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Uneven Startup Growth and Entrepreneurial Ecosystem Capacity in Northeast India: Evidence from Eight States, 2016-2024

Hrisikesh Borah [1], Preety Basumatary [2]

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Abstract
Northeast India has experienced growth in startup activity since the launch of Startup India in 2016, but the intensity of growth differs significantly across states. This paper addresses two questions simultaneously. First, it evaluates the annual and cumulative pattern of DPIIT-recognised startups across the eight Northeastern states from 2016 to 2024. Second, it makes a comparison of recent ecosystem conditions at the state level using official indicators such as bank intermediation, banking access, power availability, household internet access, higher-education participation, incubation presence, and startup-policy performance of the states. The study uses secondary data sources like DPIIT administrative data, official population projections, the RBI Handbook of Statistics on Indian States, MoSPI's Comprehensive Modular Survey: Telecom, AISHE, the NEC Yearbook, and States' Startup Ranking 5.0. A total of 2,054 DPIITs were recognised by the region during 2016-2024, and Assam has a share of 72.35% of the total. But this ordering was changed by the adjustment for population. With the adjustment for population, Manipur had the highest cumulative recognition density at 5.49 per 100,000 people, followed by Assam at 4.11. In ecosystem indicators, Sikkim performed strongly on several population-adjusted structural measures. While, Manipur had a high credit-deposit ratio and high household internet access, with low banking density and low per-capita power. However, Arunachal Pradesh was a Best Performer in States' Startup Ranking 5.0 despite having lower values on some structural measures. The results depict that startup concentration and intensity, as well as ecosystem conditions for startups, are distinct. The evidence of the study indicates that rather than taking one policy template for the whole region, state-specific policy measures would be more worthwhile.
Keywords: startup ecosystem; Northeast India; regional entrepreneurship; Startup India; entrepreneurial ecosystems; state comparison

1 Ph.D. Research Scholar, Department of Economics, Gauhati University, Guwahati, Assam
Hrisikesh Borah, E-mail: hrisikesh@gauhati.ac.in
2 Ph.D. Research Scholar, Department of Economics, Gauhati University, Guwahati, Assam
✉ Preety Basumatary, E-mail: preety@gauhati.ac.in

1. Introduction

A new phase of India's formal startup policy began when the Government of India launched the Startup India Action Plan on 16 January 2016. The measures of this plan are grouped under simplification and handholding, funding support and incentives and industry-academia partnership and incubation (Department for Promotion of Industry and Internal Trade [DPIIT], 2016). This led to the creation of a national recognition system for eligible startups and also allowed state governments to build an ecosystem. It also brought regional span into the policy discussion rather than seeing entrepreneurship as a metropolitan phenomenon.

Since then, research on India has shifted from merely counting new businesses to focusing on the circumstances behind the establishment and maintenance of businesses. Jha (2018) emphasizes the scope of India's startup growth as well as the necessity of looking beyond venture capital and valuation. From the policy angle, a similar conclusion was found in recent works. Nagaraj et al. (2025) depict that a broad set of public instruments are contained in Startup India, but their fit still depends on context. Aggarwal and Kashiramka (2025) also found that finance is more important than government programs, infrastructure and entrepreneurial education in an emerging-economy ecosystem. State and regional variation is not a minor detail, but rather an empirical question for these studies.

Northeast India offers a good setting for such a comparison. It is comprised of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The states share some geographical constraints but differ greatly in population, urban scale, banking depth, education, physical infrastructure and institutional support. Research on peripheral regions has long warned against treating remoteness as a single condition. Access to finance, talent, markets, infrastructure and policy support can vary in different combinations across places (Xu & Dobson, 2019). The same caution applies to the Northeast.

The region’s literature has grown, but is still fragmented. Hazarika and Barua (2024) report large differences across states in the number of startups and MSMEs and also find a strong concentration of formal enterprises within states. Kumar and Shobana (2023) have mentioned some limitations when it comes to standard entrepreneurship education. Patowary and Bora (2024) examined the services of one incubation centre in Assam and found that support quality varies by service. Roy and Devi (2026), using a survey of 50 startup entrepreneurs across the region, reported uneven access to institutional support, training and incubation. Borkakoty et al. (2026) approached the issue from clusters and knowledge spillovers. These studies are useful, but they use different periods, units and measures. A direct state-by-state comparison built from one official startup series and a small set of comparable ecosystem indicators is still useful.

This paper therefore separates two questions that are often mixed. The first concerns startup activity itself. The second concerns the conditions around startups. The distinction matters. A large number of DPIIT recognitions does not prove that a state has the strongest ecosystem. A strong policy tier also does not show that every resource needed by firms is abundant. Entrepreneurial ecosystem research makes the same distinction between outputs and the conditions that may support them (Stam, 2015; Stam & van de Ven, 2021).

