India's population for 2021 comes close to 139 crores, as shown in Table 21. The data-backed model also predicts that decadal growth and growth rates for 2011-21 will fall steeper than the previous decades. The upcoming 2021 census will cast more light on this.

Population in crores

Year	1951	1961	1971	1981	1991	2001	2011	2021*
Population	36.11	43.92	54.82	68.33	84.64	102.87	121.09	138.93
Decadal growth	-	7.81	10.89	13.52	16.31	18.23	18.21	17.84
Dec. growth rt.	-	21.64%	24.80%	24.66%	23.87%	21.54%	17.70%	14.73%

Table 21: Census data for 1951-2011, * indicates projections made by authors based on CRS data

Decadal growth reached its zenith in the 1991-2001 decade, with an increase of 18.23 crores, up from 16.31 crores in 1981-91. In 2001-11, decadal growth stabilized to 18.21 crores, slightly lesser than the previous decade. CRS data shows decadal growth is expected to reduce in the 2011-21 decade to roughly 17.8 crores.

Decadal growth rate, on the other hand, peaked back in 1961-70 at 24.8%, and has steadily decreased ever since; which means the population has been growing slower and slower after 1971. Growth slowly reduced to 21.5% in 1991-2001, and then rapidly dropped to 17.7% in 2001-11. With the population projection based on CRS data, it looks like decadal growth rate might plummet to 14.7% in this decade. Without a doubt, India's population is ageing.

The children born in that decade of zenithal growth, 1991-2001, are now 18+ years of age and entering the job market. India will see one more wave when the children born in the 2001-11 decade enter the job market. To harness this demographic dividend, youth need well-paying qualified jobs which is in deficit. Government must look at data and create jobs accordingly, so the potential of the youth bulge is employed. If not, India will have to deal with a large unemployed youth group which is counter-productive in multiple ways.

The future of all communities lies in its children. India was always pegged as the recipient of the demographic dividend, but data shows we will soon lose that advantage. Table 22 shows the number of children between the ages of 0 and 6 years in the census years 1991 to 2011. This number rose from 150 million in 1991 to 164 million in 2001, then dropped to 159 million in 2011. Projections from the CRS data indicate in 2021, India will have around 156 million children, a drop of 3 million from 2011.

The percentage of children to the total population, however, has been steadily decreasing from 17.8% in 1991 to 13% in 2011. 2021 projections indicate this ratio might fall to 11% soon. Fewer children being born means fewer children entering the education system, and ultimately fewer people entering the workforce.

Census	Population (in millions)		% Children of Total
	Age 0-6 yrs	All ages	
1991	150.4	846.4	17.8%
2001	163.8	1028.7	15.9%
2011	158.8	1210.9	13.1%
2021*	156.0	1389.3	11.2%

Table 22: Census data for children and total populations for 1991-2011, * indicates projections made by authors for 2021 based on CRS data

At the rates fertility and population growth are dropping, India's population may stabilize faster than expected. We can expect a peak soon, followed by a gradual decline. With improved lifespans, we are soon going to have a large ageing population supported by a gradually shrinking workforce. These trends indicate that many areas of our economy are going to be affected imminently and must be given special attention – from staffing primary schools and teacher training, to improving workforce productivity and instituting special programs for the 60+ age groups.

Most importantly, to support a large ageing population with a smaller workforce, human capital development is the single best investment we can make right now for the largest impact.

Across India

Having studied the differences in higher education (HE) in detail across states in the previous section, we now connect this data to broader economic indicators to understand **the roadmap for human capital development.** In Table 23, we analyze GER against urbanization, per-capita state GDP, total fertility rates (TFR), growth in 18-23-year population, and decadal population growth rates with projections to 2021 for representative states across India. GER is a comprehensive indicator to apply here because it gives us a sense of, not only growth in HE enrolment, but also the capacity in each state for growth in human capital.

