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Evolution of the Indian Startup Ecosystem: A Subnational Perspective

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Evolution of the Indian Startup Ecosystem: A Subnational Perspective

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Abstract

In 2023, India recognized approximately 95 startups daily, securing its position as the world's third-largest startup ecosystem. Outpacing China in 2021, India is now second only to the US as a unicorn hub. Shifting regional and sectoral dynamics are fuelling India's startup momentum. Our analysis highlights increased startup activity in less competitive states and lower-tier cities with state-level policy push. Another key pattern is the emerging industrial specialisation of startups that varies across regions. Notably, states like Haryana and Bihar show potential as emerging startup hubs in frontier industries like Green Technology and Renewable Energy.

Keywords: startups, competitiveness, heterogeneity, Startup India, startup funding, investment

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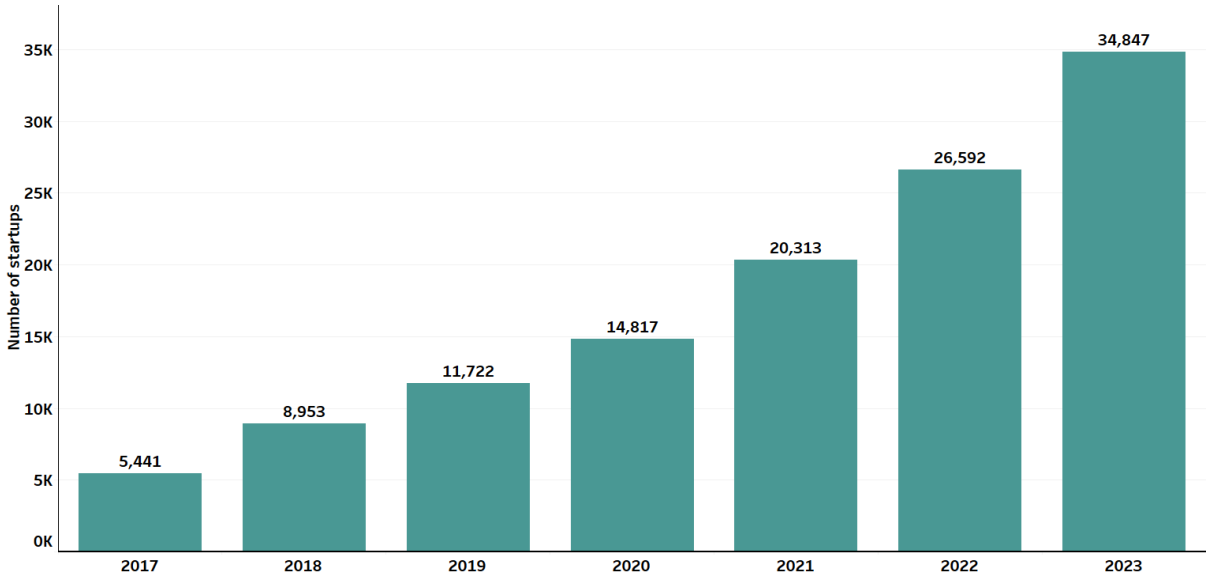
1 Introduction

In 2023, the global startup ecosystem witnessed a sharp contraction with dissolution and bankruptcy, forcing 543 startups to shut down (Goodkind, 2023). Venture capital (VC) funding dwindled to all-time lows as once-optimistic investors grew wary in an environment of high interest rates and geopolitical uncertainty (Goodkind, 2023), intensified by the collapse of Silicon Valley Bank (SVB).