The first objective is to examine the evolution and interstate distribution of DPIIT-recognised startup activity across Northeast India during 2016–2024. The analysis gives attention to annual formation, cumulative concentration and population-adjusted recognition density. The second objective is to compare recent ecosystem capacity across the eight states through indicators of finance, infrastructure and digital access, human capital, incubation and policy support. These objectives lead to two questions. RQ1 asks how DPIIT-recognised startup activity changed across the eight states and how unevenly it was distributed by 2024. RQ2 asks how the states differ on a common set of recent ecosystem indicators.

The contribution lies in the way the regional comparison is constructed. The analysis uses one consolidated DPIIT state-year series from the start of Startup India to the last complete year in the study. Cumulative recognition counts are adjusted for population so that state size does not drive the comparison. Startup activity is then placed beside a multi-dimensional ecosystem profile without combining the indicators into one index. This choice keeps the meaning of each measure visible and avoids a heavily parameterised model with only eight states.

2. Conceptual and empirical background

2.1 Entrepreneurial ecosystems as place-based systems

The entrepreneurial ecosystem approach shifts attention from the entrepreneur alone to the setting in which entrepreneurship occurs. The literature draws together regional entrepreneurship, institutions and innovation systems (Acs et al., 2017). Work on cities likewise treats framework conditions as part of the environment in which entrepreneurial activity takes place (Audretsch & Belitski, 2017). Stam and van de Ven (2021) define an ecosystem through interdependent actors and factors within a territory. Spigel (2017) makes a related argument by separating material, social and cultural attributes while stressing the relations between them. The value of the approach lies in this combination. Finance may be present while networks are weak. Although commercial links are limited, universities may exist. Physical infrastructure may improve without a similar rise in local capital or mentoring.

A measurement problem is associated along with this approach. Ecosystems seem to be complex, but a long list of indicators can easily become a loose checklist. Brown and Mason (2017) argue that entrepreneurial ecosystems vary widely across places and caution against universal templates. Leendertse et al. (2022) show that with clear definitions, comparable regional metrics are possible. Their work identifies finance, physical infrastructure, formal institutions and talent as central parts of the system. For a small regional comparison, this suggests using a limited set of indicators with clear meanings. It is better than combining many weak proxies into an opaque score.

Process also matters as well in these settings. Spigel and Harrison (2018) argue that over time resources are produced, recycled and moved through entrepreneurial ecosystems. Therefore, a cross-sectional profile cannot show the full process through which an ecosystem develops. It can still identify uneven resource conditions. The present design is guided by this distinction. The startup series is longitudinal, while the comparison of the ecosystem is a recent cross section. It is built from the latest common observation for each variable.

2.2 Peripheral and emerging-economy ecosystems

Most early ecosystem studies were based on mature innovation regions or the large cities. A problem is created when the same models are transferred to smaller or

peripheral economies. Xu and Dobson (2019) show that peripheral places or smaller places face combinations of small market size, remoteness and limited resources. Finance, talent, infrastructure, markets and policy are affected by these conditions. The important point is that weakness in one part of the system and it does not imply weakness everywhere.

A similar conclusion can be seen in evidence from emerging economies. Cao and Shi (2021) identify resource scarcity, structural gaps and institutional voids as recurring features of entrepreneurial ecosystems in emerging economies. Guerrero et al. (2021) show that the environmental conditions associated with entrepreneurship also differ across stages of the entrepreneurial process and across development settings. India-specific work now treats this heterogeneity more directly. Aggarwal and Kashiramka (2025) identify different weights for ecosystem elements in India, while Nagaraj et al. (2025) argue that public entrepreneurship policy needs more sensitivity to experimentation and context.

These arguments are relevant to Northeast India because the region is often treated as one policy space even though the eight states differ in scale and administrative capacity. A regional mean can hide those differences. The present paper therefore uses the Northeast only as the comparison set. The state remains the unit of observation.

2.3 India and Northeast India

India's startup expansion has been supported by a mix of national programmes, state policies, incubators and financial schemes. Jha (2018) described the ecosystem as large and opportunity-rich but noted problems of inclusion and value creation. Bhushan (2025) also points to uneven geographical development of startup hubs. Policy research has become more cautious about equating the presence of a scheme with its effect. Startup India covers regulation, funding, incubation, procurement and intellectual-property support, but the use and local relevance of these instruments vary (Nagaraj et al., 2025).

The Northeast evidence is consistent with that broader pattern. Hazarika and Barua (2024) found large differences in startup and MSME distribution across the eight states. Their district analysis also showed that formal enterprises were concentrated in a small number of districts. Kumar and Shobana (2023) found that entrepreneurship education in the region faces awareness, infrastructure and finance constraints. Patowary and Bora (2024) show that an incubation institution in Assam can provide many services while still having gaps in networking and legal support. It is can be suggested from the findings that institutional presence and performance of the institutions are not the same.

