

Progress of Social and Physical Infrastructure in Uttar Pradesh Over the Last Decade (2015 to 2024)

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Abstract

This study analyses the progress of social and physical infrastructure in Uttar Pradesh during 2015–2024 using secondary data from the Directorate of Economics and Statistics, Uttar Pradesh (UPDES). It adopts a descriptive and analytical approach, applying normalization, Composite Index (CI), trend analysis, and CAGR. The findings show significant improvement in physical infrastructure, with a strong upward trend in road connectivity, electricity consumption, and LPG access. However, social infrastructure presents mixed results, as the health sector shows fluctuations and a declining trend, while the education sector records moderate progress. The employment and income sector also shows instability, indicating that economic growth has not adequately translated into job creation. The study concludes that despite progress in physical infrastructure, balanced development of social sectors is essential for achieving inclusive growth.

Keywords: Social Infrastructure, Physical Infrastructure, Uttar Pradesh, Composite Index (CI), Trend Analysis, CAGR, Inclusive Growth

Introduction:

Uttar Pradesh is the most populous state of India and plays an extremely important role in the socio-economic structure of the country. With a population of more than 24 crore, the state is important not only from a demographic perspective but also holds an influential position at the national level politically and economically. Uttar Pradesh's contribution to India's total population, labour force, and consumer market is significant, making it a major region from the perspective of investment and development.

From an economic perspective, Uttar Pradesh makes an important contribution to the country's Gross Domestic Product (GDP). It has active participation in all three sectors- agriculture, industry, and services. The state has been a leader in the production of major agricultural products such as sugarcane, wheat, and rice. Along with this, Micro, Small and Medium Enterprises (MSMEs), the textile industry, handicrafts, and emerging manufacturing sectors provide momentum to the state's economy. In recent years, the state government has placed special emphasis on industrial investment, expressways, airports, and logistics parks, due to which economic activities have accelerated.

From a demographic point of view, the state has a high percentage of youth population, which presents opportunities for a “demographic dividend.” If this vast human resource is provided with quality education, health, and employment opportunities, Uttar Pradesh can play a decisive role not only at the state level but also in national development. Therefore, understanding its social and economic background is extremely necessary for the study of infrastructure progress.

Considering the large population, diverse economic structure, and strong development aspirations of Uttar Pradesh, the development of infrastructure becomes extremely necessary for overall progress. Infrastructure is the foundation of any economy because it facilitates the process of production, distribution, investment, and human resource development smoothly. When strong physical and social infrastructure is available in a state, economic activities increase rapidly and development becomes more inclusive.

Physical infrastructure- such as roads, electricity, transport, irrigation, industrial parks, and communication facilities- reduces production costs and makes access to markets easier. For example, better road and expressway networks make the transportation of agricultural products and industrial goods faster and cheaper, benefiting both farmers and industries. Similarly, regular electricity supply helps in the expansion of industries and attracting new investments. When investment increases, employment opportunities are generated and income levels rise, which has a positive impact on the state’s gross income. Social infrastructure- such as education, health, drinking water, sanitation, and housing- is the foundation of human capital development. Quality education and health services increase the productivity of the labour force. A healthy and educated population is more skilled, innovative, and competitive, which accelerates long-term economic development. Especially in a youth-populated state like Uttar Pradesh, strengthening social infrastructure is essential to convert the “demographic dividend” into real economic gains.

In addition, infrastructure development also plays an important role in reducing regional inequalities. When facilities such as roads, electricity, schools, and hospitals reach backward and rural areas, the benefits of development reach widely to all sections of society. This promotes social justice and balanced regional development.

Therefore, it is clear that infrastructure development is not limited only to economic growth; rather, it is a decisive factor in social empowerment, employment generation, investment attraction, and sustainable development. Therefore, while evaluating the overall progress of Uttar Pradesh, the analysis of social and physical infrastructure development becomes extremely important.

In the above context, it is necessary to clearly understand the concept of social and physical infrastructure, because this forms the central basis of the present study. In a vast and diverse state like Uttar Pradesh, to measure the direction and speed of development, separate as well as integrated analysis of both types of infrastructure becomes extremely important.

Social Infrastructure refers to those facilities and institutional arrangements that directly affect human development. It mainly includes services such as education, health, drinking water, sanitation, housing, nutrition, and social security. These elements assist in the formation of human capital and lay the foundation for long-term economic development. For example, an increase in the number of schools and higher educational institutions, availability of health centres, reduction in maternal and infant mortality rates, and access to clean drinking water- all these indicators reflect the progress of social infrastructure.

