

A Study on the Performance and Growth of Higher Education System in Karnataka: An Exponential Growth Model Analysis

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Abstract

Higher education plays a significant role in human capital formation, economic development, employment generation and social transformation. Karnataka has emerged as one of India's important higher-education centres, with a large network of universities, colleges and standalone institutions. The present study analyses the performance and growth of the higher education system in Karnataka, with particular emphasis on student enrolment, universities, colleges, Gross Enrolment Ratio (GER) and gender participation. Student enrolment increased from about 18.58 lakh in 2015–16 to about 27.6 lakh in 2023–24, while the number of universities increased from 52 to 91 and colleges from 3,555 to 4,529. Karnataka's overall GER increased to 41.9% in 2023–24, considerably above the national level of 30.0%.

The study results indicate a significant positive growth trend in higher education enrolment in Karnataka during the period from 2015–16 to 2024–25. The exponential growth model reveals an estimated annual growth rate of approximately 4.59%, with an R^2 value of 0.9151, indicating that 91.51% of the variation in student enrolment is explained by the time trend. The estimated exponential growth coefficient was statistically significant at the 1% level ($p < 0.01$), confirming the existence of a strong and systematic upward trend in higher education enrolment. Overall, the findings demonstrate substantial expansion in student participation in higher education in Karnataka during the study period, despite minor fluctuations in enrolment in certain years. The study concludes that Karnataka has experienced substantial quantitative expansion, although issues relating to quality, regional disparities, employability, research capacity and equitable access require continued policy attention.

Keywords: Higher Education; Colleges; Universities; Student Enrolment; GER; Growth Rate; Exponential Growth Model.

I Introduction

Higher education is an important component of human capital formation, economic development, social mobility and technological advancement. It provides skilled manpower, promotes research and innovation, enhances employability and contributes to the overall development of society. In India, the higher education sector has expanded considerably in terms of universities, colleges, student enrolment and institutional diversity. The All India Survey on Higher Education (AISHE) of the Ministry of Education is the principal source for measuring this expansion through indicators such as institutions, enrolment, teachers, Gross Enrolment Ratio (GER), gender participation and infrastructure. Karnataka occupies a prominent position in India's higher education system. The state has a large and diverse network of universities, affiliated colleges, autonomous institutions, professional institutions and standalone

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institutions. Bengaluru, in particular, has emerged as a major national centre for higher education, research, technology and innovation. The concentration of educational institutions in Bengaluru and other urban centres has contributed significantly to Karnataka's position as one of India's leading higher-education states.

Over the last decade, Karnataka has witnessed substantial institutional expansion. Historical AISHE data show that Karnataka has consistently remained among the states with the highest number of colleges in India. Its college density has also been considerably higher than the national average. The higher education system in Karnataka in 2025 can be characterised by institutional expansion, increasing student participation, diversification of programmes and growing emphasis on quality and skill-oriented education. Karnataka's higher education system is supported by government, private-aided and private-unaided institutions, providing education in arts, science, commerce, engineering, medicine, agriculture, law, management, technology and other professional disciplines. The latest completed AISHE data available for Karnataka are for 2023–24, and therefore these figures provide the most reliable statistical base for describing the higher-education situation around 2025. The Ministry of Education's current statistics portal continues to identify AISHE as a major source of higher-education statistics.

According to the latest Karnataka figures used in the study, the state had approximately 91 universities and 4,529 colleges in 2023–24. Student enrolment was approximately 27.6 lakh, demonstrating the considerable scale of higher education in the state. Karnataka's Gross Enrolment Ratio (GER) reached 41.9% in 2023–24, substantially above the national GER of about 30%. Female GER was about 42.8%, compared with 41.0% for males, indicating relatively strong female participation in higher education. The expansion of institutions has also improved the geographical availability of higher education. Karnataka recorded a college density of about 66 colleges per lakh population in the 18–23 age groups in 2021–22, placing it among the leading states in India.

II Research Objectives

The study has the following objectives:

1. To examine the performance and growth of the higher education system in Karnataka.
2. To analyse the trends in colleges, universities and enrollment of higher education system in the state.

III Research Hypothesis

1. There is a significant exponential growth in student enrolment in higher education in Karnataka during the study period.

IV Research Methodology and Data Sources

The study is based primarily on secondary data. The major source of data is the All India Survey on Higher Education (AISHE) published by the Ministry of Education, Government of India, University Grants Commission (UGC), Karnataka State Higher Education Council, Karnataka Economic Survey (2025), Directorate of Economics and Statistics, Government of Karnataka, and other relevant government publications. The study also refers to relevant research articles, academic literature, newspapers, magazines, and reliable websites to supplement and contextualise the analysis.

