

# **ACCELERATING SDG 9 IN INDIA (2014–2024): INNOVATION, INDUSTRY, AND INFRASTRUCTURE FOR INCLUSIVE DEVELOPMENT**

**Rahul Chaudhary**

Assistant Professor, G L Bajaj Institute of Management Greater, Noida

**Devendra Kumar Dixit**

GL Bajaj Group of Institutions Greater, Noida

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## **ABSTRACT**

This study critically evaluates India's progress toward SDG 9 over the decade 2014–2024, with a focus on fostering resilient infrastructure, inclusive and sustainable industrialization, and innovation capacity. Using secondary data from national indices, policy documents, and academic sources, the research analyzes trends across key indicators—such as rural road connectivity, manufacturing value added, and state-level innovation performance. The findings reveal significant disparities: while states like Karnataka, Gujarat, and Tamil Nadu lead in infrastructure readiness and innovation, others such as Bihar, Jharkhand, and Assam lag behind, constrained by structural deficits in access, investment, and institutional capacity.

The study further examines the impact of flagship programs like Make in India, Startup India, Digital India, and the National Infrastructure Pipeline, highlighting their uneven reach and regional concentration. Cross-SDG linkages are explored, particularly with SDGs 4, 8, and 11, emphasizing the systemic nature of inclusive industrial development. Ultimately, the paper argues that achieving SDG 9's objectives requires decentralized policy interventions, state-specific planning, and a strong focus on equity and regional inclusion. Without these, national progress risks masking deep-seated subnational disparities that could undermine long-term development goals.

## **INTRODUCTION**

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, aim to drive global progress across 17 critical areas of human and planetary well-being by 2030. Among these, **SDG 9 – "Industry, Innovation, and Infrastructure"** – is pivotal for enabling economic transformation and inclusive development. It emphasizes building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation — a triad considered foundational for sustainable growth, especially in emerging economies like India (UN, 2015).

India, as the world's most populous country and a major developing economy, has undertaken significant steps from 2014 to 2024 to align its national development priorities with SDG 9. Flagship programs such as **Make in India**, **Digital India**, **Startup India**, and the **National Infrastructure Pipeline** have aimed to modernize industrial capacity, boost innovation ecosystems, and expand physical and digital infrastructure (Mondal & Das, 2021; Singh & Ru, 2023). These efforts have been complemented by increased public and private investment in infrastructure, with sectors like transport, energy, and telecom seeing exponential growth under the **12th Five-Year Plan** and subsequent initiatives (Bairagi & Mujalde, 2019).

Despite these efforts, India continues to face challenges related to regional disparities in infrastructure, weak R&D intensity, and premature deindustrialization in some sectors (Saha& Shaw, 2019; Raihan, 2020). A closer analysis reveals that innovation capacity is strongly correlated with industrial output and economic inclusivity at the state level, particularly in underperforming regions like the Northeast (Mondal& Das, 2021). Furthermore, the COVID-19 pandemic exposed structural vulnerabilities in industrial supply chains, underlining the need for resilient, sustainable infrastructure as a safeguard for economic continuity and equity (Zarrabeitia-Bilbao et al., 2023).

In this context, the present study examines India's performance and strategic advancements toward achieving SDG 9 over the past decade, focusing on policy frameworks, sectoral contributions, innovation metrics, and infrastructural trends. By synthesizing evidence from academic literature and government data, the analysis aims to uncover critical success factors, gaps, and future pathways for ensuring that SDG 9 contributes meaningfully to India's broader inclusive development agenda.

## CONCEPTUALIZING SDG 9: GLOBAL AND INDIAN CONTEXT

SDG 9 — “*Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation*” — has emerged as a linchpin for economic transformation globally. It is integrally linked with multiple other SDGs, such as poverty alleviation (SDG 1), decent work (SDG 8), and climate action (SDG 13). According to the UN's global SDG framework, investment in infrastructure and industrial capacity catalyzes job creation, technological progress, and income growth (Desa, 2016). In the Indian context, SDG 9 holds particular relevance due to the country's developmental asymmetries. Rapid urbanization, regional disparities in industrial output, and fragmented infrastructure systems make achieving SDG 9 both critical and challenging (Ahmed et al., 2024). India's development policies post-2014, including *Make in India*, *Startup India*, and *Digital India*, are aligned with the SDG 9 framework, targeting industrial growth, technological innovation, and infrastructure development across rural and urban landscapes (Hannafin, 2024).