Recent regional work has moved closer to ecosystem analysis. Rroy and Devi (2026) report that amongst the startup founders, uneven access to incubation, mentoring and government support can be observed. Borkakoty et al. (2026) stress the role of clusters and local knowledge flows in regionally important sectors. Therefore, the literature points to a common problem. Across states and within states, startup activity and ecosystem resources are uneven. How the eight states compare when startup recognition is measured from one official time series and ecosystem conditions are measured through one transparent set of state indicators gives a vivid picture.

2.4 Research gap and analytical expectations

The paper does not test a causal model. Its question is comparative. If entrepreneurial ecosystems are place specific systems, their state profiles need not be lined up in one

ranking. High startup density can coexist with weak physical infrastructure. Also, a favourable policy tier can coexist with a small stock of recognised startups. Strong education or digital access can also sit beside limited bank intermediation. The value of these mismatches is practical. Policy diagnosis needs more than one metric in this case. Therefore, the empirical gap is not a casual identification but one of comparable description. The paper combines a 9-year DPIIT recognition series with current state indicators from RBI, MoSPI, AISHE, NEC and Startup India. The purpose is to establish the pattern first. Stronger causal work would require a larger panel, sub-state data or founder level observations, which are linked to policy exposure.

3. Data and methods

3.1 Research design

In this study, secondary administrative and statistical data for the eight Northeast Indian states are used. Objective 1 is longitudinal in nature and covers the period from 2016 to 2024. Objective 2 is a latest comparable period cross section data. The two parts are linked only in the discussion. The design avoids causal language as the ecosystem indicators are observational and come from different official reporting systems.

As DPIIT is available on a common administrative definition across states, its recognition is used as the startup measure. This choice has limits. A DPIIT recognised startup is not the same as every new business, every MSME or every active entrepreneurial venture. The recognition count is therefore treated as an administrative measure of formal startup recognition under Startup India.

3.2 Startup recognition, cumulative concentration and density

Annual state-level recognitions come from the annexure to Lok Sabha Unstarred Question No. 2648 answered on 5 August 2025 (DPIIT, 2025). The annexure reports state and year counts from 2016 onward. The 2025 column covers only the period to 30 June 2025, so it is excluded from the main analysis. The completed study window is 2016–2024.

Cumulative recognitions are the sum of annual recognitions over 2016–2024. Each state's share of the Northeast total is calculated from that cumulative count. The population-adjusted measure uses the official projected population as on 1 July 2024 from Population Projections for India and States 2011–2036 (National Commission on Population, 2020). Startup recognition density is defined as cumulative DPIIT recognitions during 2016–2024 divided by projected population in 2024 and multiplied by 100,000. Since the published population table is in thousands, the spreadsheet form is cumulative recognitions divided by population in thousands and multiplied by 100.

The cumulative count does not signify the active numbers of startups in 2024. The administrative series records recognitions and does not establish the operating status of every recognised entity. Therefore, the density measure is a population adjusted recognition measure.It is not a survival or performance indicator.

3.3 Ecosystem indicators

Objective 2 uses seven observed indicators across five dimensions. The set is small by design. Each indicator has a common definition across all eight states and comes from an official source. Table 1 gives the definition, reference period and interpretation.

Table 1. Operationalisation of entrepreneurial ecosystem capacity

Dimension	Indicator	Unit	Reference period	Source
Finance	C-D ratio of SCBs, place of utilisation	%	End-March 2025	RBI Table 154
Finance / access	SCB offices per 100,000 projected population	Offices/100k	End-March 2025 offices; 1 July 2025 population	RBI Table 152; NCP
Infrastructure	Per-capita availability of power	kWh/capita	2024–25	RBI Table 138
Digital access	Households with internet facility within premises	% households	Jan–Mar 2025	MoSPI CMS Telecom Table 14
Human capital	Higher-education GER, age 18–23	%	2023–24	AISHE Table 19
Incubation	Incubators and incubators per million projected population	Count; /million	Inventory as of Nov. 2023; 1 July 2023 population	NEC Year Book 2024 Table 8.6.12; NCP
Policy / institutions	States' Startup Ranking 5.0 tier	Categorical	Evaluation period: Jan. 2023–Nov. 2024	DPIIT / Startup India

Source: Reserve Bank of India (2025); Ministry of Statistics and Programme Implementation (2025); Ministry of Education (2026); National Commission on Population (2020); North Eastern Council (2024); DPIIT (2026).

The credit-deposit ratio is taken according to place of utilisation. It measures general bank credit relative to deposits and is not a startup-finance variable. SCB office density captures physical banking access. Per-capita power is used as a broad infrastructure measure. Household internet access comes from MoSPI's Comprehensive Modular Survey: Telecom, 2025 and is a household-access measure rather than a measure of business speed or service quality. Higher-education GER is used as a broad human-capital proxy. It does not measure entrepreneurial skill.

