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Human capital accumulation and economic growth of India

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Abstract
Human capital serves as a fundamental pillar of economic growth in contemporary economies, paralleling the importance of physical capital and the natural environment in sustainable development. Beyond formal education, human capital encompasses occupational skills, health, nutritional status, cultural values, and institutional knowledge, often interlinked with the concept of social capital. In India, the Gross Enrollment Ratio (GER) in higher education has shown a consistent upward trajectory, increasing from 19.4% in 2010–2011 to 27.1% in 2019–2020. This study investigates the relationship between GER and Gross Domestic Product Per Capita (GDP PC) over the period 2010 to 2019. Data were sourced from the All India Survey on Higher Education (AISHE) reports and World Bank databases. Employing Pearson's correlation and ANOVA, the study finds a strong positive correlation between GER and GDP PC. The regression analysis indicates that GER significantly predicts GDP PC, explaining 82.1% of its variance ($F = 36.573$, $p < .05$). The mean and standard deviation of GDP PC were found to be ₹1669.95 and ₹268.42 respectively, underscoring the economic returns of higher education. These findings suggest that investments in higher education yield tangible economic benefits and highlight the critical role of human capital in driving inclusive and sustained economic development.

Keywords: Human capital, sustainable economic growth, gross enrolment ratio, GDP per capita, higher education

Introduction

Human capital is the primary driver of economic growth in modern economies and since it is subject to the same risks of depreciation and obsolescence as physical or tangible capital, we view it as a component of sustainable development on par with the physical environment. In addition to education, occupational skills, nutritional status, health, culture, and values are also considered to be aspects of human capital. In a broader sense, they also refer to institutional mechanisms and knowledge, which are both occasionally referred to as social capital. Higher education in India marked a Gross Enrollment Ratio (GER) of 27.1 in the financial year 2019-2020 which indicated a rise from 26.3% in 2018-2019 and 19.4 in 2010-2011.

The increase of the Gross Enrollment Ratio (GER) to 50% by 2035 is one of NEP 2020's main objectives. Although higher education institutions are continually striving for growth, there are currently 37.4 million students enrolled in universities, with a GER of 26.3. Hence, achieving the target GER of 50% is not simple. In order to accomplish this, NEP 2020 will revamp the curriculum, pedagogy, and assessments. India would require 3.3 million additional instructors in higher education by 2035 based on a teacher student ratio of 1:15, which is a 235% increase from the current availability of 1.4 million teachers, in order to achieve the aim of 50% higher GER.

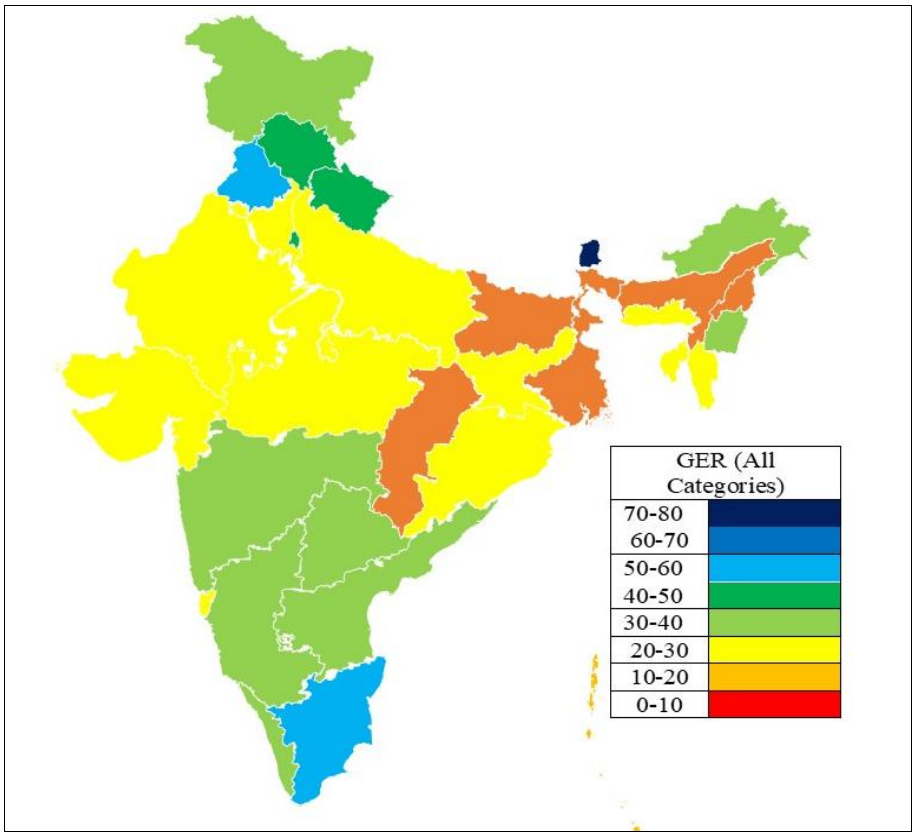
In comparison to 26.3 percent in 2018–19 and 24.3 percent in 2014–2015, 27.1 percent of students in the qualifying age group are enrolled in higher education in 2019–20. Total enrollment in higher education has increased by 11.36 lakh (3.04%), ie from 3.74 crore in 2018–19 to 3.85 crore in 2019–20. In 2014–15, there were 3.42 crore students enrolled. Overall 3.38 crore students are enrolled in undergraduate and graduate programs. Of this, almost 85% of these students (2.85 crore) were enrolled in one of the six main academic fields: humanities, science, commerce, engineering and technology, medical science, or information technology and computer science. Compared to 1.17 lakh in 2014–15, 2.03 lakh students are pursuing PhDs in 2019–20.