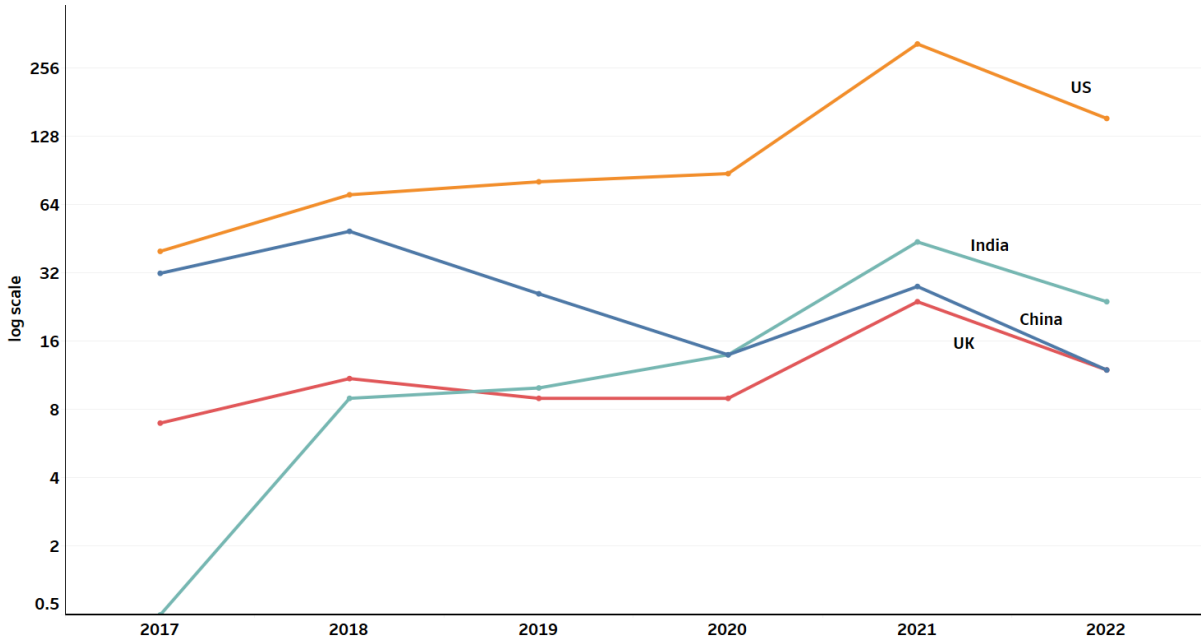
Startups in India were also affected by the prolonged funding winter. In 2023, Indian startups saw a 63% decline in VC funding, the steepest dip compared to the US, the UK, and China (GlobalData, 2024). Nevertheless, the startup environment in India showed signs of resilience, with a 71.5% rise in startup numbers post-pandemic, from 2021 to 2023 (see Fig. 1). As of 2022, the number of unicorns in India was second only to the US, having outpaced China in 2020 (see Fig. 2). Additionally, Indian startups attracted a significant US$ 8.4 billion in funding from domestic and foreign investors (Fortune India, 2024), and the country has since retained its position as the world's third-largest startup ecosystem, only trailing the US and China (Sarkar, 2021).

Figure 1: **Number of startups**



Source: Department for Promotion of Industry and Internal Trade (DPIIT) - Government of India; data.gov.in

Figure 2: **Number of unicorns**



Source: Tracxn

Note: The y-axis is log-scaled to the base 2.

Two main factors drive the buoyancy of India's startups. First, rising internet penetration has helped aspiring entrepreneurs to startup from locations considered remote previously. Since the launch of the Digital India Initiative in 2015, internet penetration (through fixed and mobile connections) has expanded by 25.4% from 2015 to 2024 (Soni, 2020). Besides accessibility, mobile data is also very affordable in India at US$0.16/GB, which is the cheapest worldwide (Kemp, 2024). Besides focusing on fields like Software-as-a-Service (SaaS) and Deep-Tech, startups are also increasingly using social media platforms for promotions, enabling them to advertise at negligible costs. With the improvements in internet infrastructure extending to rural areas, startups have also started to emerge beyond the traditional metro hubs. Additionally, with a mean age of 29, India is home to one-fifth of the global youth population - enhancing the speed and rate at which conventional and frontier technology is adopted (Ministry of External Affairs, 2021).