States in the South-West zones are more urbanized, all above the 31% all-India average. These states also have low TFR, considerably below the India average of 2.18. Low fertility and high GERs has resulted in better educated, smaller populations that are earning more than their northern counterparts. Urbanization is driving this trend - **urbanization aggregates human activity, enabling specialization and productivity improvements. It boosts economic prosperity,** which reflects in the leading per-capita GSDP figures of these states. In 2011-12, already these states had higher per-capita GSDP – with Andhra Pradesh on the low end at INR 77,000 and Maharashtra with the highest at INR 1.13 lakh. In six years, these figures have mostly doubled – Andhra Pradesh at INR 1.57 lakh, Tamil Nadu at INR 1.86 lakh, Telangana, Karnataka and Gujarat at INR 2 lakh, and Maharashtra leading at INR 2.05 lakh.

Population dynamics in south-western states are also vastly different from those of their neighbors in the north-central-east. 18-23-year populations are in steep downturn in the south – -0.95% CAGR in Andhra Pradesh and Telangana, -0.97% CAGR in Karnataka, and -1.6% CAGR in Tamil Nadu. Western states are slightly better off, with Maharashtra at -0.26% CAGR and Gujarat at 0.23% CAGR – closer to the all-India average of 0.18%. Other states with negative growth rates in 18-23-year populations are Punjab at -1.3% CAGR in the north, and Odisha at -0.33% CAGR and West Bengal at -0.15% CAGR in the east. All of the above states demonstrate rapidly falling population growth rates for the 2011-21 decade as well.

Tamil Nadu has India's highest GER, at 49, and one of the lowest TFRs, at 1.70. Its 18-23-year population is falling at -1.6% CAGR and decadal population growth rate at 8% for 2011-21. In 2011 itself, we can see TN is most urbanized at 48.4%, and GER was already high at 40.0. No other big Indian state attained a GER of 40 even in 2018-19. Rapid urbanization has boosted Tamil Nadu's enrollment in higher education. However, regressive focus on caste politics has taken away from growth. Though Tamil Nadu had the second highest per-capita GSDP in 2011-12, growth is lower compared to states like Karnataka and Telangana, which are driven by services. The state has set the standard for human capital development at the higher education level and must now converge on using high GER and urbanization to drive its strong industry legacy and build a large services sector.

Zones	Urban %	Per-capita GDP		GER		TFR	18-23 yr popn	Population growth Decadal rates		
	2011 Census	2011-12	2017-18	2011-12	2018-19	2013-15	7-yr CAGR	1991-2001	2001-11	2011-21 *
North-Central										
Uttar Pradesh	22.3%	35,917	62,291	17.4	25.8	2.74	0.81%	25.8%	20.2%	20.8%
Rajasthan	24.9%	62,907	1,11,539	18.2	23.0	2.40	1.29%	28.4%	21.3%	19.5%
Madhya Pradesh	27.6%	43,082	93,491	18.5	21.5	2.32	0.68%	24.3%	20.3%	19.1%
Punjab	37.5%	95,379	1,55,816	23.0	29.5	1.62	-1.31%	20.1%	13.9%	9.2%
East										
Jharkhand	24.0%	45,318	69,534	9.9	19.1	2.55	1.06%	23.4%	22.4%	17.7%
Odisha	16.7%	54,708	92,726	16.6	22.1	2.05	-0.33%	16.3%	14.0%	11.3%
Bihar	11.3%	23,525	42,242	12.5	13.6	3.41	1.80%	28.6%	25.4%	20.2%
West Bengal	31.9%	56,693	1,04,750	13.6	19.3	1.77	-0.15%	17.8%	13.8%	9.7%
South										
Tamil Nadu	48.4%	1,03,600	1,86,125	40.0	49.0	1.70	-1.55%	11.7%	15.6%	8.0%
Andhra Pradesh	33.4%	76,997	1,57,495	29.9	32.4	1.83	-0.95%	14.6%	11.0%	9.0%
Telangana	-	1,00,732	1,98,577	29.9	36.2	1.78	-0.95%	-	-	-
Karnataka	38.7%	98,568	1,99,875	23.8	28.8	1.80	-0.97%	17.5%	15.6%	11.3%
West										
Maharashtra	45.2%	1,13,154	2,05,499	26.3	32.0	1.87	-0.26%	22.7%	16.0%	10.8%
Gujarat	42.6%	1,01,075	2,00,244	16.5	20.4	2.03	0.23%	22.7%	19.3%	14.5%
All-India	31.2%	72,187	1,31,698	20.8	26.3	2.18	0.18%	21.5%	17.7%	14.7%