The incubation measure uses the state-wise inventory in NEC Year Book 2024. That inventory is based on NEDFi Research and is dated November 2023. It lists 33 incubators across the eight states. A later NEC publication reproduces a narrower Startup India map with lower counts. The dedicated state inventory is used because it is explicitly presented as a state-wise incubator inventory. Incubator density uses the 1 July 2023 projected population to match the inventory date as closely as possible.

States' Startup Ranking 5.0 is kept categorical. Arunachal Pradesh is a Best Performer. Manipur, Meghalaya and Nagaland are Leaders. Assam, Mizoram, Sikkim and Tripura are Aspiring Leaders (DPIIT, 2026). Assam is evaluated in Category A2 while the other seven states are in Category B. The tier is therefore used as policy context and is not converted into a numerical score.

3.4 Data treatment and analysis

The initial analysis is started with annual counts, cumulative shares and population adjusted density for Objective 1. For Objective 2, raw values and simple descriptive comparisons are used. SCB office counts are converted to offices per 100,000 using the 1 July 2025 projected population. Incubator counts are converted to units per million using the 1 July 2023 projected population. Other indicators are already rates or ratios and are retained in the published unit.

For the visual profile, six continuous ecosystem indicators are standardised within the eight-state set. Each value is centred on the eight-state mean and divided by the population standard deviation of the eight observations. Positive values indicate that a state is above the eight-state mean for that indicator. Negative values indicate that it is below the mean. These z-scores are used only for display. They are not summed into a composite index. The Startup Ranking tier is excluded from standardisation because it is categorical.

No cross-sectional regression is estimated. With eight state observations, a model containing several ecosystem predictors would be unstable and would invite causal interpretations that the design cannot support. The paper therefore uses transparent comparison, ranks where useful and a heatmap of standardised values. This is consistent with calls for careful definition and measurement in entrepreneurial ecosystem research (Stam, 2015; Leendertse et al., 2022).

4. Results

4.1 Startup recognition across the region, 2016–2024

Table 2. Annual DPIIT-recognised startup counts in Northeast India, 2016–2024

State	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Arunachal Pradesh	0	0	2	2	0	4	9	18	13	48
Assam	10	35	68	71	119	190	285	361	347	1,486
Manipur	0	4	7	6	13	37	31	26	55	179
Meghalaya	0	0	2	6	0	9	10	18	17	62
Mizoram	0	0	2	1	1	2	6	13	16	41
Nagaland	1	4	2	2	5	7	7	22	35	85
Sikkim	0	1	0	2	1	4	2	2	0	12
Tripura	0	0	4	7	23	12	27	23	45	141
Northeast India	11	44	87	97	162	265	377	483	528	2,054

Source: DPIIT (2025), Lok Sabha Unstarred Question No. 2648, Annexure I. Note: 2025 is excluded because the official 2025 observation covers only 1 January to 30 June.

New DPIIT recognitions rose from 11 across the Northeast in 2016 to 528 in 2024. The series increased every year at the regional level. Growth was slow between 2018 and 2019, when the count moved from 87 to 97. It accelerated after 2020. Recognitions increased from 162 in 2020 to 265 in 2021 and 377 in 2022. The largest absolute annual increase occurred between 2021 and 2022, when the regional count rose by 112. The count reached 483 in 2023 and 528 in 2024.

Assam recorded the largest annual count throughout the study period. Its new recognitions rose from 10 in 2016 to 347 in 2024. The state reached 361 in 2023 before a small decline in 2024. Manipur recorded 55 new recognitions in 2024. Tripura

recorded 45 and Nagaland 35. The smaller states also showed an upward movement over the full period, but annual counts remained much lower than Assam's. Sikkim recorded no new DPIIT recognition in 2024.

The regional time series shows expansion in formal recognition under Startup India. It does not show startup survival, revenue growth or employment quality. Those outcomes require different data.