## INDUSTRIALIZATION TRENDS AND POLICY SHIFTS (2014–2024)

India's industrial growth has fluctuated between 4% and 8% over the past decade, affected by global supply chain disruptions, domestic regulatory reforms (e.g., GST), and shifts in labor dynamics. Raihan (2020) warns that India risks “*premature deindustrialization*”, where manufacturing stagnates before reaching its full economic potential. This is particularly concerning in light of India's goal to increase manufacturing's GDP share from ~17% to 25%.

To counteract this, public policies have increasingly focused on value-added manufacturing, defense production, and digital transformation. Saha and Shaw (2019) argue for sector-specific industrialization tailored to state capabilities, particularly in underdeveloped regions. Studies have emphasized that industrial zones, economic corridors, and production-linked incentives have improved regional competitiveness but require consistent governance and infrastructure support.

## INNOVATION AS A DRIVER OF INDUSTRIAL GROWTH

Innovation is a core pillar of SDG 9 but remains underleveraged in India. Despite the presence of high-performing research institutions and a growing startup ecosystem, India's gross expenditure on R&D (GERD) remains under 1% of GDP — lower than the OECD average. Mondal and Das (2021) conducted a cross-state analysis showing that regions with higher innovation indices (e.g., Karnataka, Maharashtra) exhibit better industrial performance

and GDP growth. Fonseca and Achcar (2024) link innovation in India's pharmaceutical and health-tech sectors to SDG 9 and SDG 3 synergies. They emphasize that public-private partnerships and patent reforms can accelerate technology diffusion and industrial scaling. However, the innovation ecosystem still suffers from inadequate funding, weak linkages between academia and industry, and limited commercialization pathways.

## **INFRASTRUCTURE DEVELOPMENT: CHALLENGES AND PRIORITIES**

Infrastructure development is the most capital-intensive component of SDG 9. According to Bairagi and Mujalde (2019), India's 12th Five-Year Plan emphasized multi-sectoral infrastructure expansion, particularly in transport, energy, and urban planning. National programs like Bharatmala, Sagarmala, and the National Infrastructure Pipeline (NIP) have allocated over ₹100 lakh crore toward infrastructure investment.

However, access to infrastructure remains deeply unequal. Ahmed et al. (2024) provide a state-wise SDG 9 Index and highlight disparities across electricity access, road connectivity, and internet penetration. Infrastructure gaps are especially severe in tribal, hilly, and northeastern regions of India, affecting inclusive development. The logistics sector, identified as a key enabler of SDG 9, has also evolved significantly. Terzi and Kula (2024) argue that digitized logistics platforms and 5G infrastructure are reshaping India's supply chains and industrial efficiency.

## **DIGITAL TRANSFORMATION AND SMART INFRASTRUCTURE**

The intersection of SDG 9 with digital innovation has gained prominence since 2014. Initiatives like *Digital India* and the *Smart Cities Mission* aim to integrate ICT into urban infrastructure and public service delivery. Hannafin (2024) and Mahajan et al. (2022) highlight the role of Indian PSUs and Navratna companies in deploying smart technologies to improve energy grids, transport systems, and data governance. Social media analysis by Zarrabeitia-Bilbao et al. (2023) reveals that public engagement around SDG 9 themes — such as innovation, smart infrastructure, and sustainable industry — has increased in the post-COVID era, although digital access remains uneven.

## **INCLUSIVITY, EQUITY, AND ENVIRONMENTAL SUSTAINABILITY**

While economic metrics often dominate SDG 9 evaluations, equitable and sustainable outcomes are equally critical. Tomaselli et al. (2019) emphasize the importance of supporting forest-based and rural livelihoods through decentralized industries. Singh and Ru (2023) advocate for local innovation hubs, decentralized energy systems, and climate-resilient infrastructure as inclusive pathways to industrialization.

Legal and policy frameworks are also crucial for inclusivity. Morris (2023) underscores the need for coherent legal governance structures that support the financing, regulation, and enforcement of SDG 9-related goals.

## **RESEARCH GAPS**

Despite measurable national progress toward Sustainable Development Goal 9 (SDG 9) from 2014 to 2024, a deeper examination reveals three critical structural gaps undermining inclusive development. First, there is a clear innovation divide across states. While a few regions such as Karnataka, Maharashtra, and Tamil Nadu host robust R&D ecosystems, most other states—especially in the eastern and northeastern corridors—lack the institutional and financial infrastructure necessary to support meaningful innovation. This results in a concentration of patents, startups, and research output in select metros, leaving vast regions

of India under-innovated and poorly integrated into national knowledge networks (Mondal& Das, 2021).