On the other hand, Physical Infrastructure refers to those basic facilities that facilitate production, transportation, and economic activities. It includes road and transport networks, electricity supply,

irrigation systems, industrial areas, communication systems, and urban development structures. These facilities connect markets, attract investment, and increase industrial and agricultural productivity.

The period from 2015 to 2024 is particularly important because during this decade, infrastructure projects expanded rapidly in the state. During this time, special emphasis was given to expressways, airports, electricity production, smart city schemes, and social welfare programs. Therefore, the analysis of this period will help in understanding to what extent infrastructure development in the state has influenced economic and social progress.

In this study, the period from 2015 to 2024 has been selected for analysis. This decade can be considered extremely important from the perspective of Uttar Pradesh's development because during this time infrastructure development was given special priority in the state. During this period, several major projects related to roads, expressways, airports, electricity supply, and urban development were initiated and completed. Along with this, planned expansion was also seen in social sectors such as education, health, housing, and sanitation.

This period is also important because it includes rapid policy changes, investment promotion efforts, and the impact of global challenges such as COVID-19. Therefore, the analysis of 2015–2024 provides a comprehensive and contemporary perspective to understand the progress of infrastructure in the state, policy effectiveness, and the direction of development.

Review of Literature:

Amita Kushwaha (2025), found in her study that the use of digital platforms such as DIKSHA and Samagra Shiksha enhances teacher professional development by improving access to training, digital skills, and pedagogical practices. The study also highlights that blended learning approaches, combining online and face-to-face methods, are more effective in bringing real classroom improvements. Furthermore, it emphasizes that infrastructure gaps, limited digital literacy, and lack of contextualized content remain major challenges affecting the overall effectiveness of technology-driven teacher training.

Altaf Hussain Padder and B Mathavan (2025), found that economic growth in India does not necessarily lead to employment generation. The study highlights a negative relationship between GDP and employment, indicating a “jobless growth” phenomenon, where rising output fails to create sufficient job opportunities due to structural and capital-intensive changes.

Bado, & Dunakhir (2024), This study found that a state's infrastructure contributes to the development of the state both directly and indirectly such as road connectivity and power supply which will attract foreign investment. In this study, the importance of infrastructure was given greater emphasis at the national or international level than at the state level.

Mehr-un-Nisa and Faghiya Khalid (2024), found in his study that the development of infrastructure also increases agricultural productivity, which leads to an improvement in the quality of rural life and a rise in income. This study also highlights the importance of social infrastructure, particularly in education and health services.

Monica et al. (2024), found that unemployment and economic growth in India are closely related. The study confirms that higher economic growth generally reduces unemployment, supporting Okun's law. However, structural issues and capital-intensive growth patterns limit the capacity of economic expansion to generate sufficient employment opportunities.

Swarna Prava Hota and Sanat Kumar Acharya (2023), found that educational infrastructure and government expenditure significantly contribute to economic growth. The study highlights that higher

enrolment rates and improved school facilities positively influence development. It also emphasizes that investment in infrastructure, such as digital and physical resources, is essential for enhancing educational quality and achieving sustainable economic progress.

Bashar (2022) found in his study that several health centres also lacked basic infrastructure, and there was also a shortage of transport facilities. To improve the quality of healthcare services at the rural level, basic health infrastructure is essential.

Manggat, Zain, and Jamaluddin (2018) found in his study that basic amenities such as roads, electricity, and communication not only play a crucial role in improving rural life quality but also reduce rural-urban inequality.

Mohd et al. (2017) found in their study that there was an increase in the number of Primary Health Centres (PHCs) and Community Health Centres (CHCs). Significant growth in health infrastructure was also observed under the Janani Suraksha Yojana (JSY). However, in many states, there was a shortage of doctors and paramedical staff, as well as an unequal distribution of health resources.

Research Gap

Previous studies show that social and physical infrastructure play an important role in economic growth, employment, and improving quality of life. However, most studies focus on specific sectors like education, health, or employment, or are conducted at the national level.

There is very limited research that studies both social and physical infrastructure together at the state level, especially for Uttar Pradesh during the recent decade (2015–2024). Also, earlier studies do not clearly analyse recent trends or provide practical policy suggestions.