Statistical Techniques: The study employs various statistical techniques to analyse the growth and performance of higher education in Karnataka. These include percentage analysis, Annual Growth Rate (AGR), Compound Annual Growth Rate (CAGR), trend analysis, and the exponential growth model. For data processing, statistical analysis, tabulation, and graphical presentation, the study uses Microsoft Excel, SPSS 21, EViews, and Gretl. The application of these statistical tools facilitates systematic analysis and interpretation of the trends and growth patterns in the higher education sector of Karnataka.

V Performance of Higher Education System in Karnataka

The higher education system in Karnataka serves as a major engine of technological innovation, economic mobility, human capital development, and research in India. By 2025–26, Karnataka has strengthened its position as

one of the country's leading educational hubs, supported by major academic and research centres in Bengaluru, Mysuru, Mangaluru, and other parts of the state. Karnataka's Gross Enrolment Ratio in higher education is approximately 41.8%, which is considerably higher than the national average. Female students have continued to demonstrate strong participation in higher education, with women's enrolment and academic performance showing notable improvement.

Karnataka has one of the highest concentrations of higher education institutions in India, with about 69 colleges per lakh population in the 18–23 age groups. This relatively high institutional density provides greater access to higher education across the state. The state's higher education ecosystem comprises more than 90 universities and nearly 5,000 colleges, offering programmes across diverse disciplines, including arts, science, commerce, engineering, medicine, management, and other professional and technical fields.

Table-1 Karnataka's Gross Enrolment Ratio (2019 to 2023)

Year	GER (%)
2019–20	32.0
2020–21	36.0
2021–22	36.2
2022–23	39.6
2023–24	41.9

Source: Compiled from the All India Survey on Higher Education (AISHE),

As shown in the table, Karnataka's GER increased substantially from 32.0% in 2019–20 to 41.9% in 2023–24. This indicates a significant improvement in participation among the 18–23 age groups. The latest AISHE report places Karnataka well above the national GER of 30.0% in 2023–24. This relatively high GER reflects Karnataka's extensive network of colleges, universities and professional institutions.

VI Results and Discussion

Status and Growth of Higher Education in Karnataka: Colleges, Universities, and Enrollment

The higher education system in Karnataka is administered through six Regional Joint Directors' Offices located at Bengaluru, Mysuru, Mangaluru, Shivamogga, Dharwad, and Kalaburagi. These offices oversee 411 Government First Grade Colleges, 12 Government Residential First Grade Colleges, 2 Government Fine Arts Colleges, 3 Government Sanskrit Colleges, 320 Private Aided Degree Colleges, 53 Private Aided B.Ed. Colleges, 27 Private Aided Law Colleges, and 23 Private Aided Fine Arts Colleges (Economic Survey of Karnataka – 2025).

Table-2 Growth of Universities, Colleges and Higher Education Enrolment in Karnataka (2015 to 2024)

Year	Universities	Colleges	Higher Education Enrolment (In Lakh)
2015–16	52	3,555	18.57
2016–17	55	3,753	18.71
2017–18	60	3,593	19.43
2018–19	65	3,670	19.88
2019–20	69	4,047	21.87
2020–21	72	4,233	24.40
2021–22	72	4,430	23.51
2022–23	79	4,524	24.34
2023–24	91	4,529	27.60
2024–25	94	5,013	25.74

Source: Compiled from the All India Survey on Higher Education (AISHE), Ministry of Education, Government of India, and Karnataka Higher Education Department reports. Note: The 2023–24 and 2024–25 enrolment figures in the supplied dataset should be cross-checked with the latest AISHE release before final publication.

The data indicate a substantial expansion of Karnataka's higher education infrastructure during the period 2015–16 to 2024–25. The number of universities increased from 52 to 94, representing an increase of approximately 80.8% over the study period. This expansion indicates the strengthening of the state's institutional capacity for higher education. The number of colleges also increased considerably, from 3,555 in 2015–16 to 5,013 in 2024–25, an increase of approximately 41.0%. Although there were some fluctuations in the number of colleges during the middle years, the overall trend was clearly upward, particularly after 2018–19. Higher education enrolment increased from 18.58 lakh students in 2015–16 to 25.74 lakh in 2024–25, representing an overall increase of approximately 38.6%. Enrolment reached its highest level in the supplied series in 2023–24, at 27.60 lakh, before declining to 25.74 lakh in 2024–25. This decline may warrant further investigation in terms of demographic changes, institutional reporting, migration, programme restructuring, or differences in the underlying data sources.