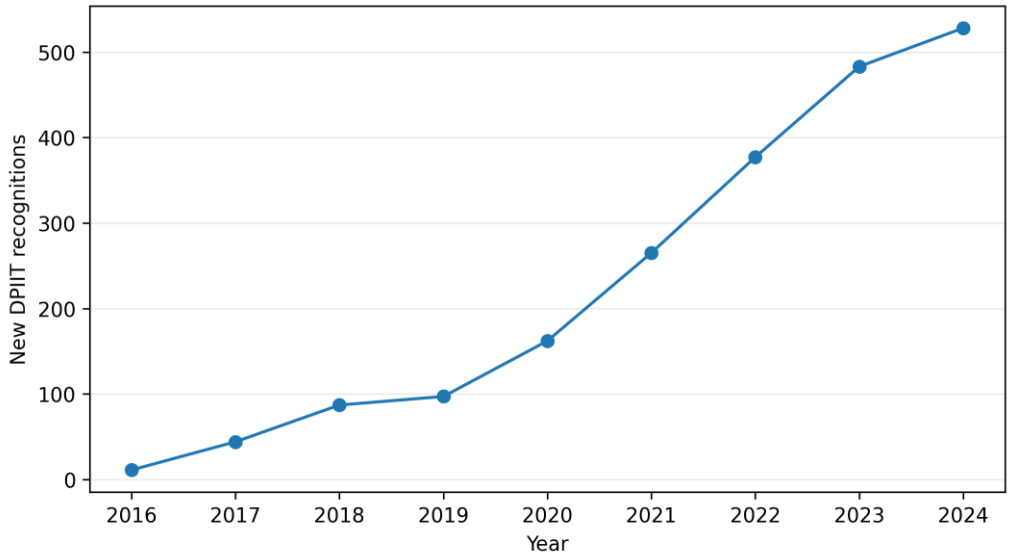

Figure 1. Annual DPIIT startup recognitions in Northeast India, 2016–2024
Source: Authors' figure from DPIIT (2025).

4.2 Cumulative concentration and population-adjusted density

Table 3. Cumulative DPIIT recognitions, regional share and startup recognition density at the 2024 endpoint

State	Cumulative recognitions	2024 pop. ('000)	NE share (%)	Density /100k	Density rank	Count rank
Arunachal Pradesh	48	1,580	2.34	3.04	6	6
Assam	1,486	36,159	72.35	4.11	2	1
Manipur	179	3,260	8.71	5.49	1	2
Meghalaya	62	3,387	3.02	1.83	7	5
Mizoram	41	1,252	2.00	3.27	5	7
Nagaland	85	2,258	4.14	3.76	3	4
Sikkim	12	697	0.58	1.72	8	8
Tripura	141	4,194	6.86	3.36	4	3
Northeast India	2,054	52,787	100.00	3.89		

Source: Authors' calculations from DPIIT (2025) and National Commission on Population (2020). Note: Density is cumulative DPIIT recognitions during 2016–2024 per 100,000 projected population as on 1 July 2024.

The cumulative distribution is concentrated in Assam. The state accounts for 1,486 of the 2,054 recognitions recorded in the region during 2016–2024. Its share is 72.35%.

Manipur accounts for 8.71% and Tripura for 6.86%. Nagaland contributes 4.14%. The remaining four states each account for about 3% or less. Sikkim has 12 cumulative recognitions, equal to 0.58% of the regional total.

Population adjustment changes the ordering. Manipur has the highest cumulative recognition density at 5.49 per 100,000 projected population. Assam is second at 4.11. Nagaland follows at 3.76. Tripura records 3.36, Mizoram 3.27 and Arunachal Pradesh 3.04. Meghalaya and Sikkim have the lowest densities at 1.83 and 1.72. The Northeast-wide value is 3.89 per 100,000.

The difference between count rank and density rank is important. Assam is the main centre of recognised startup activity in absolute terms, yet Manipur has the highest recognition intensity after adjustment for population. Tripura also rises in the population-adjusted comparison. Meghalaya moves in the opposite direction. Large regional shares and high population-adjusted intensity are therefore separate features of the startup pattern.