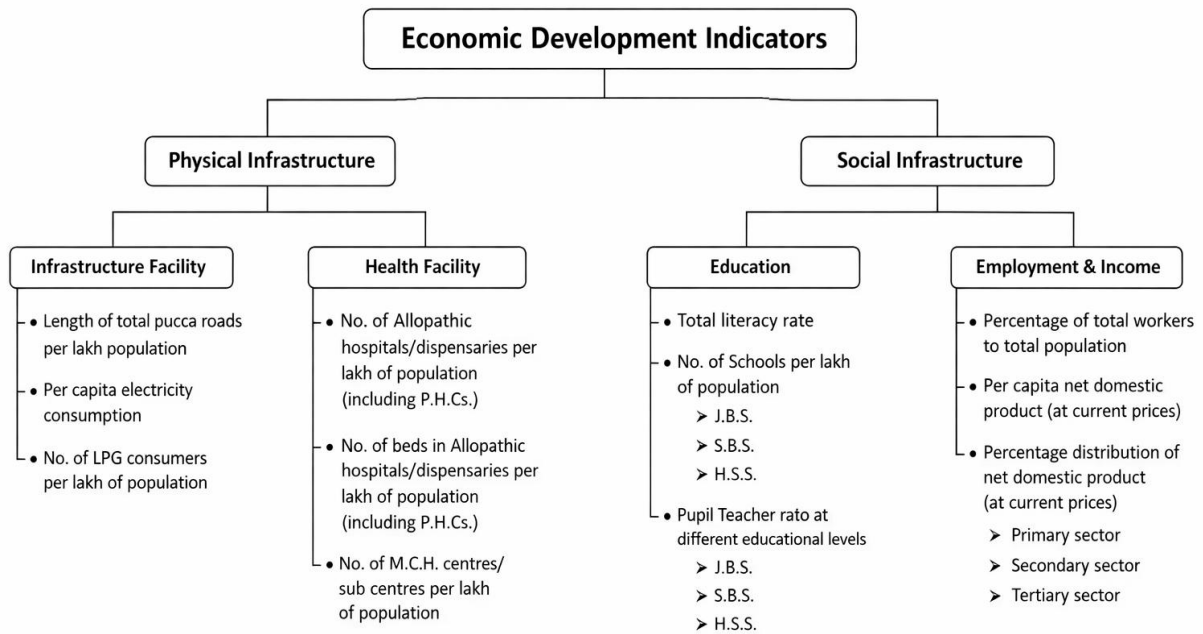
Therefore, this study aims to fill this gap by analysing trends and giving useful policy recommendations.

Objective:

1. To analyse the trends in the development of social and physical infrastructure in Uttar Pradesh over the last decade (from 2015 to 2024)
2. To provide practical policy recommendation and suggestion for improvement

Research Methodology:

- **Type of Study:** This study is descriptive and analytical in nature. It is descriptive because it explains the development of social and physical infrastructure in Uttar Pradesh from 2015 to 2024. It is analytical because it uses trend analysis to examine how different infrastructure sectors have changed over time.
- **Nature of Data:** The study is based on secondary and quantitative data. The data is numerical in nature and is used to analyse trends in social and physical infrastructure from 2015 to 2024.
- **Data Source:** The data for the study has been collected from Directorate of Economics and Statistics Uttar Pradesh (UPDES), an official source of the Government of Uttar Pradesh.
- **Indicators of the Study:** The study is based on two main categories, namely Physical Infrastructure and Social Infrastructure. These categories are further divided into sub-categories for detailed analysis. The hierarchical classification of these categories, sub-categories and their respective variables is presented through a tree diagram



• Normalization of Indicators:

The values of different indicators included in the study are expressed in different units, making direct comparison difficult. Therefore, in order to ensure comparability, all the indicators have been normalized using the Min-Max normalization technique. This method transforms the original values into a unit-free scale ranging from 0 to 1.

Normalization Formula

$$X_{norm} = \frac{X - X_{min}}{X_{max} - X_{min}}$$

Where:

- X = actual value of the variable
- Xmin = minimum value of the variable in the dataset
- Xmax = maximum value of the variable in the dataset

Example:

Calculation (Normalization)

The normalized value of Infrastructure Indicator ‘A’ for the year 2014–15 is calculated as follows:

$$= \frac{131.03 - 126.43}{165.08 - 126.43} = \frac{4.60}{38.65} = 0.119$$

The normalized value of Infrastructure Indicator ‘B’ for the year 2014–15 is calculated as follows:

$$\begin{aligned}
 B_{norm} &= \frac{253.54 - 252.42}{478.32 - 252.42} \\
 &= \frac{1.12}{225.90} \\
 &= 0.005
 \end{aligned}$$

The normalized value of Infrastructure Indicator ‘C’ for the year 2014–15 is calculated as follows:

$$\begin{aligned}C_{norm} &= \frac{9038.81 - 7805.62}{20104.07 - 7805.62} \\ &= \frac{1233.19}{12298.45} \\ &= 0.100\end{aligned}$$

Similarly, normalized values for other indicators have been calculated using the same method.