Table 23: Economic indicators across states, data from AISHE, RBI, Census 2011, NFHS-4, CRS database [* projections by authors based on CRS data]

Karnataka is an intriguing case. With one of the highest per-capita GDPs at INR 2 lakh in 2017-18 and a reasonably high urban percentage at 38%, a reality check indicator is its lower GER of 28.8. Data from RBI and the Economic Survey shows 60% of Karnataka's GDP comes from Bengaluru and the services sector - driven by IT and other technological drivers. The state displays some of the strongest economic indicators for human capital development in its services-first economy structure. However, as analysed in detail in the Formal Employment section above, a majority of the specialized workforce come from elsewhere. Like most southern states, TFR is low, 18-23-year population is shrinking and population growth rates are down; but the state sees significant immigration. Despite its large services sector, by defocusing on human capital, Karnataka's government is placing natives in an unfortunate situation of being unable to compete for the best jobs in their state. Karnataka must focus on its higher education base to remedy this, which will further boost the state's impressive growth trajectory.

Gujarat is another unusual case – high urbanization at 43% but low GER of 20.4, lower than the all-India average. Gujarat's steady growth and high per-capita GSDP of INR 2 lakh are driven by its phenomenal industry sector, which accounts for more than half of GVA. High dependency on industry, and not services which contribute only 35% of GVA, means Gujarat's growth will start slowing down when automation and other factors kick in. With a TFR of 2.03, Gujarat's population downturn is not as steep as southern states. Without the development of human capital, Gujarat is in danger of lagging in the future. The answer to this is investing in higher education and building a strong services sector to complement its industry.

Punjab stands out among the northern states. It boasts a high urban percentage - 37.5%, high GER – 29.5 in 2018-19, and one of the lowest TFRs – 1.62 along with shrinking 18-23-year population and falling population growth rate. Despite this, Punjab still relies heavily on agriculture; its services and industrial output is lower than southern states. With indicators of high urbanization, high GER and low population growth, Punjab can easily make the transition to a high-growth economy focused on services with the right policies. With great higher education indicators in GER and specialization, Punjab will find driving its human capital development much easier compared to neighbours in the North-Central-East zones.

Other states in the North-Central-East zones mostly have low urbanization and low GER. The lack of urbanization has resulted in a shortage of industry and services sectors and low per-capita GDP. The populations in these states will keep growing in the foreseeable future. Fertility rates are all high – with Bihar at 3.41, Uttar Pradesh at 2.74, Rajasthan at 2.4, Madhya Pradesh at 2.32, and Jharkhand at 2.55. Population growth rates are all high compared to the all-India average. 18-23-year population are also continuing to grow. It is imperative to focus on educating these young populations and provide ample high-growth employment opportunities. Without employment options in high-growth sectors, these large populations cannot rely on agriculture nor industry alone for growth. Services are a must.

Uttar Pradesh has a made a valiant effort to develop human capital – GER rose from 17.4 to 25.8 in seven years. Per-capita GSDP has moved from INR 36k in 2011-12 to INR 62k in 2017-18. Immediate policies to provide formal employment through labour-intensive industries (LIIs), specialized industries, and services are required to employ the large educated base and provide a means to improve GSDP and per-capita incomes.

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Bihar is a Troubling Case

Bihar is a troubling case study on the effects of low urbanization and human capital. Only 11.3% of the population is urban. GER is the lowest in India and hardly growing – from 12.5 to 13.6 in seven years. Per-capita GSDP is lowest, at INR 42k in 2017-18. Despite having fertile land, Bihar's agriculture sector cannot grow because it is disorganized with a large number of dependents. With India's highest TFR - 3.41, Bihar's expanding population is condemned to a sub-aspirational existence due to the state's stagnant economy. Bihar needs special attention from the Centre with focused schemes to organize the agricultural industry, urbanize and educate the masses, and provide mass employment through LIIs. Madhya Pradesh has set a good example under the same conditions of Bihar by prioritizing agrarian growth as well as instituting LIIs to provide mass employment. Both states need focused effort on higher education to simultaneously improve human capital.