Trend Analysis and CAGR Results for Higher Education in Karnataka

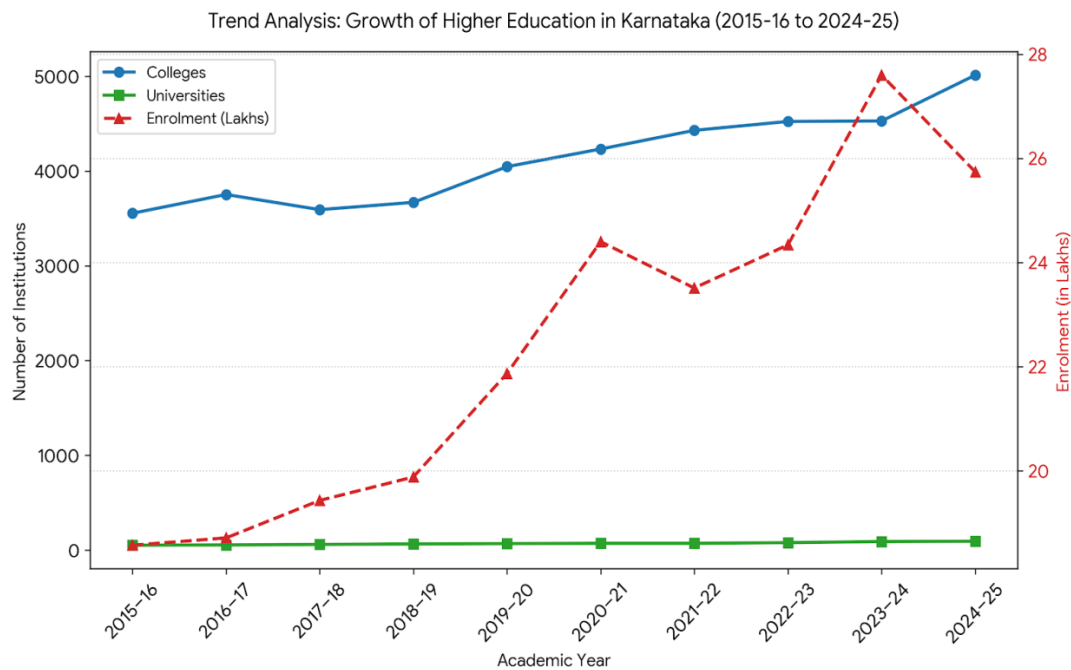
The trend analysis shows a clear expansion of Karnataka's higher education infrastructure during the study period. The number of universities increased from 52 in 2015–16 to 94 in 2024–25, while the number of colleges increased from 3,555 to 5,013. Higher education enrolment also increased from 18.57 lakh to 25.74 lakh during the same period. Table-3 details the AGR of Universities, colleges, and higher education enrolment in Karnataka from 2015 to 2024.

Table-3 AGR of Universities, Colleges and Higher Education Enrolment in Karnataka

(2015 to 2024)

Year	Universities	Annual Growth (%)	Colleges	Annual Growth (%)	Enrolment (Lakh)	Annual Growth (%)
2015–16	52	-	3,555	-	18.57	-
2016–17	55	5.77	3,753	5.57	18.71	0.75
2017–18	60	9.09	3,593	-4.26	19.43	3.85
2018–19	65	8.33	3,670	2.14	19.88	2.31
2019–20	69	6.15	4,047	10.27	21.87	10.01
2020–21	72	4.35	4,233	4.60	24.40	11.57
2021–22	72	0.00	4,430	4.65	23.51	-3.65
2022–23	79	9.72	4,524	2.12	24.34	3.53
2023–24	91	15.19	4,529	0.11	27.60	13.15
2024–25	94	3.30	5,013	10.68	25.74	-6.74