Composite Index (CI) Calculation

After normalization, a Composite Index (CI) has been constructed to represent the overall performance of each category. The composite index is calculated by taking the simple average of the normalized values of the respective indicators. Equal weight has been assigned to each indicator.

Formula for Composite Index (CI)

$$CI = \frac{A + B + C}{3}$$

Calculation (Composite Index) For the year 2014–15:

Infrastructure CI

$$= \frac{0.119 + 0.005 + 0.100}{3} = 0.075$$

Thus, the normalized values and composite indices provide a clear and comparable measure of the level of development in infrastructure and health facilities over the study period

Reverse Normalization

In the case of certain indicators such as the pupil-teacher ratio, where lower values indicate better performance, the reverse normalization method has been applied. The formula used for reverse normalization is as follows:

$$X_{norm} = \frac{X_{max} - X}{X_{max} - X_{min}}$$

This transformation ensures that higher normalized values consistently represent better performance across all indicators.

• Analytical Tools

The present study uses various analytical tools to examine the trends and growth of social and physical infrastructure in Uttar Pradesh during the period 2015 to 2024. The main tools used in the study are as follows:

- **Trend Analysis:** Used to analyse the direction and pattern of change in different infrastructure indicators over time.
- **Line Graphs:** Used for graphical representation of data to clearly show trends and comparisons over time
- **Compound Annual Growth Rate (CAGR):** Used to measure the average annual growth rate of different variables over the study period. It helps in understanding the overall growth trend in a simpli-

fied manner.

CAGR

The Compound Annual Growth Rate (CAGR) is used to calculate the average annual growth rate over a specific period. It provides a clear picture of how a variable has grown consistently over time.

Formula:

$$CAGR = \left(\frac{Ending\ Value}{Beginning\ Value} \right)^{\frac{1}{n}} - 1$$

Where:

- **Ending Value** = Value at the end of the period
- **Beginning Value** = Value at the beginning of the period
- **n** = Number of years

Data Analysis & Interpretation:

This chapter presents the analysis and interpretation of the data collected for the study. The data has been analyzed using various statistical and analytical tools such as trend analysis, Compound Annual Growth Rate (CAGR), percentage method and graphical techniques.

Table 1: Infrastructure and Health Indicators with Composite Index

| Year | Infrastructure Facility | | | | Health | | | |
|---------|-------------------------|--------|----------|-------|--------|-------|-------|-------|
| | A | B | C | CI | A | B | C | CI |
| 2014-15 | 131.03 | 253.54 | 9038.81 | 0.075 | 2.39 | 39.95 | 9.62 | 0.272 |
| 2015-16 | 126.43 | 252.42 | 7805.62 | 0.000 | 2.07 | 18.26 | 12.03 | 0.229 |
| 2016-17 | 137.43 | 360.03 | 12669.3 | 0.385 | 2.27 | 39.87 | 9.44 | 0.237 |
| 2017-18 | 144.36 | 398.99 | 13680.93 | 0.530 | 2.23 | 39.34 | 9.29 | 0.214 |
| 2018-19 | 140.94 | 392.23 | 16769.4 | 0.574 | 3.82 | 45.7 | 11.52 | 0.714 |
| 2019-20 | 144.83 | 401.29 | 18231.06 | 0.661 | 4.13 | 55.7 | 11.44 | 0.846 |
| 2020-21 | 147.22 | 390.93 | 18308.7 | 0.668 | 3.89 | 53 | 11.27 | 0.769 |
| 2021-22 | 147.91 | 399.41 | 19250.88 | 0.712 | 2.18 | 37.62 | 13.28 | 0.523 |
| 2022-23 | 155.36 | 462.19 | 19747 | 0.883 | 2.46 | 34.01 | 10.88 | 0.336 |
| 2023-24 | 165.08 | 478.32 | 20104.07 | 1.000 | 2.5 | 33.69 | 10.79 | 0.332 |