West Bengal and Odisha in the east are in the danger of ageing before they develop human capital and become richer. GERs are below the all-India average of 26.3, 18-23-year populations are decreasing, fertility rates are lower than the all-India average of 2.18, and population growth rates are falling similar to southern states. Odisha's per-capita GSDP grew from INR 54.7k in 2011-12 to 92.7k in 2017-18. In the same time period, West Bengal's per-capita GSDP grew from INR 56.7k to INR 1 lakh. If these states age before their economic growth improves, the state's populations face inferior quality of life compared to both their southern neighbours (who have double the per-capita GSDP) and northern neighbours (who can still reap the youth dividend). Aggressive focus on human capital development is the only way forward.

It is clear that every state – irrespective of prosperity or geographical location – is diverse. We are now in an era where the role of the Centre is increasingly limited, and State spending is growing. Each state must evaluate its economy – workforce distribution, demographics, sectoral contribution, formal employment, unique growth drivers – and set a development plan. Central to this plan for every state is human capital development, and aggressive growth in higher education and formal employment.

Preparing for the Future

With this rich database on our higher education infrastructure and other economic indicators, we have a concrete foundation to plan our human capital development in the coming decades. The following considerations are crucial.



1. Gross Enrolment Ratio of 50 by 2030

India's GER is currently 26.3 – which means only 26.3% of the eligible 18-23-year population is enrolled in higher education. We have studied above how this number varies across India – from 49 in Tamil Nadu to 13.6 in Bihar. Various stakeholders like FICCI via the **'Vision 2030 for Higher Education' 2013** report and the **National Education Policy 2019** have laid a vision of growing India's GER to 50 by 2030. Data compiled in this report also affirms that this is indeed reasonable – for a GER of 50, enrolment needs to grow at 6.2% CAGR till 2030. All stakeholders – Central and State Governments, higher education bodies, universities and colleges, and others – must work together to understand the changes required to make this vision a reality.

To grow enrolment at 6.2% CAGR, it is imperative to focus on capacity, equity and affordability. The scenario is vastly different across India's states and require different interventions. States with low GER, high pupil-teacher ratios, and fewer institutions like Bihar and Jharkhand need Government intervention to build more institutions and drive staffing to increase capacity. States like Rajasthan and Uttar Pradesh have adequate number of institutions; they require more teachers and increased capacity in these institutions to drive their GERs up. These are all states with larger populations where the youth bulge is still strong. It is critical to provide them more opportunities for human capital development.

Southern states have larger share of private institutions where sections who can pay for an education is stagnating. The next wave of enrolment has to come from sections in need. Government spending in the form of aid to private institutions to improve affordability can help drive GER in these states.

One policy to increase enrolment across India is not going to work because the situation in each state is highly variant. Policymakers of each state must study the status-quo and available growth drivers in their states to create a detailed plan and execute

2. Brownfield expansion using current infrastructure

On average, India's current HE infrastructure is adequate for rapid brownfield expansion and increasing enrolment. Some states require new institutions as discussed above, but most states have enough. Instead of indiscriminately building more institutions, we must now focus on rapid brownfield expansion – which is faster, productive, and more straightforward. Enhancing our current institutions and improving the quality of education and GER is the need of the hour.

The **National Education Policy 2019** recommends consolidation of fragmented institutions into multidisciplinary universities and colleges with enrolments upward of 3,000 each to improve quality and capacity. In this manner, valuable resources like quality teaching staff, research personnel, and equipment can be shared across these large university systems and will not be scattered. Some of the best universities worldwide like Harvard, Stanford and Cambridge are multidisciplinary universities where students get a well-rounded education and opportunities to try different avenues in research and industry. It is easier for large universities to build long-lasting industry partnerships for recruitment and setting up research laboratories that industry can participate in. India already has many institutions – private, private-aided and government – that can serve as nuclei points to build these large multidisciplinary universities today.