Source: Compiled Data by the Researcher

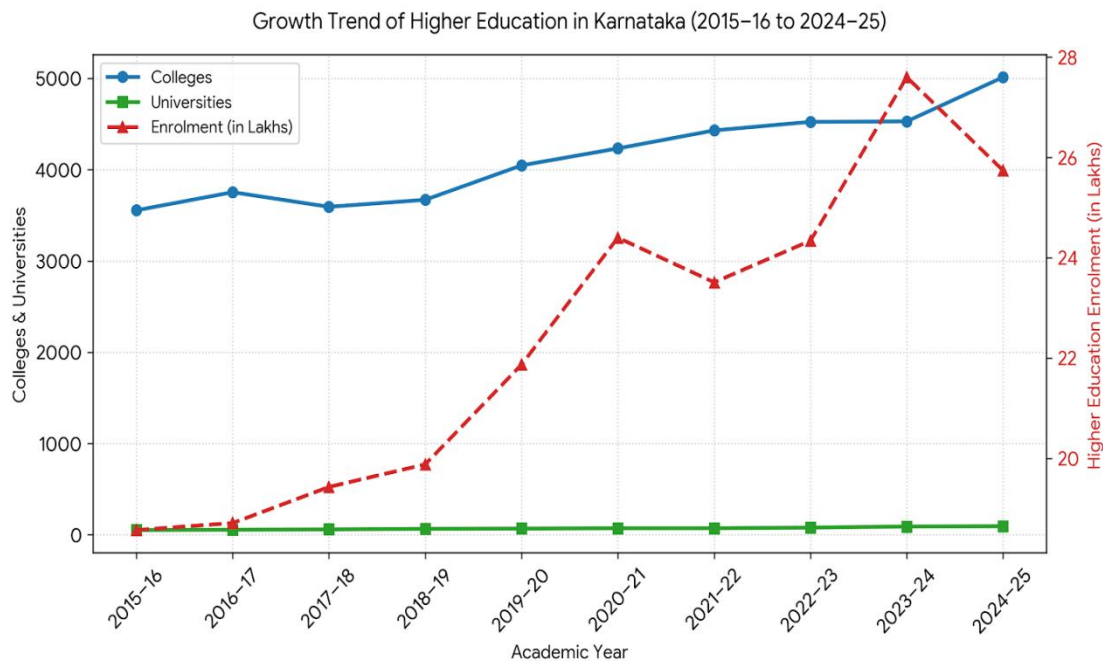


The annual growth analysis reveals that the expansion of universities was generally positive throughout the study period. The highest annual growth in universities occurred in 2023–24 (15.19%), followed by 2022–23 (9.72%). The number of colleges showed greater fluctuations. The most notable decline occurred in 2017–18 (-4.26%), whereas the highest growth was recorded in 2019–20 (10.27%) and again in 2024–25 (10.68%). Thus, despite some short-term fluctuations, the long-term trend in the number of colleges was positive. Higher education enrolment also demonstrated an overall upward trend but with greater year-to-year volatility. The highest annual growth was recorded in 2023–24 (13.15%), followed by 2020–21 (11.57%) and 2019–20 (10.01%). However, enrolment declined by 3.65% in 2021–22 and by 6.74% in 2024–25. These fluctuations indicate that growth in institutional capacity did not always translate into a corresponding increase in student enrolment.

Table-4 Overall Growth and CAGR of Higher Education in Karnataka

Indicator	2015–16	2024–25	Absolute Increase	Percentage Increase	CAGR (%)
Universities	52	94	42	80.77	6.80
Colleges	3,555	5,013	1,458	41.01	3.89
Higher Education Enrolment (Lakh)	18.57	25.74	7.17	38.61	3.69

Source: Compiled Data by the Researcher



The

CAGR results demonstrate that the number of universities recorded the highest rate of growth, with a CAGR of 6.80% per annum. The number of universities has increased by nearly 80.77%, indicating substantial expansion in university-level institutional capacity over the study period. The number of colleges registered a CAGR of 3.89%, increasing from 3,555 to 5,013. This represents an overall increase of 41.01%. Although the rate of expansion was lower than that of universities, the substantial increase in the number of colleges indicates continued strengthening of the state's higher education network. Higher education enrolment increased at a CAGR of 3.69%, rising from 18.57 lakh students in 2015–16 to 25.74 lakh in 2024–25. The enrolment growth rate was therefore lower than the growth rates of both universities and colleges. This suggests that institutional expansion occurred at a faster pace than student enrolment growth.

VII Testing Hypothesis

H_0 : There is a significant exponential growth in student enrolment in higher education in Karnataka during the study period.

H_1 : There is a significant exponential growth in student enrolment in higher education in Karnataka during the study period.

Exponential Growth Model Analysis: For the exponential growth analysis, the comparable annual enrolment observations from 2015–16 to 2024–25 were used. An exponential growth model can be estimated using the log-linear form:

$$\ln Y = a + bt$$

Where, Y represents higher education enrolment in lakh and t represents the time period. Estimated exponential equation:

$$\ln(Y) = 2.8536 + 0.04484t$$

or,

$$Y = 17.3500e^{0.04484t}$$

The implied annual exponential growth rate is approximately 4.59%.