Source: <https://updes.up.nic.in>

The Indicators Used in the Table Are Defined as Follows:

Infrastructure Facility:

- A = Length of total pucca roads per lakh population
- B = Per capita electricity consumption
- C = Number of LPG consumers per lakh of population

Health:

- A = Number of Allopathic hospitals/dispensaries per lakh population (including PHCs)
- B = Number of beds in Allopathic hospitals/dispensaries per lakh population (including PHCs)
- C = Number of MCH centres/sub-centres per lakh population

Trend Analysis-

Infrastructure Index (CI)

2014–15 → 0.075

2023–24 → 1.000

Trend:

- The index shows an overall increasing trend over the study period.
- Minor fluctuations are observed in between.

Interpretation:

The infrastructure index exhibits an overall increasing trend with minor fluctuations during the study period, indicating gradual improvement in infrastructure facilities.

Health Index (CI)

2014–15 → 0.272

2019–20 → 0.846 (Peak)

2023–24 → 0.332

Trend:

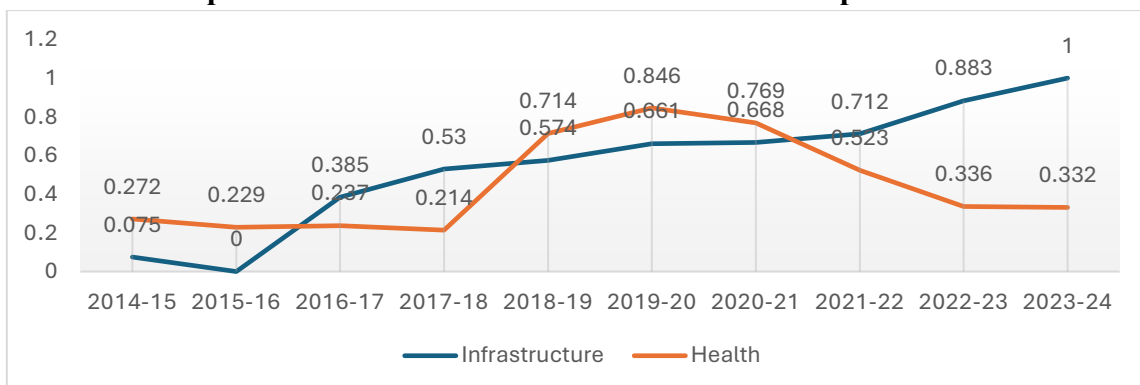
- The index shows an increasing trend initially, followed by a declining trend.
- Fluctuations are observed over the study period.

Interpretation:

The health index shows a fluctuating trend, with an initial increase followed by a decline in the later years, indicating uneven development in health facilities.

Line Graphs-

Graph 1: Trend of Infrastructure and Health Composite Index



Source: Computed by the researcher

The above line graph presents the trend of infrastructure and health composite indices over the study period from 2014–15 to 2023–24. It is observed that the infrastructure index shows an overall increasing trend, rising from 0.075 in 2014–15 to 1.000 in 2023–24, with minor fluctuations in between. This indicates a steady improvement in infrastructure facilities over time. On the other hand, the health index exhibits a fluctuating trend. It increases initially and reaches a peak of 0.846 in 2019–20, after which it declines and stabilizes around 0.332 in 2023–24. This reflects uneven and inconsistent development in the health sector.

Compound Annual Growth Rate (CAGR)-

| Health | Infrastructure |
|---|---|
| Beginning Value = 0.272 | Beginning Value = 0.075 |
| Ending Value = 0.332 | Ending Value = 1.000 |
| CAGR ≈ 2.2% | CAGR ≈ 33.5% |
| Indicates low growth in the health sector | Indicates high growth in infrastructure development |

Overall, the analysis shows that infrastructure development has improved significantly over the study period with a strong upward trend. However, minor fluctuations indicate that growth has not been entirely uniform.