Second, the expansion of infrastructure, though substantial at the national level, remains **urban**-centric and spatially uneven. Rural and tribal regions continue to suffer from deficits in digital connectivity, road access, and reliable electricity, which in turn constrain both industrial investments and service delivery. These gaps create a self-reinforcing cycle where infrastructure scarcity depresses economic activity, which in turn reduces the feasibility of future investment, particularly in backward regions (Ahmed et al., 2024).

Third, while India has launched ambitious national industrialization programs such as *Make in India* and the *National Infrastructure Pipeline*, **their** impact has been disproportionately skewed toward already-industrialized states. The lack of adaptive, state-specific strategies and fiscal decentralization mechanisms has meant that lagging states are unable to fully leverage these schemes due to limitations in administrative capacity, absorptive infrastructure, and skilled labor availability (Saha& Shaw, 2019).

Collectively, these gaps suggest that India's approach to SDG 9 has been vertically integrated but horizontally fragmented—strong in national ambition but weak in subnational equity. Bridging these divides will require a more distributed development paradigm, rooted in localized innovation, inclusive infrastructure planning, and regionally differentiated industrial policy.

## RESEARCH METHODOLOGY

This study employs a descriptive-exploratory design, utilizing secondary data sources to evaluate India's progress toward Sustainable Development Goal 9 (SDG 9) over the period from 2014 to 2024. Given the multidimensional nature of SDG 9, which encompasses innovation, industrialization, and infrastructure, a mixed-methods analytical framework was adopted to enable both quantitative assessment and qualitative insight. The research does not involve primary fieldwork; instead, it systematically synthesizes official datasets, peer-reviewed academic literature, and government policy documents to generate evidence-based insights.

Key data sources include the NITI Aayog SDG India Index (2018–2023), which offers state-level disaggregated indicators relevant to SDG 9; the MoSPI for industrial and infrastructure data; and international datasets from the World Bank and the UN SDG Global Database, which facilitate cross-country comparisons. These are complemented by Scopus-indexed research publications that provide theoretical depth and policy evaluation (Ahmed et al., 2024; Mondal& Das, 2021; Singh & Ru, 2023).

The analysis is structured around three core dimensions of SDG 9: innovation, industry, and infrastructure. Innovation is operationalized using indicators such as gross expenditure on R&D (GERD), patent filings, and the number of recognized startups (as per DPIIT records). Industrial performance is measured via manufacturing value added (MVA) as a percentage of GDP, MSME contributions, and industrial electricity consumption. Infrastructure development is assessed through road and rail density, internet penetration (TRAID), and logistics efficiency metrics (Bairagi&Mujalade, 2019; Terzi & Kula, 2024).

Quantitative data analysis employs descriptive statistics and time-series trend mapping across the decade. A state-wise comparative framework is used to examine regional disparities in SDG 9 outcomes using quintile segmentation. Correlation analysis (Pearson and Spearman) is applied to explore relationships between innovation outputs, industrial performance, and infrastructure accessibility. In parallel, a qualitative document analysis (Bowen, 2009)

reviews major national programs—such as *Make in India*, *Startup India*, *Digital India*, and the *National Infrastructure Pipeline*—for alignment with SDG 9 targets, implementation strategies, and outcome indicators.

Validation of findings is achieved through cross-referencing data across multiple credible sources and interpreting them within existing scholarly frameworks (Raihan, 2020; Saha & Shaw, 2019). While the methodology ensures broad coverage and data triangulation, it is limited by inconsistencies in state-level innovation data, lag in official statistics for recent years (2023–2024), and the absence of micro-level impact assessments. Nonetheless, this secondary-data-based approach offers a comprehensive and policy-relevant perspective on India's performance in achieving SDG 9.

## OBJECTIVES OF THE STUDY

This objective aims to evaluate the progress and regional disparities in India's advancement towards Sustainable Development Goal 9 (SDG 9), which emphasizes **industry, innovation, and infrastructure**. Utilizing secondary data from reputable sources, the analysis covers the period from 2014 to 2024, highlighting state-wise performance and identifying areas requiring policy attention.

## ANALYSIS AND INTERPRETATION

This section presents a structured analysis of India's performance on Sustainable Development Goal 9 (SDG 9) using secondary data collected from national indices, government reports, and peer-reviewed academic literature. The data was assessed through a combination of trend analysis, state-wise comparisons, and programmatic evaluation covering the period 2014 to 2024.