Table-5 Exponential Growth Model of Higher Education Enrolment in Karnataka from 2015–16 to 2024–25

Particulars	Exponential Growth Model Result
Constant (a)	2.8536
Exponential coefficient (b)	0.04484
Standard Error of b	0.00766
t-value	5.85
p-value	0.000015
R ²	0.9151
Adjusted R ²	0.9045
Annual Exponential Growth Rate	4.59%
Number of observations (N)	10
F-statistic	34.47
Significance	Significant at 1% level

Source: Compiled Data by the Researcher

As shown in the table, the exponential growth model results indicates that higher education enrolment in Karnataka experienced a positive and statistically significant growth trend during the period from 2015–16 to 2024–25. The estimated exponential coefficient is 0.04484, corresponding to an annual growth rate of approximately 4.59%. The R² value of 0.9151 indicates that approximately 91.51% of the variation in higher education enrolment is explained by the time trend specified in the exponential growth model. The coefficient is statistically significant at the 1% level, as the p-value (0.000015) is considerably lower than 0.01.

This demonstrates strong evidence of a systematic upward growth trend in student enrolment. Although enrolment shows some year-to-year fluctuations—for example, a decline from 24.40 lakh in 2020–21 to 23.51 lakh in 2021–22 and from 27.60 lakh in 2023–24 to 25.74 lakh in 2024–25—the overall long-term trend remains strongly positive. Enrolment increased from 18.57 lakh in 2015–16 to 25.74 lakh in 2024–25, representing substantial expansion in higher education participation. Since the estimated exponential growth coefficient is statistically significant ($p = 0.000015 < 0.01$), the null hypothesis is rejected and the alternative hypothesis is accepted. The empirical results provide strong statistical evidence that higher education enrolment in Karnataka has experienced significant exponential growth during 2015–16 to 2024–25, with an estimated annual growth rate of approximately 4.59%. The high R² value of 0.9151 further confirms the strong explanatory power of the time-based exponential growth model.

VIII Major Findings and Conclusion

The study concludes that the higher education system in Karnataka experienced a substantial and sustained expansion during 2015–16 to 2024–25, although the pace of growth varied across universities, colleges and student enrolment. The annual growth analysis reveals that the number of universities followed a predominantly positive trend, with the highest growth recorded in 2023–24 (15.19%), followed by 2022–23 (9.72%). The growth of colleges was comparatively fluctuating, with a decline of 4.26% in 2017–18 but strong growth in 2019–20 (10.27%) and 2024–25 (10.68%). Higher education enrolment also increased overall, despite periodic declines, particularly in 2021–22 and 2024–25. These variations suggest that institutional expansion and enrolment growth did not occur at a uniform pace. The CAGR analysis further confirms the long-term expansion of Karnataka's higher education infrastructure. Universities recorded the highest CAGR of 6.80%, increasing by approximately 80.77% over the study period. Colleges registered a CAGR of 3.89%, increasing from 3,555 to 5,013, representing an overall growth of 41.01%. Higher education enrolment recorded a CAGR of 3.69%, increasing from 18.57 lakh students in 2015–16 to 25.74 lakh in 2024–25. The comparatively lower CAGR of enrolment indicates that the expansion of institutional capacity occurred at a faster rate than the growth in student participation.

The exponential growth model provides strong statistical evidence of a positive long-term trend in higher education enrolment. The estimated exponential coefficient of 0.04484 corresponds to an annual growth rate of approximately 4.59%. The model's R² value of 0.9151 indicates that 91.51% of the variation in enrolment is explained

by the time trend. Moreover, the coefficient is statistically significant at the 1% level, with a p-value of 0.000015, which is substantially below 0.01. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, confirming that higher education enrolment in Karnataka experienced a statistically significant exponential growth trend during the study period.

Finally, the empirical findings from annual growth analysis, CAGR and exponential modelling demonstrate that Karnataka has made considerable progress in expanding its higher education system. However, the faster growth of institutional capacity compared with enrolment highlights the need to strengthen student participation and ensure effective utilisation of available educational infrastructure. Future policies should therefore focus not only on quantitative expansion but also on quality enhancement, equitable access, regional balance, faculty development, employability, digital infrastructure, research and innovation. Sustaining these measures will be essential for transforming Karnataka's expanding higher education network into a more inclusive, efficient and quality-oriented system capable of meeting the educational and human-resource requirements of the state. The study also highlights that quantitative expansion alone cannot ensure better educational outcomes. Greater attention is required to quality, employability, research and innovation, digital infrastructure, faculty availability, regional equity and industry-academic linkages. Therefore, Karnataka's future higher education strategy should focus on achieving a balance between institutional expansion and quality improvement.

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