Table 2: Education Indicators with Composite Index

| Year | Education | | | | | | | | | |
|---------|-----------|-------|-------|-------|--------|-------|-------|--------|--------|-------|
| | A | B | | | | C | | | | |
| | | J.B.S | S.B.S | H.S.S | CI (B) | J.B.S | S.B.S | H.S.S. | CI (C) | CI |
| 2014-15 | 67.68 | 79.2 | 36.06 | 10.67 | 0.864 | 66.76 | 43.45 | 51.13 | 0.083 | 0.316 |
| 2015-16 | 67.68 | 78.85 | 35.9 | 6.66 | 0.615 | 50.26 | 39.7 | 54.55 | 0.185 | 0.267 |
| 2016-17 | 67.68 | 73.38 | 29.34 | 11.91 | 0.571 | 35.56 | 33.49 | 46.55 | 0.595 | 0.389 |
| 2017-18 | 67.68 | 74.41 | 29.08 | 11.73 | 0.564 | 31.11 | 24.27 | 46.48 | 0.789 | 0.451 |
| 2018-19 | 67.68 | 71.97 | 35.96 | 11.79 | 0.822 | 29.33 | 25.96 | 44.24 | 0.827 | 0.55 |
| 2019-20 | 67.68 | 60.7 | 36.84 | 12.28 | 0.724 | 28.09 | 28.84 | 42.25 | 0.834 | 0.519 |
| 2020-21 | 67.68 | 59.77 | 37.02 | 12.07 | 0.706 | 26.97 | 28.62 | 40.84 | 0.881 | 0.529 |
| 2021-22 | 67.68 | 58.84 | 36.83 | 11.85 | 0.672 | 26.71 | 29.24 | 41.67 | 0.852 | 0.508 |
| 2022-23 | 67.68 | 56.57 | 36.2 | 11.98 | 0.621 | 22.74 | 25.76 | 43.55 | 0.896 | 0.506 |
| 2023-24 | 67.68 | 56.17 | 36.59 | 12.15 | 0.641 | 20.97 | 25.12 | 43.37 | 0.924 | 0.522 |

Source: <https://updes.up.nic.in>

Table 2.1: Employment and Income Indicators with Composite Index

| Year | Employment & Income | | | | | | |
|---------|---------------------|----------|----------------|------------------|-----------------|--------|-------|
| | A | B | C | | | CI (C) | CI |
| | | | Primary sector | Secondary sector | Tertiary sector | | |
| 2014-15 | 32.94 | 683651 | 31.1 | 19.36 | 49.54 | 0.294 | 0.431 |
| 2015-16 | 32.94 | 36250.44 | 29.99 | 18.33 | 51.68 | 0.333 | 0.111 |
| 2016-17 | 32.94 | 43860.82 | 27.92 | 25.77 | 46.3 | 0.415 | 0.191 |
| 2017-18 | 32.94 | 46298.82 | 28.73 | 23.19 | 48.08 | 0.384 | 0.199 |
| 2018-19 | 32.94 | 51014.45 | 27.8 | 25.79 | 46.41 | 0.42 | 0.243 |
| 2019-20 | 32.94 | 58009.29 | 26.76 | 27.27 | 45.97 | 0.459 | 0.307 |
| 2020-21 | 32.94 | 66511.95 | 23.58 | 23.65 | 42.53 | 0.532 | 0.392 |
| 2021-22 | 32.94 | 70792.08 | 30.2 | 24.58 | 45.22 | 0.429 | 0.387 |
| 2022-23 | 32.94 | 70792.08 | 30.2 | 24.58 | 45.22 | 0.429 | 0.387 |
| 2023-24 | 32.94 | 83635.78 | 28.88 | 26.6 | 44.52 | 0.525 | 0.508 |

Source: <https://updes.up.nic.in>

The Indicators Used in the Table Are Defined as Follows-

Table 2: Education

- **A** = Total Literacy Rate.
- **B** = Number of Schools per lakh population, including J.B.S. (Junior Basic Schools), S.B.S. (Senior Basic Schools), and H.S.S. (Higher Secondary Schools).
- **C** = Pupil–Teacher Ratio at different educational levels, including J.B.S., S.B.S., and H.S.S.
- **CI (B)** represents the composite index of number of schools.
- **CI (C)** represents the composite index of pupil–teacher ratio.
- **CI** represents the overall education composite index.

Table 2.1: Employment and Income

- **A** = Percentage of total workers to total population.
- **B** = Per capita net domestic product (at current prices).
- **C** = Percentage distribution of net domestic product, including Primary, Secondary, and Tertiary sectors.
- **CI (C)** represents the composite index of sectoral distribution.
- **CI** represents the overall employment and income composite index.

Trend Analysis-

Education Index (CI)

2014–15 → 0.316

2023–24 → 0.522

Trend:

- The index shows an overall increasing trend.
- Minor fluctuations are observed during the middle years.