Table 1 indicate state-wise data reveal stark disparities in the performance of Indian states across key components of SDG 9—namely infrastructure access, industrial output, and innovation capacity. States like Gujarat, Tamil Nadu, and Karnataka have achieved near-complete rural road connectivity under PMGSY, reflecting well-functioning governance and efficient infrastructure delivery systems. In contrast, Bihar, with only ~88.1% connectivity, and Assam (~91.2%) continue to lag behind, reflecting persistent infrastructure bottlenecks that constrain industrial growth and service delivery in those regions. This gap underscores the need for intensified infrastructure investment and implementation capacity in eastern and northeastern India. In terms of industrial performance, Gujarat leads with 22.2% of Gross Value Added (GVA) originating from manufacturing, followed closely by Tamil Nadu and Maharashtra, all of which have benefited from policies that foster sector-specific industrial clusters, logistics readiness, and foreign direct investment. On the other end of the spectrum, Bihar and Assam have MVA figures under 9%, indicating the persistence of under-industrialization in economically weaker regions. This lack of industrial base also reflects in manufacturing employment data. While Tamil Nadu (16.1%) and Gujarat (15.3%) maintain a significant share of employment in manufacturing, Jharkhand (7.2%), Bihar (6.5%), and Assam (6.9%) show limited integration of their labor force into formal manufacturing sectors, highlighting a missed opportunity for inclusive economic transformation.

**Table 1: State-wise SDG 9 Indicators (2023–2024)**

State	Road Connectivity (PMGSY 2023-24)	Mfg. Value Added (of GVA, 2018-19)	Mfg. Employment (Total, 2018-19)	Innovation Index Rank (2020)
Karnataka	99.5%	18.1%	14.2%	1 (Top)
Maharashtra	98.3%	19.2%	13.6%	2



Tamil Nadu	99.7%	21.0%	16.1%	4
Gujarat	99.8%	22.2%	15.3%	5
Punjab	99.0%	17.4%	14.5%	8
Andhra Pradesh	98.7%	17.9%	13.8%	6
West Bengal	97.0%	14.5%	10.2%	10
Uttar Pradesh	95.6%	13.3%	9.8%	12
Bihar	88.1%	7.8%	6.5%	<b>17 (Bottom)</b>
Jharkhand	92.0%	9.5%	7.2%	15
Assam	91.2%	8.1%	6.9%	14
Kerala	98.9%	12.6%	10.8%	7
Rajasthan	96.5%	14.8%	11.3%	11
Madhya Pradesh	97.3%	13.6%	10.9%	9

The disparity is even more pronounced in innovation metrics. Karnataka, ranked first in the India Innovation Index (2020), stands out as a national innovation hub, driven by R&D expenditure, university-industry linkages, and a robust startup ecosystem centered on Bengaluru. Other high-performing states include Maharashtra, Tamil Nadu, and Andhra Pradesh. In stark contrast, Bihar ranks last (17th), while Jharkhand and Assam also perform poorly, lacking both innovation infrastructure and policy frameworks to support knowledge-intensive industries. This geographic concentration of innovation threatens to widen regional inequalities, unless addressed by targeted policy interventions.

## DECADAL PROGRESS

The trend analysis from 2014 to 2024 shows moderate national improvement in SDG 9 indicators but masks subnational divergence. Manufacturing value added increased only marginally—from ~16.0% of GDP in 2014 to ~17.2% in 2024 suggesting that structural reforms and incentive schemes such as the Production-Linked Incentive (PLI) programs had only partial sectoral effects. Road construction under PMGSY, however, saw major progress, growing from ~390,000 km in 2014 to over 735,000 km in 2024, thereby significantly enhancing rural access. Similarly, mobile internet penetration in rural areas jumped from ~25% to over 70%, thanks to initiatives like BharatNet and the Digital India mission, which expanded telecom infrastructure and data access.

**Table 2: Decadal Progress**

Indicator	2014	2024 (Est./Latest)	Trend & Remarks
<b>Manufacturing Value Added (% of GDP)</b>	~16.0%	~17.2%	Marginal improvement; fell during COVID-19 but rebounded via PLI schemes.
<b>Roads constructed under PMGSY (km)</b>	~390,000 km	>735,000 km	88% habitations connected in 2014 vs. 99.7% by 2024 (MoRD, NIP).
<b>Mobile Internet Penetration (rural)</b>	~25%	>70%	Driven by BharatNet, Jio expansion, and Digital India.
<b>India Innovation Index (National Score)</b>	Not available	Up from 18.5 (2019) to 38.5 (2022)	Indicates expanding R&D ecosystem, but skewed by a few states.
<b>Startup India Recognized Startups</b>	<1,000	>100,000	Startup India mission enabled exponential growth, but 85% startups are in 8 states.

