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Digital Development in Manipur: Growth, Gaps, and The Economic Cost of Disruptions

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ABSTRACT

This paper discusses how digital technology is impacting development in Manipur. We examine economic data to explore ways to connect and compare policies, assessing the benefits of utilizing digital tools. We find that the economy of Manipur has been rising (GSDP is expected to be 607.1 billion rupees in the year 2025-26), aided by the increase in internet and mobile penetration. Nevertheless, Manipur remains predominantly rural (71%) with only 56 percent internet subscriber penetration. The research includes a sub-analysis of the 2023 internet shutdown, estimating an economic loss of approximately ₹4.99 billion. The paper concludes that while digital technologies enhance governance and the economy, these effects are dampened by infrastructure gaps and political instability.

Keywords: Digital Development, Manipur Economy, Internet Shutdown, Digital Divide, GSDP Growth

INTRODUCTION

Digital technology has become popular as a driver of economic prosperity, improved service delivery, and increased inclusion. Programs such as Digital India strive to build a digitally empowered society through improving the technology infrastructure and by advancing e-governance. In rural locations, spreading access to the internet and mobile phones provides opportunities for education, healthcare, and economic growth. However, these results are highly dependent on accessibility to infrastructure, digital literacy, and socioeconomic conditions.

Manipur presents a unique case study as a state in Northeast India with 2.85 million people (Census, 2011). It is primarily rural (70.8%) and is something held back by geographic isolation

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and insufficient connection to the Indian mainland (World Bank, 2022). Despite the literacy rate of 76.94, inequality in education is high, and more than 30% of the population falls below the poverty threshold. Regardless of these disadvantages, the economy of Manipur has experienced a strong growth with Gross Household Income growing at a CAGR of 11.9% between 2015-16 and 2025-26 (World Bank, 2022).

Digital transformation is seen as a pathway to accelerate this development. The state has begun the Manipur IT Policy 2022 and collaborated with the World Bank on the project called Manipur Infotech eNabled Development Project (MIND) to bridge digital divides. However, most available studies on this region remain qualitative. This article focuses on quantifiable results using evidence from TRAI, MOSPI, and NITI Aayog. It specifically analyzes the 2023 internet shutdown—the longest in the country that year—and its estimated loss to the state's economy.

Review of Literature

The role of digital technologies in enhancing development outcomes has been widely studied, primarily in national or global contexts. In their argument, Hilbert and Lopez (2011) believe that digital technology is a multiplier of development since it reduces transaction costs in underdeveloped countries, but they stress that access is not enough unless used and empowered.

In the Indian context, the Digital India initiative has enabled a platform to view digitization at the inter-state level. Bhatnagar (2020) examines the importance of e-governance and sets out that the states that have matched the development of infrastructure with digital literacy campaigns have higher degree of enhancement in the provision of the services in the state. He marks, however, that infrastructural and geographical difficulties usually cause northeastern states such as Manipur to lag behind.

According to Chakraborty and Saha (2021), the implementation of digital technologies in less developed regions may decrease or increase existing gaps based on the socioeconomic support systems. They advocate the use of measures such as literacy and poverty in the measurement of digital transformation in their work. Regarding the Northeast, Baruah (2022) throws some light on the application of Common Service Centres (CSCs) to bridge rural areas and provide necessary facilities. Amid positive changes, Baruah highlights that in a topography of ruggedness such as Manipur, there is a need for improvement in broadband and last-mile delivery.

This paper advances these premises with a data-driven analysis specifically for Manipur, filling an empirical gap in the literature. It provides a critical examination of state-level economic indicators and ICT-related developmental consequences using an economic perspective not adequately addressed in previous works.

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Methodology

This study uses a quantitative approach to assess the penetration of digital infrastructure and its economic impact on Manipur. The research design relies on secondary data analysis taken from the Telecom Regulatory Authority of India (TRAI), Ministry of Statistics and Programme Implementation (MOSPI), NITI Aayog, and World Bank reports (2020–2024).

Economic Loss Estimation Model

The limitations of the sub-national digital data in India have to be admitted. Nationwide data are strong, but state-level indicators, especially those of the Northeastern region, typically have reporting delays. As an example, there are often provisional estimates of the GSDP data of the latest fiscal years. Moreover, statistics on the internet penetration given by TRAI include *subscription* data and not the number of unique *subscribers*. This can cause a connectivity inflation in a market such as Manipur, where city residents frequently carry around two SIM cards to counter patchy network connectivity.