Second, the benefits from a tranche of government schemes under the Startup India Initiative of 2016 have contributed towards India's startup growth. These schemes cover a wide range of aspects such as capital availability and credit guarantees for loans, ease of compliance burdens, intellectual property protection, tax rebates, and access to international markets (Press Information Bureau, 2023). A slew of promising schemes for Bio and Deep-Tech startups and funding avenues to raise R&D investments in sunrise sectors was announced in the recent 2024-25 Interim-Budget presentation (Press Information Bureau, 2024). Additionally, the 2024-25 Union Budget included measures to boost investments in startup and innovation through incentives for increasing private sector-driven research, incentives for Electric Vehicles (EVs) and R&D, simplified norms

for FDI inflows, and an outlay of Rs 1000 crore under the Startup India Seed Fund (SISF) for early-stage startups. One of the more lucrative components in the Budget was the scrapping of the angel tax for all classes of investors, a victory for angel investors and startups alike (Ministry of Finance, 2024).

The robust policy support has facilitated startup growth beyond metropolitan cities to Tier 2 and 3 cities and some villages. Historically, Karnataka (whose capital city Bengaluru is dubbed the Silicon Valley of India), Maharashtra and Delhi have cemented their dominance as well-equipped startup spaces. However, in recent times, federal and subnational governments have shown heightened interest in transforming lower-tier cities and lesser competitive subnational economies into conducive startup hubs (The Economic Times, 2022; Kannaiah, 2024; The Times of India, 2023; The Economic Times, 2021). Against this context, we examine the subnational evolution of the startup ecosystem in India using data on startup numbers and funding from 2017 to 2023, and 2018 to 2022, respectively. Our findings indicate a reasonable degree of heterogeneity in startup proliferation across the country with low-tier cities and less competitive states emerging as startup hubs after the COVID-19 pandemic. Furthermore, we find evidence of industrial specialisation with startups in less competitive states such as Bihar and Assam witnessing the largest growth in frontier industries such as Green Technology and Renewable Energy.

The rest of the paper is structured as follows. Section 2 presents the data. Section 3 provides a comprehensive review of India's policy landscape directed at supporting startup activity, followed by Section 4, which provides an analysis of the key trends shaping the evolution of India's startup ecosystem regions and states. Next, Section 5 presents case studies on Haryana and Bihar - two less competitive recently which displayed great startup momentum in the recent years. Section 6 concludes.

2 Data

We use the annual data on the number of startups in India by industry at the subnational level from 2017 to 2023 from *data.gov.in*, India's Open Government Data Platform. We complement our subnational analysis using data on startup funding pertaining to stages, deal volumes and values from 2018 to 2022 from *Startup Talky* that publishes data on startup funding volumes and funding stages at the city-level. For our analysis, we aggregate this city-level data up to the subnational level. We also perform a similar data transformation exercise to aggregate tiered classifications of cities (Tier 1, 2 and 3) up to the subnational level. We obtain particulars on the tiered categorisation of cities from *Housing.com*. Additionally, we use the data on subnational competitiveness from Vaid and Zhang (2024) to classify the states of India as Top, Middle or Bottom in terms of competitiveness across four broad dimensions - macroeconomic stability; government and institutional setting; financial, business and manpower conditions; and quality of life and infrastructure development.[1]