A World Bank Policy Research Working Paper estimates that between 2011 and 2019, India's rate of extreme poverty decreased by 12.3 percentage points. According to the report, the number of people living in extreme poverty decreased from 22.5% in 2011 to 10.2% in 2019. The fall in rural areas was also significantly greater than in urban areas. The literacy rate has also raised from 69.3 per cent in the year 2011 to 74.3 per cent in the year 2018 according to world bank data. In 2010, the total unemployment rate was 5.5 percent, however by 2019, it had dropped to 5.3 percent. During these years, the total unemployment rate has decreased as India's gross enrollment ratio has increased.

The below figure shows the GER of Indian states as on 2020.

According to the All India Survey on Higher Education (AISHE) 2020–2021 published by the Ministry of Education. Higher education enrollment rises to 4.14 crore, surpassing the 4-crore mark for the first time; this is an increase of 7.5% from 2019–20 and 21% from 2014–15. Female enrollment reaches 2 crores, an increase of 13 lakh from 2019–20, and there is a significant increase in the number of SC students (28% in 2020–21 and 38% in 2020–21 for female SC students), as well as a significant increase in the number of SC students overall (28% from 2014–15). Significant growth in ST student enrollment of 47% and in female ST student enrollment of 63.4% from 2014–15 to 2020–21. Additionally, there has been a notable increase in OBC student enrollment of 32% since 2014–15 and a 39% increase in female OBC students. The North Eastern Region will have a noticeable rise in student enrollment of 29% and in female student enrollment of 34% in 2020–21 compared to 2014–15. All social groups' Gross Enrolment Ratios (GER) improved over the previous year, while enrollment in distance education climbed by 7% from 2019–20 to 2020–

21. In 2020-21 compared to 2019-20, the number of Universities has increased by 70, while the number of Colleges has increased by 1,453. The Gender Parity Index (GPI), which was 1 in 2017–18, has increased to 1.05 in 2020–21. The overall number of professors and teachers rises by 47,914 from 2019–20.



Source: The authors drew this map based on AISHE 2020-21 report, MoE, India

Objective

Human capital is the primary driver of economic growth in modern economies and since it is subject to the same risks of depreciation and obsolescence as physical or tangible capital, we view it as a component of sustainable development on par with the physical environment. In addition to education, occupational skills, nutritional status, health, culture, and values are also considered to be aspects of human capital. In a broader sense, they also refer to institutional mechanisms and knowledge, which are both occasionally referred to as social capital. Higher education in India marked a Gross Enrollment Ratio (GER) of 27.1% in the financial year 2019-2020 which indicated a rise from 26.3% in 2018-2019 and 19.4% in 2010-2011. This paper investigates the impact of the gross enrollment ratio (GER) on the gross domestic product per capita (GDP PC).