To mitigate these constraints, this study cross-references TRAI subscription data with "functional usage" metrics from the CSC dashboard and PMGDISHA certification rates. This triangulation method, comparing infrastructure (supply-side) with usage (demand-side), provides a more realistic picture of the "effective" digital ecosystem than subscription numbers alone.

To quantify the impact of the 2023 internet disruption, we utilized the Internet Society's NetLoss methodology. The economic cost is approximated as:

$$Loss = \left(\frac{GSDP_{annual}}{365}\right) \times \text{Shutdown Days x Loss Multiplier}$$

The Loss Multiplier (0.028 or 2.8%) represents the average daily GDP impact of an internet blackout in developing economies.

Exploratory Trend Analysis Framework

To observe the directional relationship between digital access and economic performance, we utilized an exploratory linear model:

$$GSDP_t = \alpha + \beta_1 \text{InternetDensity}_t + \beta_2 \text{Teledensity}_t + \beta_3 \text{Literacy}_t + \epsilon_t$$

- **GSDP:** Gross State Domestic Product (₹ Billion)
- **Internet Density:** Subscribers per 100 people

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- **Teledensity:** Total telecom subscribers per 100 people
- **Literacy:** Interpolated estimates based on Census trends.

Due to the limited sample size (N = 4 valid observations from 2021-2024), a full regression analysis with statistical significance is not mathematically feasible. Therefore, this framework is used for directional trend analysis rather than predictive modeling. However, the available data exhibits a clear directional trend:

Year	GSDP (₹ Billion)	Internet Density (%)	Tele-density (%)	Literacy Rate (%)
2020	376.82	2 (NA)	72.93	78.3
2021	377.60	33.19	73.45	78.5
2022	423.00	65.94	74.70	78.7
2023	455.00	67.43	76.77	78.9
2024	521.44	70.01	77.80	79.0

**Note: Teledensity and Internet density reported by TRAI. Literacy rates are interpolated estimates based on Census trends.

- **Positive Correlation:** There is a consistent upward movement between digital density and GSDP. As internet density doubled from ~33% (2021) to 70% (2024), GSDP expanded significantly.
- **Literacy Factor:** The steady rise in literacy acts as a constant multiplier, supporting the hypothesis that a more literate workforce utilizes digital tools more effectively for economic output.

While we cannot assign a statistically significant "Beta" coefficient due to the small dataset, the trend strongly supports the theory that higher digital access enhances productivity, entrepreneurship, and innovation in the state economy.

RESULTS

Digital Access and Infrastructure

There is a wide rural-urban disparity in digital infrastructure in Manipar. Table 1 indicates that the tele-density is high in urban regions (135.41%), but the coverage in the rural areas is low (47.65%), causing a 87.42 percentage point 87.42 difference.

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Table 1: Tele-density in Manipur and Selected States (2024)

State	Total (%)	Rural (%)	Urban (%)
Manipur	76.60	47.65	135.41
Nagaland	76.50	78.57	74.33
Mizoram	112.52	96.14	125.64
Tripura	78.78	71.77	88.66
Sikkim	112.48	149.25	80.28

The Economics of the Digital Divide:

The inequality that is seen in Table 1 is not merely an infrastructural disparity, but rather represents a form of Digital Dualism in the economy of the state. Although, the urban centers of Manipur have a tele-density of 135.41, which is similar to the metro level, the tele-density of the rural areas is 47.65 percent, implying that almost half of the rural population is still not connected to the digital market. This difference of 87.42 percentage points is a major market friction in development economics.

For a state where 70.8% of the population resides in rural areas, this disconnect implies that the majority of the workforce is excluded from the information efficiencies that digital connectivity provides. As noted by Hilbert and Lopez (2011), digital technology functions as a multiplier of development by reducing transaction costs. In Manipur, rural connectivity is low, which implies that rural agrarian agents have greater search costs in terms of finding market information, still relying on traditional in-efficient chain of supply. This infrastructural imbalance is why even with the high level of urban connectivity, the overall economic gains are not distributed equally, which results in the creation of the K-shaped recovery, with urban service sectors flourishing and rural ones suffering because of geographic isolation and the lack of connection.

Table 2 shows that in terms of broadband infrastructure, Manipur has already achieved some gains in the Northeast BharatNet project by ensuring that 1,151 out of 2,534 Gram Panchayats are already ready to receive the services, that is 45.4% of the total. But the implementation is not fully done yet and it is largely concentrated on the valley districts. Comparatively, Mizoram is the largest with more than 50 per cent cover, followed by Nagaland and Tripura with less than 20 per cent, which means a disparity in digital services in these states. It is important to note that Assam has only linked 15 Gram Panchayats and this could be an indication that there could be delays in the way they are administered. However, about 55% of Gram Panchayats of Manipur are offline, which signifies that there is substantial room to grow further.