Interpretation:

The education index exhibits an overall increasing trend over the study period, rising from 0.316 in 2014–15 to 0.522 in 2023–24. This indicates gradual improvement in educational infrastructure and

performance. However, the presence of minor fluctuations suggests that the progress has not been entirely consistent.

Employment & Income Index (CI)

2014–15 → 0.431

2023–24 → 0.508

Trend:

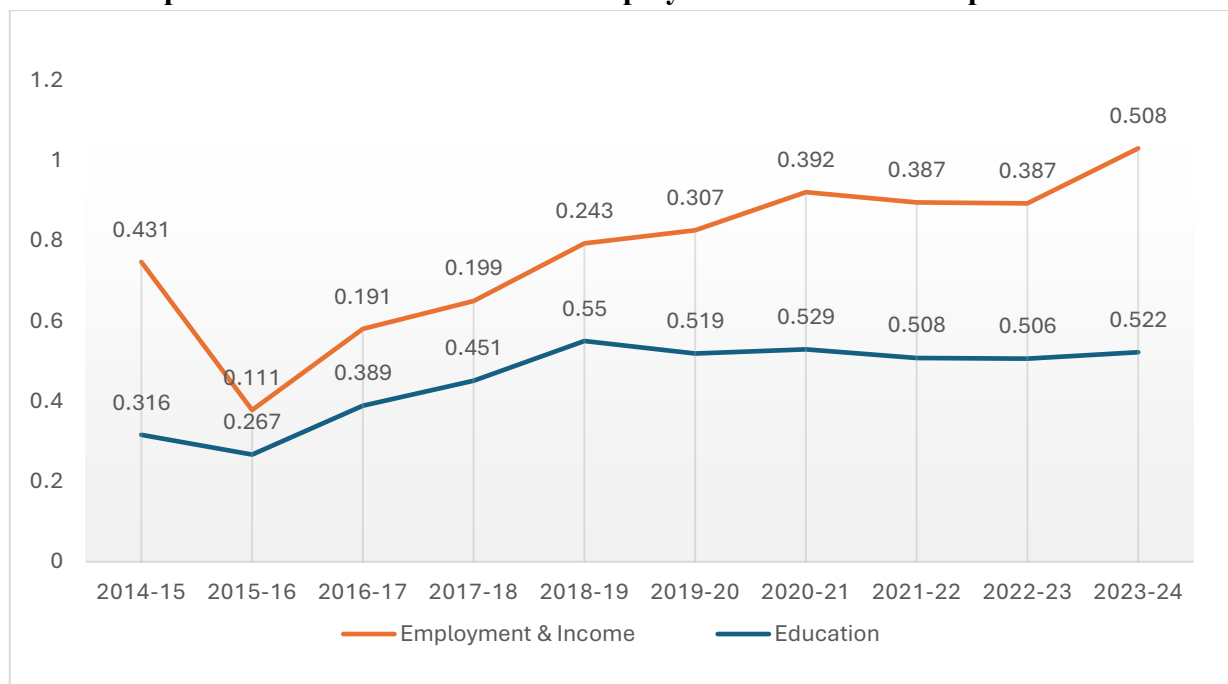
- The index shows a fluctuating trend.
- A sharp decline is observed in the initial years, followed by gradual improvement.

Interpretation:

The employment and income index show a fluctuating trend over the study period. It declines sharply in the initial years and subsequently demonstrates a gradual improvement, reaching 0.508 in 2023–24. This indicates that although there has been overall progress, the growth pattern remains unstable and uneven.

Line Graphs-

Graph 2: Trend of Education and Employment & Income Composite Index



Source: Computed by the researcher

The graph shows that the education index follows a generally increasing trend with minor fluctuations, indicating steady progress. On the other hand, the employment and income index exhibit a fluctuating trend, reflecting uneven and less stable growth. Overall, the education sector performs more consistently than the employment and income sector.