### Source

India's Innovation Index score rose from 18.5 in 2019 to 38.5 in 2022, reflecting improved national R&D and startup dynamics. However, the distribution remains skewed, as innovation remains concentrated in a handful of states. Finally, the Startup India initiative catalyzed dramatic growth in formal entrepreneurship, with recognized startups increasing from fewer than 1,000 in 2016 to over 100,000 by 2024. Still, 85% of these startups are located in just eight states, raising concerns over regional equity and innovation inclusiveness.

### PROGRAMMATIC IMPACT ANALYSIS

Table 3 show an analysis of flagship national programs affirms that India has taken a multipronged approach to SDG 9 implementation. Make in India, launched in 2014, successfully attracted FDI into sectors like electronics, pharmaceuticals, and defense, particularly in Maharashtra, Gujarat, and Karnataka. Startup India, since 2016, has created a robust policy ecosystem that supports early-stage ventures through seed funding, tax benefits, and incubation networks. However, the benefits have largely accrued to states with pre-existing innovation capacity.

Similarly, the Digital India initiative contributed to a digital infrastructure revolution, especially in rural and semi-urban areas. It indirectly bolstered industrial growth by enabling digital participation and expanding access to public services. Meanwhile, the National Infrastructure Pipeline (NIP), launched in 2019, committed ₹111 lakh crore to over 6,800 projects spanning transport, energy, and urban development. While the financial scope is transformative, implementation disparities across states remain a concern, potentially undermining inclusive infrastructure development.

**Table 3: Programmatic Impact Analysis**

National Program	Year Launched	SDG 9 Relevance	Impact Summary
<b>Make in India</b>	2014	Promotes manufacturing & FDI	Helped boost sectors like electronics, pharma, and defense, especially in Maharashtra, Gujarat, Karnataka.
<b>Startup India</b>	2016	Fosters innovation & entrepreneurship	Enabled policy ecosystem for innovation; seed funding, incubators, IP support.
<b>Digital India</b>	2015	Digital infrastructure & e-governance	Enabled rural connectivity, mobile access, and digital literacy; indirect boost to industrial participation.
<b>National Infrastructure Pipeline (NIP)</b>	2019	Infrastructure investment	Allocated ₹111 lakh crore for 6,835 projects; roads, energy, logistics, and urban renewal prioritized.

### Source

### CROSS-SDG LINKAGES

Table 4 indicate the interdependence of SDG 9 with other Sustainable Development Goals is evident. SDG 8 (Decent Work and Economic Growth) is directly supported by industrialization strategies under SDG 9, as they enable job creation, especially in labor-intensive sectors. SDG 11 (Sustainable Cities and Communities) benefits from SDG 9's emphasis on urban infrastructure, transportation, and climate-resilient construction. Additionally, SDG 4 (Quality Education) is foundational to innovation, as R&D productivity

depends on STEM education and skill development. Lastly, SDG 5 (Gender Equality) intersects with SDG 9 through the integration of women in manufacturing, innovation leadership, and digital entrepreneurship.

**Table 4: Connection with SDG 9**

Linked SDG	SDG	Connection with SDG 9
Quality Education	SDG 4	Innovation requires higher education, vocational training, and STEM capacity-building.
Gender Equality	SDG 5	Manufacturing and digital innovation must include women entrepreneurs and workforce integration.
Decent Work & Economic Growth	SDG 8	Industrialization under SDG 9 enables job creation and structural transformation.
Sustainable Cities & Communities	SDG 11	Infrastructure under SDG 9 is critical for urban transport, housing, and resilience.

*Source: NitiAayog*

## RESULTS AND DISCUSSION

The results of this study reveal a significant divergence in SDG 9 performance across Indian states, despite overall national improvements between 2014 and 2024. States such as Tamil Nadu, Gujarat, and Karnataka have demonstrated near-universal rural road connectivity under PMGSY, with coverage exceeding 99% by 2024. This indicates strong implementation capacity and targeted investments in physical infrastructure, a prerequisite for regional industrialization and access to services (Ahmed et al., 2024). Conversely, Bihar, Jharkhand, and Assam still lag behind, with connectivity levels below the national average, pointing to geographic, administrative, and fiscal challenges that continue to hinder equitable infrastructure delivery (Bairagi&Mujalde, 2019).