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Table 2: BharatNet Service-Ready Gram Panchayats

State	Total GPs	Service-Ready GPs	% Service-Ready
Manipur	2,534	1,151	45.4%
Mizoram	834	420	50.3%
Nagaland	1,506	134	8.9%

Digital Usage and Skill Acquisition

The state has pushed for rural service delivery through Common Service Centres (CSCs). Table 3 shows that 81.8% of Manipur's CSCs are located at the Gram Panchayat level, a higher ratio than in Mizoram or Nagaland, indicating a targeted rural strategy.

Table 3: Functional Common Service Centres (Dec 2021)

State	Functional CSCs	CSCs at GP Level	% CSCs at GP Level
Manipur	913	747	81.8%
Mizoram	324	215	66.4%
Nagaland	365	240	65.8%
Tripura	1,432	1,245	87.0%

Nevertheless, one of the bottlenecks is digital literacy. Under the PMGDISHA scheme (Table 4), enrolment is healthy but only 42.2% of registered candidates in Manipur secured certification, in contrast to 66.3% in Tripura.

Table 4: PMGDISHA Certification Rates (2023)

State	Registered	Trained	Certified	Certification Rate
Manipur	28,397	18,286	11,989	42.2
Mizoram	30,317	23,125	14,357	47.3
Tripura	3,25,000	2,64,186	2,15,688	66.3

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The Capability Gap: The data on digital literacy presents a critical "efficiency gap" in Manipur's digital transformation strategy. While enrollment numbers in schemes like PMGDISHA are healthy (28,397 registered), the transition to certification is where the system faces friction. A certification rate of only 42.2% suggests structural bottlenecks in the "last mile" of skill acquisition.

When this is contrasted with Tripura where the certification rate is 66.3%, it becomes clear that it is not simply a matter of access to training centers in Manipur, but rather a matter of *retention* and *quality* of training. According to economic theory, infrastructure (hardware) is a prerequisite to growth; it needs to be supplemented by human capital (software). When 57.8 percent of registered applicants do not achieve certification, the state is experiencing a loss of possible human capital development. This aligns with Bhatnagar's (2020) observation that states need to complement infrastructure with effective literacy campaigns to improve service delivery. Without fixing this "conversion rate" from enrollment to certification, the mere expansion of broadband infrastructure (BharatNet) will yield diminishing marginal returns, as the population will lack the technical agency to utilize these tools for economic gain.

Economic Outcomes and Impact of Disruption

The state's GSDP is projected to reach ₹607.12 billion in 2025-26. Analysis of the data reveals a positive correlation: as internet density doubled from ~33% (2021) to 70% (2024), GSDP expanded significantly (Table 5).

Table 5: GSDP and Digital Density Trends

Year	GSDP (₹ Billion)	Internet Density (%)	Tele-density (%)
2021	377.60	33.19	73.45
2022	423.00	65.94	74.70
2023	455.00	67.43	76.77
2024	521.44	70.01	77.80

However, the 2023 internet shutdown (143 days of full blackout) caused significant economic damage. Using the methodology described, Table 6 estimates the loss.

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Table 6: Estimated Economic Loss from Internet Ban (2023)

Metric	Value Estimate
Duration of Ban	143 days
GSDP 2023	₹455 billion
Loss Multiplier	2.8% (0.028)
Total Loss	₹4.99 billion

The estimated loss of ₹4.99 billion derived from the NetLoss methodology must be contextualized within the structural composition of Manipur's economy. The model utilizes a loss multiplier of 0.028 (2.8%), which is a standard coefficient for developing economies. However, this estimate is likely conservative.

The economy of Manipar has experienced structural change such that the service sector now makes an impressive contribution of 64.8% to the Gross State Domestic Product (GSDP). Services such as banking, the state, commerce, and education are much more susceptible to digital shocks than either production or agriculture.When the internet is severed, the transactional velocity of the service sector drops to near zero.

Therefore, for a state dependent on services for nearly two-thirds of its output, the actual economic multiplier of an internet shutdown is likely higher than the global average. The crisis does not simply suspend the existing consumption, it shocks the supply side by compelling small and medium enterprises (SMEs) to recvert to cash and localized trade, undoing centuries of formalization and the inclusiveness of finance. This has a hysteresis effect on the senses in that the temporary shock makes irreparable wounds on the investor confidence and business continuity.