Compound Annual Growth Rate (CAGR)-

| | |
|--|--|
| <p>Education Index</p> <p>Beginning Value= 0.316</p> <p>Ending Value= 0.522</p> <p>CAGR ≈ 5.7%</p> <p>The education index grew at a CAGR of about 5.7%, reflecting steady and moderate progress over the study period.</p> | <p>Employment & Income Index</p> <p>Beginning Value= 0.431</p> <p>Ending Value= 0.508</p> <p>CAGR ≈ 1.8%</p> <p>The employment and income index grew at a CAGR of about 1.8%, indicating slow and somewhat inconsistent improvement.</p> |
|--|--|

Findings:

The present study examines the progress of social and physical infrastructure in Uttar Pradesh over the period 2015–2024. Based on the analysis of composite indices, trend patterns, and growth rates, the major findings of the study are as follows:

- 1. Significant Improvement in Physical Infrastructure:** The study reveals that physical infrastructure in Uttar Pradesh has improved substantially during the study period. The composite index of infrastructure increased sharply from 0.075 in 2014-15 to 1.000 in 2023-24, indicating a strong upward trend. The Compound Annual Growth Rate (CAGR) of approximately 33.5 percent further confirms rapid development. This growth is mainly driven by expansion in road connectivity, increased electricity consumption, and rising LPG penetration.
- 2. Uneven Progress in Health Infrastructure:** In contrast to physical infrastructure, the health sector shows inconsistent and fluctuating performance. The health index initially improved and reached a peak of 0.846 in 2019–20, but declined thereafter to 0.332 in 2023–24. The low CAGR of around 2.2 percent indicates slow growth. This suggests that despite some initial improvements, the development of health infrastructure has not been sustained over time.
- 3. Moderate Growth in Educational Infrastructure:** The education sector demonstrates steady but moderate progress. The composite index increased from 0.316 in 2014–15 to 0.522 in 2023–24, with a CAGR of approximately 5.7 percent. Although the trend is positive, minor fluctuations indicate that improvements in educational facilities and quality have not been entirely consistent.
- 4. Fluctuating Trends in Employment and Income:** The employment and income index exhibit a volatile and unstable trend throughout the study period. After an initial decline, the index gradually improved to 0.508 in 2023–24, with a relatively low CAGR of 1.8 percent. This indicates that economic growth in the state has not translated proportionately into stable employment and income generation.
- 5. Imbalance Between Physical and Social Infrastructure:** One of the key findings of the study is the imbalance between physical and social infrastructure development. While physical infrastructure has grown rapidly, social infrastructure—particularly health and employment—has lagged behind. This imbalance may limit the overall effectiveness of development and reduce the potential benefits of economic growth.

All sectors, especially health and employment, show noticeable fluctuations over time. This indicates that development has not been uniform and may be influenced by policy changes, economic conditions, and

external factors such as the COVID-19 pandemic.

Conclusion:

The present study analysed the development of social and physical infrastructure in Uttar Pradesh during the period 2015–2024 using composite indices and trend analysis. The results indicate that the state has made significant progress in physical infrastructure, particularly in road connectivity, electricity consumption, and LPG access. The infrastructure index shows a strong and consistent upward trend, reflecting effective policy initiatives and increased investment in this sector.

In contrast, the performance of social infrastructure remains uneven. The health sector shows fluctuations, with initial improvement followed by a decline in recent years, indicating a lack of sustained development. The education sector, however, demonstrates moderate and steady progress, although the pace of improvement is relatively slow.

Furthermore, the employment and income sector exhibit an unstable trend, suggesting that economic growth and infrastructure expansion have not fully translated into adequate employment generation and income growth.

Overall, the study concludes that while Uttar Pradesh has achieved notable success in strengthening physical infrastructure, the development of social infrastructure has not kept pace. Therefore, a more balanced and integrated approach is required to ensure inclusive and sustainable development across all sectors.

Policy Suggestions:

- 1. Strengthening Health and Social Infrastructure:** The government should prioritize the development of health and other social infrastructure by increasing investment in hospitals, healthcare facilities, and basic services, especially in rural and backward areas to ensure consistent and accessible services.
- 2. Improving Quality of Education and Human Capital:** Focus should be on improving the quality of education through better teacher training, digital learning facilities, and maintaining an appropriate pupil–teacher ratio to enhance human capital development.
- 3. Promoting Employment-Oriented and Inclusive Growth:** There is a need to promote labour-intensive industries, MSMEs, and skill development programs so that infrastructure growth leads to employment generation and income improvement.
- 4. Ensuring Balanced and Integrated Infrastructure Development:** Policy efforts should ensure equal emphasis on both physical and social infrastructure so that rapid growth in roads and energy is supported by improvements in health, education, and welfare sectors.
- 5. Strengthening Governance, Monitoring, and Regional Equity:** Effective implementation, regular monitoring of projects, and targeted policies for backward regions should be ensured to reduce regional disparities and achieve inclusive development.

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