In rural and semi-urban areas, HE institutions must work towards developing programmes that will benefit the local and traditional industries and meet the needs of local population. For example, as healthcare infrastructure expands outside the urban areas and more wellness centres are instituted, they can employ youth trained in medical sciences at local HE institutions. Another example is in agriculture-intensive regions, HE institutions can build capacities of local youth to start allied agriculture industries, and downstream food processing industries, and so on.

To ensure access, equity and quality of education to more youngsters, a public-private partnership is necessary. Data shows private players in HE ensures higher quality and well-rounded education. On the other hand, government contribution is required to ensure better access and affordability to all communities. An ideal combination maybe 40-60 public-private, and there are interesting ways for both parties to contribute.

3. Teachers and staffing

Data must be used to estimate requirements for teaching staff over the coming decades. Enrolment in some fields are reducing whereas it is increasing in other fields. It is necessary to forecast which fields of study will expand and ensure adequate teaching capacity in those fields, while minimizing capacity in fields that are over-staffed already or will start tapering (like school enrolment). Crucially, in some fields, enrolment is reducing but should actually be encouraged to go up – like engineering and technology. Focus is also required on improving quality of the teaching staff which will ensure quality of graduates.

School teachers must be rationalized as number of children being born and entering school is coming down. For GER of 50 in 2030 in higher education, enrolment will grow at 6.2%. At the same time, with diversity in domains being taught and interdisciplinary teaching, complexity is also increasing. Building capacity in modern pedagogy to teach multidisciplinary and interdisciplinary programmes is essential. To nurture more quality teachers in specialized fields, their enrolment in Ph.D. and PG courses must increase. We need more teachers with Ph.Ds. and detailed expertise. Specialized institutes at the top of the pyramid to increase depth of knowledge and facilitate teaching curriculum and others are required. The **National Education Policy 2019** makes specific recommendations around teacher training courses by universities for specialized fields and where B.Ed. degrees are required.

The internet and other digital technologies are changing the face of education. Teachers must be acquainted with these trends and how to leverage these technologies for to improve access and dissemination of education. Teachers must also be aware of industry trends and the impact of frontier technologies on jobs and other opportunities. Building these capabilities in teachers at their training levels itself will enable them to provide a richer and multilateral learning experience or their students.

4. Social equity

All communities across the socio-economic spectrum must be able to access high quality education. This is the only way the whole country rises; by improving human capital across all social groups. Data already shows SC, ST and OBC communities are faring well in HE. Women enrolment is climbing. Low income families, minorities and groups that have been left behind need focused attention. Reservation is not the only lever available for this; improving capacity in areas where these communities are highest in number is required.

Focussed affirmative programmes have seen success in developing human capital of groups left behind. For example, the Kalinga Institute of Social Sciences works with tribal children and Vidya Gyan works with economically backward children. Both institutes focus not only on providing basic education but also follow-on higher education and employment opportunities for these children. Learnings and best practices from these success stories must be propagated around the country with the overall aim of human capital development.

With women GER in higher education normalized with men's, and steadily increasing enrolment, it is essential to focus on bringing these numbers into the workforce. Apart from qualified jobs, these must include incentives for the participation and traction of women in the workforce. Many women in India are primary caregivers of their children and other family members. Employment policies must take these constraints into account so women can have the flexibility to work around their schedules. **Otherwise, well-educated women will have no option but to drop out of the workforce,** which is a loss for everyone - from the individual to her family to the nation

Fertility data indicates there will be fewer young people twenty years from now. This will result in India's workforce shrinking rapidly while supporting an ageing population. **Instead, if more women are incentivized to work, they will contribute to society and the GDP for a long time,** especially given that Indian lifespans and general wellbeing are also increasing. Higher education can also play a role in developing specific programmes for opt-out women to re-enter into workforce.