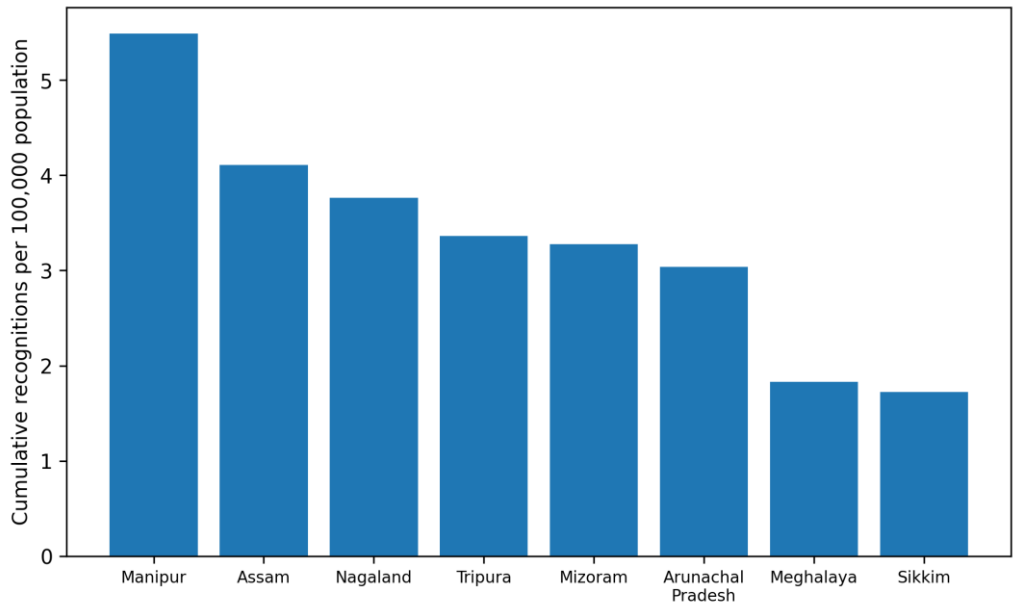

Figure 2. Cumulative DPIIT recognition density by state at the 2024 endpoint
Source: Authors' calculations from DPIIT (2025) and National Commission on Population (2020).

4.3 Ecosystem conditions across the eight states

Table 4. Selected indicators of entrepreneurial ecosystem capacity across Northeast India

State	C-D (%)	SCB /100k	Power kWh/capita	Internet %	GER %	Incubators	Incubators /m	SRF 5.0
Arunachal Pradesh	32.2	14.37	666.2	77.8	34.3	3	1.92	Best Performer

Assam	**66.0**	**8.87**	**356.2**	**90.9**	**19.8**	**13**	**0.36**	**Aspiring Leader**
Manipur	79.7	7.94	328.9	97.4	30.7	4	1.24	Leader
Meghalaya	40.7	11.53	606.7	91.2	29.1	3	0.89	Leader
Mizoram	51.8	19.07	568.0	96.8	31.5	3	2.42	Aspiring Leader
Nagaland	53.5	10.14	417.2	88.4	18.4	5	2.23	Leader
Sikkim	43.8	26.32	820.1	97.6	42.5	1	1.45	Aspiring Leader
Tripura	45.4	15.26	463.7	81.2	22.9	2	0.48	Aspiring Leader

Source: RBI (2025), Tables 138, 152 and 154; MoSPI (2025), Table 14; Ministry of Education (2026), AISHE Table 19; North Eastern Council (2024), Table 8.6.12; DPIIT (2026). Bank-office density uses the 1 July 2025 projected population. Incubator density uses the 1 July 2023 projected population.

The finance indicators do not produce a common ranking. Manipur has the highest credit-deposit ratio at 79.7%, followed by Assam at 66.0%. Arunachal Pradesh has the lowest ratio at 32.2%. Physical banking access shows another pattern. Sikkim has 26.32 SCB offices per 100,000 projected population. Mizoram has 19.07 and Tripura 15.26. Manipur has the lowest branch density at 7.94, while Assam records 8.87. A high C-D ratio and a dense branch network are therefore not the same condition.

Infrastructure and digital access also differ. Sikkim has the highest per-capita power availability at 820.1 kWh. Arunachal Pradesh records 666.2 and Meghalaya 606.7. Manipur has the lowest value at 328.9 kWh, followed by Assam at 356.2. Household internet access follows a different ordering. Sikkim records 97.6%, Manipur 97.4% and Mizoram 96.8%. Arunachal Pradesh has the lowest estimate at 77.8%, followed by Tripura at 81.2%.

Higher-education GER ranges from 18.4% in Nagaland to 42.5% in Sikkim. Arunachal Pradesh records 34.3%, Mizoram 31.5% and Manipur 30.7%. Assam records 19.8%. These values measure participation in higher education. They should not be read as direct measures of founder skill or the quality of entrepreneurial labour.

The NEC inventory identifies 33 incubators as of November 2023. Assam has the largest raw count at 13. Nagaland has five and Manipur four. Arunachal Pradesh, Meghalaya and Mizoram have three each. Population adjustment changes the order. Mizoram has 2.42 incubators per million projected population, Nagaland 2.23 and Arunachal Pradesh 1.92. Assam falls to 0.36 per million because of its much larger population.

States' Startup Ranking 5.0 adds a policy measure rather than another structural rate. Arunachal Pradesh is a Best Performer. Manipur, Meghalaya and Nagaland are Leaders. Assam, Mizoram, Sikkim and Tripura are Aspiring Leaders. The classifications do not mirror the structural indicators. Sikkim has strong values on several current indicators but remains an Aspiring Leader. Arunachal Pradesh is a Best Performer while recording the lowest C-D ratio and the lowest household internet-access estimate in this comparison.