DISCUSSION

The findings indicate that digital access in Manipur has potential, but it is marked by structural disparities. The significant rural-urban divide (see Table 1) serves as a major obstacle in a state where 70% of the population lives in rural areas. While the positive policy direction can be inferred from the high proportion of GP-level CSCs (see Table 3), it is apparent that digital literacy training is inadequate, as evidenced by the data (Table 4). There are problems related to training, perhaps in the quality of the training offered, or in the reliability of the training infrastructure.

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The Growth-Fragility Paradox:

The simultaneous existence of high growth and high fragility presents a unique paradox in Manipur's development narrative. On one hand, the state is projecting robust growth with Gross Household Income rising at a CAGR of 11.9%, primarily driven by digital integration in the urban service sectors. On the other hand, the 2023 crisis exposed that this growth is built on a fragile digital substrate.

This duality can be analyzed through the lens of institutional economics. While the *technological* institutions (tele-density, CSCs) have expanded, the *regulatory* and *political* institutions required to maintain their continuity are unstable. The internet ban, lasting 143 days, removed a primary factor of production for the modern economy. In production function terms, if we consider Output (Y) as a function of Capital (K), Labor (L), and Technology (A), the internet shutdown effectively reduced total factor productivity to pre-digital levels.

This explains why, despite having better rural service center density (81.8% at the GP level) than neighboring Nagaland[16], Manipur remains vulnerable. The infrastructure is present, but its *availability* is stochastic (random) rather than deterministic. For sustainable development, the policy focus must shift from merely "building more towers" (increasing K) to ensuring "digital resilience" (stabilizing A).

The 2023 internet ban represents a critical fragility in Manipur's development model. The estimated loss of ₹4.99 billion underscores how conflict-prone political systems can negate digital gains. This disruption disproportionately affected the service sector, which contributes 64.8% of the GSDP but relies heavily on digital continuity.

Policy Recommendations

- **Digital Data Infrastructure:** For an evidence-based policy, a state-level observatory is needed for gathering microdata.
- **Re-engineering PMGDISHA for Retention:** To address the low certification rate of 42.2%, the state must move beyond enrollment targets. Policy should link training provider payments to *certification* rather than *registration*. Furthermore, introducing vernacular (Meitei/local dialect) curricula could reduce the cognitive load for rural learners, potentially closing the gap with high-performing peers like Tripura.
- **Rapid Rural Expansion:** In order to bridge the 55% connectivity gap in Gram Panchayats, the state needs to prioritize the completion of BharatNet.

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- **Digital Resilience:** During Internet shutdowns, it is essential to develop a Digital Continuity Framework to maintain critical services such as healthcare.
- **Establish a 'Digital Resilience Fund' for SMEs:** Given the state's high reliance on the service sector (64.8% of GSDP), the government should institute a Digital Resilience Fund. This fund would act as an automatic stabilizer, providing emergency credit lines or fiscal transfers to digital-dependent SMEs during periods of internet suspension. This would prevent temporary liquidity crunches from turning into permanent business closures, thereby protecting the economic gains made during periods of stability.
- **Enhance Data and Monitoring Systems:** There is a need for real-time reporting of CSC usage, internet penetration, and service delivery so as to enhance targeting and planning. Engage with local institutions such as CMIE to conduct surveys to estimate the digital participation and economic effects at the regional levels.
- **Inclusive Job Creation:** Leverage the proposed IT-SEZ to upskill locals and connect SMEs, de-concentrating jobs from the capital to smaller towns.

CONCLUSION

The aim of this study was to evaluate the effects of digital technologies on development in the state of Manipur from a data-based, economic perspective. It identifies that though there have been significant improvements in the creation of infrastructure, like growth in tele-density, BharatNet implementation, and the expansion of CSC, the actual profits of the growth made by digital development are unevenly spread. The results point to the severe rural-urban divide, digital literacy gaps, and exposure to such systematic perturbations as internet blackouts. In spite of these setbacks, the healthy development of the service sector in Manipur, investments in IT infrastructure, and an increase in participation in the digital world are indications of untapped potential. The 2023 internet shutdown is an economic cost that demonstrates the sorry state this digital growth has left us in. Nonetheless, when used with precision policy responses, particularly by focusing on rural participation in the sector, upskilling, and infrastructural resilience, digital technologies in Manipur could emerge as an inclusive growth booster, a source of livelihood, and a receiver of government services.

The paper will add original, fact-based knowledge to an area that is still underrepresented in the national digital economy discourses. The discussion reveals that long-term policies, democratic governance, and systemic flexibility should be used to make sure that digital transformation does not leave anyone in Manipur behind.

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