5. Special focus on Muslims required

Data shows the Muslim community is lagging behind. Estimated all-India GER for Muslims is only 9.7, compared to 26.3 for all-India. Special programs to make up deficit otherwise the community risks being left behind with large social consequences. A special drive to increase capacity and number of schools and colleges in Muslim-dominated areas is necessary. Further, focused training toward competitive exams for government jobs and skill development programs such as NSDC will provide opportunities for educated Muslims to utilize their skills in the workforce.

The Central Government and State Governments where Muslims are in higher numbers must make it a mission to improve enrolment in the community. Targets to accelerate GER over the next five years must be set and executed. **The Ministry of Minority Affairs has sufficient budget of INR 4,700 crores year-on-year already allocated to implement this.** Priority to Muslims' higher education, especially women, must be executed in this budget

The Muslim community must take charge of improving their human capital. When other groups like SC/ST/OBCs have demonstrated such rapid improvement, there is no reason the Muslim community cannot. In this world where the velocity of change is unprecedented due to technology, the internet and other drivers, every community must focus on its human capital development. The Indian Muslim community must utilize every advantage they possess to ensure their children are not left behind in this new world dynamic. Focusing on higher education is one of those compelling advantages.

6. Improve specialization

India needs more postgraduates and Ph.Ds., especially in fast-growing fields like fundamental engineering, technology, sciences, computing and AI, and so on, where we have very low capacity. In addition, these graduates need follow-on research and employment opportunities in India to serve the country's interests. Special measures to curb the outflow of our talent to other countries by providing them teaching and research opportunities at world-class facilities in India is required.

Like other countries, there must be a robust framework for effective collaboration between research, industry and academia. Developing world-class laboratories, production facilities, innovation hubs, incubation centres, science parks, and Centres of Excellence, where industry, research and academia can collaborate and produce frontier research and development of technology is the need of the hour. These facilities cannot be a numbers game; we must plan them around centres that already have expertise and facilitate the build-ups of critical mass of talent in all leading research areas. India needs to focus on developing science and technology powerhouses of innovation like the San Francisco Bay Area in the US or the Shenzhen economic zone in China.

India specially needs engineering institutions at scale with increased capacity, research and laboratories, and skilled teachers. Curriculum must focus on breadth and depth and provide an interdisciplinary education. Strategies to incentivize high-potential youngsters to enroll more in these courses can include scholarships, better laboratories in school, more application-based project work, and platforms like Atal Tinkering Labs (ATL) to develop an innovation mindset in school students.

Incentives to conduct world-class research in India through state-of-the-art facilities, research grants and committed resources toward publishing articles in international research journals and toward filing intellectual property like patents will incentivize more students in higher education to specialize and conduct ground-breaking research in India for India.

As India's budding startup ecosystem starts generating more multi-billion dollar businesses and industries in many fields, strengthening industry-academia ties will create an ecosystem of industry linked process and system innovation. Higher education institutes must deploy specialists to actively understand the needs of industry and continuously innovate around their curricula and training of students so they can specialize accordingly.

7. National Research Foundation

Research is one of India's biggest lag areas. High-quality HE institutions all over the world combine good teaching methods with research-oriented curriculum and laboratories. India must focus on this as well. At the federal level, as has been suggested by multiple groups, we need a National Research Foundation to fund long-term research projects and support our top research talent across the country.

The National Education Policy 2019 makes suggestions around setting up a grant system to fund ideas and proposals in a peer-reviewed selection process across all major domains and facilitating research at higher education institutions. To set up such systems and build mentor hood models, it recommends hiring eminent and active research scholars that are retired or near retirement from high-quality research institutions. Focus on funding young research students and faculty will enable India to build a critical mass of research talent; a valuable resource in building global research powerhouses.

There are many models for NRF around the world that we can study and implement in the Indian context – National Science Foundation (NSF) and Defence Advanced Research Projects Agency (DARPA) in the US, Singapore's National Research Foundation, and the National Natural Science Foundation in China.

8. Technology assimilation

Technology drivers are rapidly changing the world and any country (and community) that doesn't focus on this, risks getting left behind. Drivers like data and analytics, hyper-connectivity, network effects, computation, artificial intelligence and machine learning, and other emerging forces have to be assimilated in education and skills development for maximum impact.