Methodology

The Gross enrolment ratio data and GDP per capita data from 2010 to 2019 are collected from AISHE reports and world bank reports respectively. Pearson's Correlation and ANOVA have been used to understand the association between these variables.

Results and Discussion

Table 1: Descriptive information

	Mean	Std. Deviation	N
Gross enrollment ratio	23.7900	2.54141	10
Gdp per capita income	1669.9500	268.42061	10

Source: SPSS output

The above table shows the descriptive statistics of Gross enrollment ratio and GDP per capita income. The mean GER over the 10-year period is 23.79%, indicating the average percentage of students enrolled in higher education out of the total eligible population. The mean GDP per capita is ₹1669.95, suggesting the average income per person. The standard deviations show how spread out the values are around the mean. GER has a smaller variation (2.54), while GDP PCI varies more (268.42).

Table 2: Correlations

		Gross enrollment ratio	GDP Per Capita Income
Gross enrollment ratio	Pearson correlation	1	.906**
	Sig. (2-tailed)		.000
	N	10	10
Gdp per capita income	Pearson correlation	.906**	1
	Sig. (2-tailed)	.000	
	N	10	10

**. Correlation is significant at the 0.01 level (2-tailed).

Source: spss output

The Pearson correlation coefficient between GER and GDP PCI is 0.906, which is a very strong positive correlation. The p-value is 0.000, which is less than 0.01, indicating the correlation is statistically significant at the 1% level. This implies that as GER increases, GDP PCI also increases.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906[a]	.821	.798	120.61508

a. Predictors: (Constant), GROSS ENROLLMENT RATIO
Source: SPSS output

The R value (0.906) confirms strong linear relationship between gross enrollment ratio and GDP per capita Income. The above table shows that 82.1% of the variation in GDP per capita is explained by GER and the adjusted R square value is 0.798 indicating good model fit.

Table 4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	532062.637	1	532062.637	36.573	.000[b]
	Residual	116383.971	8	14547.996		
	Total	648446.608	9			

a. Dependent Variable: GDP PER CAPITA INCOME
b. Predictors: (Constant), GROSS ENROLLMENT RATIO
Source: SPSS output

The F-statistic is 36.573, and the p-value is 0.000, which is highly significant ($p < 0.05$). This means the model significantly explains the variability in GDP PCI. GER is a significant predictor of GDP PCI.

Table 5: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(constant)	-606.087	378.284		-1.602	.148
	Gross enrollment ratio	95.672	15.820	.906	6.048	.000

a. Dependent Variable: GDP Per Capita Income
Source: SPSS output

The regression coefficient 95.672 shows that in this model gdp per capita income increases by 95.672 rupees with each additional unit of gross enrollment ratio. The t-value for GER is 6.048 and the p-value is 0.000, indicating that GER is a statistically significant predictor of GDP PCI. The constant (-606.087) is not statistically significant ($p = 0.148$), so the intercept may not be meaningful alone in this context.

Conclusion

The GDP Per Capita Income is influenced by the Gross Enrolment Ratio with a mean and standard deviation of 1669.95 and 268.42 respectively. This proposes that the PCI of the country is affected by enrolments in higher education. The dependent variable GDP Per Capita Income and the independent variable Gross Enrolment Ratio are related and there exists a strong positive correlation between them. When the Gross Enrolment Ratio is increased then the GDP Per Capita Income also increases and vice versa. Hence GDP Per Capita Income is regressed on GER. The model fits perfectly with 82.1% of the explanation of the variance in the GDP Per Capita Income and this explanation is considered valid as the F value (36.573) is significant statistically ($p<.05$). the beta coefficient is also significant as the t value is significant($p<.05$).

Implications for theory and Practice

Without a doubt, India would develop into a superpower in the world if all of the enrolled youth were trained to become skilled forces. We can outperform the rest of the world in terms of technological development and raise the socioeconomic standing of the country. By 2035, the Gross Enrolment Ratio in higher education (including vocational education) is expected to rise from 27.1 percent (2019–20) to 50 percent, according to the National Education Policy, 2020. Although 60.56 percent of colleges in India are currently located in rural areas, the NEP aspires to construct new higher education institutions (HEIs) in underserved areas to improve access, equity, and inclusion. To fulfil these capacity-building objectives, current higher education institutions will need to be developed and improved.

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