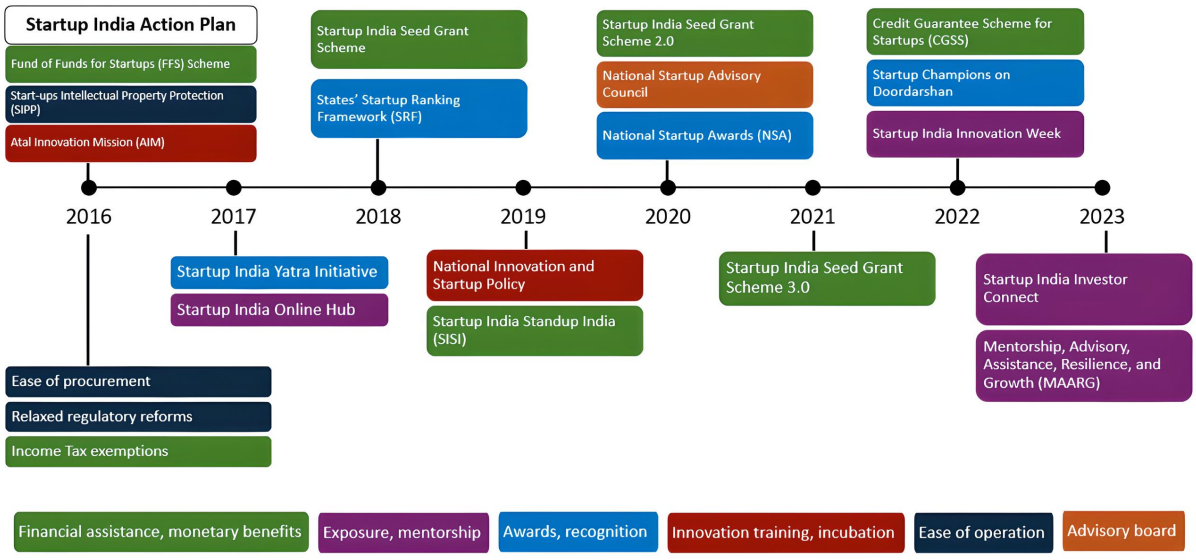
[1]More information on the publication can be found at: https://aciperspectives.com/2024/06/28/book-launch-innovative-india-a-sub-national-competitiveness-analysis/

3 Policy initiatives - Startup India Initiative

The Startup India Initiative of 2016 (and its 19-point Action Plan) is the umbrella scheme that set in force a plethora of measures driven by the principal objective of encouraging innovation, investment flows and startup activity (Press Information Bureau, 2023). In Fig. 3, we divide the policy initiatives into six broad categories: financial assistance and monetary benefits; exposure and mentorship; awards and recognition; innovation training and incubation; ease of operation; and advisory board.

Financial assistance and monetary benefits: A large share of policy initiatives corresponds to the provision of monetary or financial assistance. Initiated in 2016, the Fund of Funds for Startups (FFS) Scheme and the Credit Guarantee Scheme for Startups (CGSS) cater to the funding requirements of startups. FFS extends credit facilities to startups at the early, seed and growth stages out of a corpus of Rs 10,000 crore (Press Information Bureau, 2023). CGSS offers credit guarantees of up to Rs 10 crore against capital loaned by banks, non-banking financial corporations (NBFCs) and Alternative Investment Funds (AIFs) (Press Information Bureau, 2022a). Besides these, startups gains a tax holiday for three successive years out of their first 10 years of incorporation (Press Information Bureau, 2023).

Figure 3: **A Timeline of Major Policy Initiatives**



Source: Authors' compilation using information from the Press Information Bureau and the NITI Aayog - Government of India

Exposure and mentorship: The second category of policy initiatives under the Startup India Action Plan includes attractive non-monetary benefits through mentorship and exposure. For example, the Startup India Investor Connect portal is an online platform that allows startups operating across the country to register, connect, and network with

leading investors and VC funds. As of April 2023, over 1900 startups and 82 AIFs have enrolled on this platform. To ensure that the spirit of entrepreneurship reaches the bulk of the population, the government airs the Startup Champions program on *Doordarshan* - a government-run television network that requires, at the minimum, a stable cable connection - which most households in India have access to (Press Information Bureau, 2023).

Innovation training and incubation: With regard to the technical training, incubator support, and R&D categorisation, Atal Innovation Mission (AIM) gains prominence as it focuses on inculcating a penchant for innovation among school students through Atal Tinkering Labs that span over 10,000 schools. Furthermore, it engages with universities to set up Atal Incubation Centres (AICs) - launchpads for startup activity. Based on official statistics, 72 AICs are fully functional across India (Atal Innovation Mission, nd). Finally, to foster technology-led innovation in Tier 2 and 3 cities, tribal and hilly areas, 14 Atal Community Innovation Centres (ACICs) have been set up to ensure capital infusion to startups in these target areas (Atal Innovation Mission, nd).