Higher education must incorporate a technology layer for teaching and conducting research. Incorporation can be at three levels: (1) Program or discipline level with multidisciplinary and interdisciplinary subjects being vital, (2) at the organisational and governance level with artificial intelligence, machine learning, big data, and data analytics being key, and (3) the teaching/learning environment where design thinking in pedagogy and digital technologies for delivery is important

Educational technology and online learning, in particular, is gaining traction around the world as. Distance and online teaching modes are becoming popular, and many premier institutions around the world are supplementing their classroom teaching models with additional online content. MOOCs or Massive Open Online Courses from the world's best universities are turning into certification courses for students around the world.

Virtual modes of learning are gaining popularity in India as well. FICCI estimates India's e-learning market is likely to expand to over 9.5 million users by 2021. Building a robust and globally acceptable credit-system for such learning will be important to encourage students to leverage these courses as part of their overall profile enhancement. Such a system will be invaluable in raising the general level of human capital development in India.

9. Globalization

Globalization is driving the world economy today. India is attracting students from other nations who come here to study higher education. In 2018-19, 47,427 students from 164 foreign countries enrolled to study in India's higher education system. Table 24(a) shows number of students enrolled from the top 10 countries, starting with Nepal at 12,747, followed by Afghanistan at 4,657, and Bangladesh at 2,075 students. 1,518 students from the United States enrolled to study in India, whereas 106 students came from China.

Sl. No.	Country	Enrolled
1	Nepal	12,747
2	Afghanistan	4,657
3	Bangladesh	2,075
4	Sudan	1,905
5	Bhutan	1,811
6	Nigeria	1,614
7	United States	1,518
8	Yemen	1,498
9	Sri Lanka	1,252
10	Iran	1,127
Total	164 Countries	47,427

Table 24(a): Foreign student enrolment in India, data from AISHE

The top fields chosen by foreign students to study are shown in Table 24(b) – 8.9k in Bachelor of Technology degrees, 3.4k in Bachelor of Business Administration, 3.3k in Bachelor of Science degrees, 2.6k in Bachelor of Engineering degrees, and 2.5k in Bachelor of Pharmacy degrees.

Domain	Enrolled
B.Tech.	8,861
B.B.A.	3,354
B.Sc.	3,320
B.E.	2,576
B.Pharm.	2,498

Table 24(b): Top domains enrolment by foreign students in India, data from AISHE

On the other hand, the Ministry of External Affairs estimates there are 7.5+ lakh Indian students studying across 90 countries abroad. The US is the top destination with 2.2+ lakh Indian students, followed by Canada and Australia. This is an expensive affair. Instead of students traveling worldwide to go to universities, can we incentivize world-class universities to come to the students?

Top US universities already have global satellite campus systems where they ensure top quality teachers and research while opening up new access points for students to join their ecosystem. For example, Carnegie Mellon University headquartered in Pittsburgh, USA has thriving degree-granting satellite campuses in Rwanda (Africa), Australia and Qatar. Faculty from the Pittsburgh campus often travel to the satellite campuses for a semester or two to teach and conduct joint research.

US universities also collaborate heavily with select university systems worldwide and offer joint degrees. Harvard University, for instance, has two research centers in India for public policy and business administration studies where they also provide select classroom style courses. India must actively look to create partnerships with these top-tier universities to provide access to quality education for Indians in India. Crucially, this must include teaching and research in the most important fields that will impact our development in the coming century – engineering and technology, sciences, computing, urban design, clean and renewable energy, and so on.

An intensive 'Study in India' initiative can focus on making India attractive for foreign investment in higher education. We can start with specific programmed that India is strong in and then expand laterally. Cities can be developed as education hubs with strong city-specific branding in academic and general themes. Similarly states can create their own education brands – for example, with Bengaluru's prowess in science and technology, Karnataka can create and leverage that brand to expand its higher education base in science, engineering and technology. Indian institutions can also be encouraged to collaborate and start campuses in strategic countries.

10. Rankings and ratings

Our ranking systems must be updated to include research, industry outcomes, and other drivers. The newly launched National Institutional Ranking Framework is making strides in this direction and will guide India's HE institutions as more of them become autonomous. We must also pay attention to global ranking frameworks, to both learn from and ensure Indian institutions stay current.