In terms of industrial output, Gujarat (22.2%), Tamil Nadu (21.0%), and Maharashtra (19.2%) contribute the highest manufacturing value added (MVA) to their gross value added (GVA), reflecting the success of sectoral policies, special economic zones, and robust logistics networks (Saha& Shaw, 2019). By contrast, eastern and northeastern states like Bihar and Assam exhibit below-average industrial contributions (below 10%), due to inadequate infrastructure, weak industrial bases, and limited integration with national value chains (Raihan, 2020).

On innovation metrics, Karnataka leads the nation with the highest rank in the India Innovation Index (2020), owing to its robust startup ecosystem, R&D spending, and strong industry-academia linkages centered in Bengaluru (Mondal& Das, 2021). States like Maharashtra, Tamil Nadu, and Andhra Pradesh also rank highly, benefiting from innovation clusters and favorable policy ecosystems. In contrast, Bihar, Jharkhand, and Chhattisgarh rank near the bottom, reflecting a lack of higher education infrastructure, innovation financing, and technology diffusion mechanisms (Singh & Ru, 2023). This disparity underscores a core challenge for SDG 9 implementation in India: the spatial concentration of innovation capacity in a few metro-centric states.

Together, these findings indicate that while India has made progress at the macro level, subnational inequities in infrastructure access, industrial capacity, and innovation ecosystems remain deeply entrenched. The states that are already industrially and digitally advanced are moving faster due to cumulative advantages, while lagging regions are trapped in a cycle of underinvestment, weak institutional capacity, and low absorptive potential.



## POLICY IMPLICATIONS

The findings of this study suggest several targeted policy recommendations to bridge regional gaps in SDG 9 implementation. First, state-specific industrial policies must be prioritized over uniform national strategies. Each region's industrial profile and demographic structure demand bespoke solutions, including cluster-based development and local value-chain integration (Saha & Shaw, 2019). Second, decentralizing innovation infrastructure beyond metropolitan centers is crucial. Expanding research funding, incubators, and technical education institutions into Tier 2 and Tier 3 cities can democratize access to innovation benefits (Fonseca & Achcar, 2024). Third, there is a pressing need to integrate infrastructure planning across sectors. Coordinated investments in roads, energy, and digital infrastructure can produce compounding benefits for both industrial expansion and service delivery. Programs such as the National Infrastructure Pipeline and Gati Shakti should be leveraged with localized performance metrics (Mahajan et al., 2022). Fourth, investment incentives like tax holidays, viability gap funding, and public-private partnerships should be directed toward backward regions, to reduce investor risk and attract capital in infrastructure-scarce states (Bairagi & Mujalde, 2019). Finally, India must adopt a data-driven governance model. Timely, high-resolution, disaggregated data on SDG 9 indicators is necessary to guide interventions, measure outcomes, and ensure accountability at both central and state levels.

## CONCLUSION

This study provides a decade-long assessment of India's journey toward achieving Sustainable Development Goal 9 (SDG 9), focusing on the interconnected pillars of industry, innovation, and infrastructure. The analysis reveals that while India has made notable national-level progress through expanded road networks, enhanced digital access, and a flourishing startup ecosystem the benefits of these advancements have been unevenly distributed across states.

High-performing states such as Karnataka, Gujarat, Maharashtra, and Tamil Nadu have emerged as industrial and innovation hubs, driven by strong institutional capacity, investment-ready infrastructure, and favorable policy environments. In contrast, low-performing states like Bihar, Jharkhand, and Assam continue to face barriers stemming from infrastructural deficits, limited private investment, and weak innovation ecosystems. These disparities underscore the urgent need for region-specific strategies and decentralized policy implementation to achieve truly inclusive and sustainable industrialization.

National flagship programs such as Make in India, Startup India, Digital India, and the National Infrastructure Pipeline have created enabling conditions, but their effectiveness is contingent on local governance, state capacity, and socio-economic context. Furthermore, the study highlights the importance of integrating SDG 9 with related goals, such as SDG 4 (education), SDG 8 (decent work), and SDG 11 (sustainable cities), to create a multiplier effect on development outcomes.

In conclusion, India's path to fulfilling SDG 9 must move beyond aggregate success and embrace a differentiated, data-driven, and equity-oriented approach. Only by closing the regional gaps in innovation, industry, and infrastructure can the country ensure that economic growth translates into inclusive development for all.

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