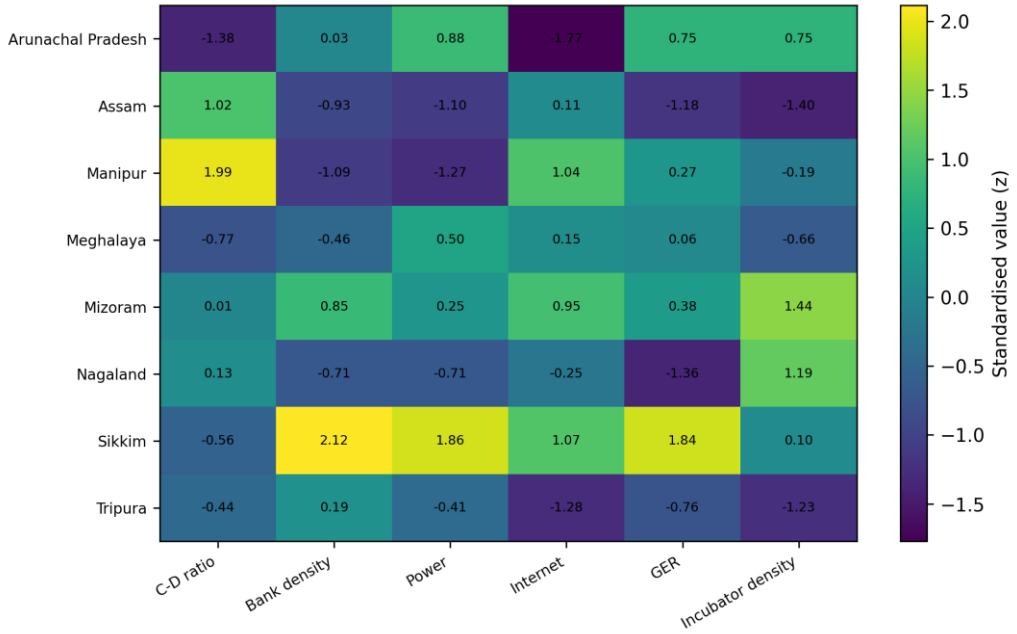

Figure 3. Standardised profile across six continuous ecosystem indicators

Note: Values are standardised within the eight-state set. Positive values are above the eight-state mean, and negative values are below it. The values do not form an ecosystem score. Source: Authors' calculations from the official sources listed in Table 1.

5. Discussion

5.1 Startup concentration and startup intensity are different

The first result is the scale of regional growth. Annual DPIIT recognitions rose from 11 in 2016 to 528 in 2024. The rise is clear, but it is highly concentrated. Assam accounts for more than seven in ten of all recognitions during the period. This confirms that a regional total can give a misleading picture of spatial spread. Earlier work also found strong concentration of formal enterprise activity in a small number of states and districts (Hazarika & Barua, 2024). The updated DPIIT series shows that interstate concentration remains large even after several years of Startup India.

A second view is given by population adjustment. Manipur moves ahead of Assam on cumulative recognition density. This does not make Manipur the stronger ecosystem. It means that the stock of formal startup recognitions is larger relative to population. The distinction is simple but useful. Absolute counts measure scale. Density measures intensity relative to population. Policy discussions need both because a state can be important to the regional startup total without having the highest per-capita presence.

The finding also warns against using raw counts as a direct proxy for entrepreneurial capacity. Assam's large population and urban scale make it more likely to lead in absolute numbers. The density measure reduces that size effect. It still does not control for age structure, urbanisation, sector mix or differences in recognition uptake.

5.2 Ecosystem conditions do not form one state hierarchy

The absence of a common state ordering across ecosystem indicators is another important result. The systems literature would lead us to expect this. Ecosystem elements are connected, but they are not interchangeable (Spigel, 2017; Stam & van de Ven, 2021). In the current data, Manipur has the highest C-D ratio. It is near universal household internet access with the lowest branch density and the lowest per capita power. Sikkim combines high bank office density, power availability, internet access and GER with a below average C-D ratio. Assam has the largest raw banking network and incubator stock but low population adjusted branch and incubator density.

These mismatches matter as they weaken simple explanations of growth of startups. Manipur has the highest startup recognition density although several structural indicators are weak. Sikkim has the lowest startup recognition density while several structural indicators are strong. It does show that no single current indicator explains the 2016–2024 startup pattern. The timing difference is also important. Most ecosystem measures are from 2023–2025, while the startup count accumulates 9 years of recognitions. Some current capacity may have been built after much of the observed startup stock was formed.

For the same reason, policy tiers are divergent. Arunachal Pradesh is a Best Performer in Startup Ranking 5.0, yet its recognition density is below the Northeast average. Despite strong values on several structural indicators, Sikkim is an Aspiring Leader. Startup Ranking evaluates policy and ecosystem actions under a separate framework. It is not a stock measure of firms or infrastructure. Treating it as a direct outcome rank would mix different concepts. Brown and Mason (2017) make a wider version of this point. They stated that entrepreneurial ecosystems are varied and should not be reduced to one template.

5.3 What the Northeast comparison adds to ecosystem research

The eight-state comparison gives support to work on peripheral and emerging-economy ecosystems. Xu and Dobson (2019) argue that peripheral regions face several constraints at once, but the local combination differs. Cao and Shi (2021) describe resource scarcity and institutional gaps as recurring features in emerging economies. Northeast India fits that general setting, yet the data show internal variation that is easy to miss when the region is treated as one block.