Our top universities must aspire to be among the top 100 institutions around the world. To do this, we must look at the criteria and ensure they are being met. For example, the Times Higher Education world rankings use 13 performance indicators underlying five major metrics: research, teaching, research influence, industry income and international outlook. In 2019, for the first time in seven years, no Indian institute featured in the Top 300 on the THE World Rankings due to low resarch impact and international outlook. This indicates a lackadaisical approach toward the criteria and understanding how to maintain rankings.

The same also shows us how easy it is to understand the criteria and engineer the same. Recently established institutions like IIT Ropar and IIT Indore outperformed their older counterparts by being proactive about the ranking criteria like citation impact. The same attitude must now propel our institutions into the Top 100 over the next decade.

11. Autonomy

Keeping our institutions under heavy Government regulation will take away from focusing on quality. India has built a sufficient base for higher education now, and our next challenges are deeper inclusiveness, increasing GER and improving quality. In order to do this, our top 250 universities and institutions must be given autonomy.

Without academic, administrative, and financial autonomy, our institutions can never compete fully in global ranking systems. With constant regulation which stifles the freedom to innovate around curricula and teaching methods, institutions cannot leverage the quality improvements India needs.

The National Education Policy 2019 makes specific recommendations around granting academic, administrative, and eventually financial autonomy to HE institutions in order to enable a vibrant multidisciplinary culture at large university systems. The Policy recommends that apart from regulation on some fundamental matters like financial integrity and disclosures, governance, hiring norms, and educational outcomes, that universities be given the autonomy to develop and innovate around the rest. HE institutions can be incentivized to perform well by providing public funding to the exceptional ones.

Conclusion

'Human Capital Development in India' extensively surveys India's higher education system to understand where it stands now and how to ramp it up in the future as a means to develop India's human capital.

Specific suggestions around improving enrolment with a target GER of 50% by 2030, rapid brownfield expansion of current infrastructure to improve quality and capacity, focused Government spending and intervention to improve access and affordability, increasing social equity in higher education, and especially increasing capacity in Muslim-dominated areas to improve the community's low GER have been made in the report. Special focus on staffing by forecasting requirements and ensuring quality of teachers is needed to improve the overall quality of the system. Follow-on employment opportunities in research and formal employment by building industry partnerships and understanding the needs of the industry is required so higher education graduates can apply themselves in well-qualified jobs.

Specialization has to go up, overall. Instituting a robust framework for effective collaboration between research, industry and academia, and incentives to conduct world-class research in India through state-of-the-art facilities, and research grants will incentivize more students in higher education to specialize and conduct ground-breaking research in India for India. The move to build a National Research Foundation to fund long-term research projects and support our top research talent across the country must be executed immediately

Higher education institutions must incorporate technology layers to keep up with this change. Harnessing the globalization trend by incentivizing more students to come to India to study while retaining India's talent is important. India's top 250 universities must be granted academic, administrative, and financial autonomy so they may innovate as required and build vibrant multidisciplinary universities that can compete with the world's best in quality

India certainly has the potential and base infrastructure to rapidly improve its human capital. By focusing on higher education, and follow-on employment and research universities, we can quickly develop our human capital as India aims for USD 5 trillion GDP by 2025 and USD 10 trillion by 2030.

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About FICCI

Federation of Indian Chambers of Commerce and Industry (FICCI)

Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

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FICCI Higher Education Committee

FICCI has been playing a proactive role in the Education sector since the last 15 years. It has been the leading industry association, that has been advocating reforms in education sector, carrying out research, surveys and studies. FICCI's Higher Education (HE) Committee, which has a strong representation from the Industry, Academia, thought leaders, Think Tanks, NGOs and Consultants, is a platform for policy advocacy, creating sustainable industry—academia linkages, networking, knowledge sharing and promoting collaborative ventures in academic exchanges, industry-oriented research/ consultancy and value-added services. Over the years, the Higher Education Committee has proactively been complementing Government's growth agenda for the sector.

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