The findings also add a measurement point. Leendertse et al. (2022) show the value of multi-dimensional metrics, while Stam (2015) warns about shallow causal claims in ecosystem research. The present results support a modest version of both arguments. A small transparent indicator set can reveal state differences without producing an arbitrary league table. The data also show why policy outputs, physical resources and startup counts should remain separate until a stronger research design links them.

Regional studies give examples of the mechanisms that could sit behind the observed profiles. Entrepreneurship education remains uneven (Kumar & Shobana, 2023). Incubators can provide useful services, but service gaps remain even within established institutions (Patowary & Bora, 2024). Founder-level evidence points to uneven mentoring, incubation and support access (Rroy & Devi, 2026). Cluster-based work also suggests that knowledge flows depend on local sector and spatial structure (Borkakoty et al., 2026). These mechanisms are plausible explanations for interstate differences, but the present data do not test them directly.

5.4 Policy implications

The results do not support one regional policy prescription. The more useful approach is to diagnose the weakest parts of each state profile and then examine whether existing programmes address those gaps. This is consistent with work on India that calls for context-sensitive entrepreneurship policy rather than an excessive reliance on a narrow set of instruments (Nagaraj et al., 2025).

For Assam, scale is an advantage, but population-adjusted branch density, incubator density and GER are low within the regional comparison. The policy question is therefore not only how many institutions exist but how widely their services are available relative to population. For Manipur, the contrast between a high C-D ratio and weak branch density and power suggests that financial intermediation and physical access should not be treated as the same policy problem. For Sikkim, strong structural values coexist with very low cumulative DPIIT recognition density. That case needs founder- and sector-level work before any claim is made about the reason for low recognition uptake.

Arunachal Pradesh presents another useful case. Its Best Performer tier shows strong policy evaluation under SRF 5.0, yet current digital-access and bank-intermediation indicators remain weak relative to the other states. It means that policy action and structural capacity have different time horizons and measurement rules. A useful follow-up would track whether states with stronger policy tiers later show changes in startup recognition, survival or scaling.

At the regional level, two priorities follow directly from the evidence. First, public reporting should continue to move towards comparable state and district series for startup finance, survival, incubation use and founder characteristics. Second, programme evaluation should separate access from presence. Counting a bank branch, incubator or scheme says little about who uses it and with what result. Better linked administrative data would allow future studies to move from description to policy evaluation.

6. Limitations

The study has some limitations. DPIIT recognition is an administrative measure and does not cover all entrepreneurs or firms, nor does it indicate whether recognised startups remained active throughout 2016-2024. Population figures are based on official projections from the 2011 Census, so projection errors may be possible. Since the indicators come from different reference years, the findings represent a **latest-comparable profile** rather than a single-period picture.

The selected indicators are also proxies and do not fully capture aspects such as startup finance, digital quality, entrepreneurial skills, incubator performance, venture capital, market access, or startup survival. Finally, the analysis covers only eight states; therefore, regression analysis would have limited statistical reliability and could not establish causality. More robust evidence would require longer state-level panels, district-level data, or data linked to specific policy interventions.

7. Conclusion

The startup recognition base in Northeast India grew significantly between 2016 and 2024. The growth was not uniform in every state of the region. Assam accounted for 72.35% of all DPIIT recognitions, but after population adjustment, Manipur had the highest recognition density. This discrepancy demonstrates the need for combined reporting of absolute counts and per-capita metrics. A second outcome of the

ecosystem comparison is that states combine strengths and constraints in different ways. Finance, banking access, power, household internet access, higher education participation, incubation presence, and policy tiers do not produce a single state hierarchy. Some of the most striking contrasts occur between the accumulated startup pattern and current structural conditions, but these differences are informative, not causal evidence.

The practical implications are easy. It is not appropriate to analyse Northeast India as a single, homogeneous startup ecosystem. State scale, resource conditions and policy capacity differ for each state. Future study can build on the existing comparison by relating startup records to survival, funding, sector and district location. For now, the official data support a state-specific picture of ecosystem growth and a cautious separation between policy effort, structural capacity and observed startup recognition.

Data availability

All data used in the analysis are drawn from publicly available government sources cited in the manuscript. The calculations reported in Tables 3 and 4 can be reproduced from those source tables and the stated population projections.

Author contributions

Hrisikesh Borah: Conceptualisation, methodology, data analysis, visualisation, interpretation and manuscript writing.

Preety Basumatary: Data collection, startup trend analysis, literature review, data verification, manuscript writing and editing.

Both authors reviewed and approved the final manuscript.

Conflict off interest

The authors declare that they have no known conflict of interest.

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