Ease of operation: Provisions that facilitate the ease of startup operation in India are quintessential for startup growth. Since 2016, the government has implemented over 50 regulatory measures to lower the compliance burden and make it easier for startups to raise funds and conduct business operations in India. Also, startups can avail of fast-tracked patent application processes under the Startup Intellectual Property Protection (SIPP) mechanism. It also mandates that startups registering for patents, trademarks, and designs only pay the statutory fee as the government bears the bulk of the costs (Press Information Bureau, 2023).

4 Emerging subnational trends in the startup ecosystem

In recent years, two major trends have shaped the Indian startup ecosystem amid the national policy focus on building the startup landscape. First, the ascent of Tier 2 and 3 cities, and Middle- and Bottom-ranking subnationals as emerging startup hubs. Second, the industrial specialisation of startups varies across subnational economies. This section sheds light on the recent shifting regional and sectoral dynamics of startups in India.

4.1 Low-tier cities emerging as startup hubs

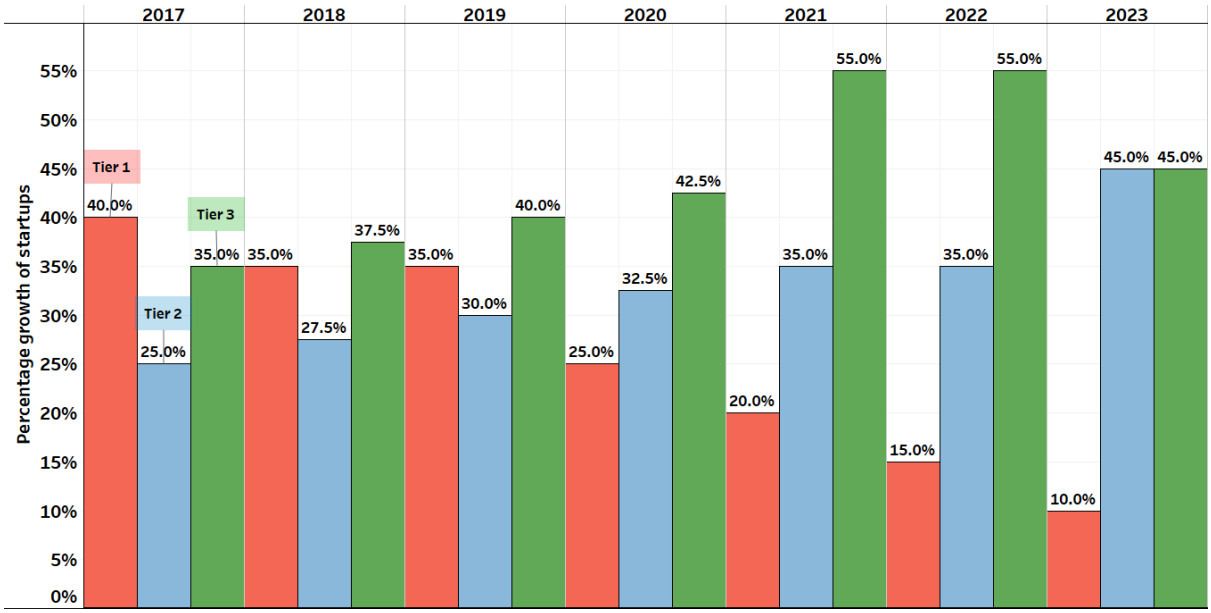
In recent years, policymakers, entrepreneurs and investors have increasingly explored lower-tier cities as startup hubs due to the multiple advantages they offer compared to their Tier 1 counterparts. According to some founders, small towns have seen major infrastructure upgrades through superior internet connectivity and efficient transport

systems (Ojha, 2023). In addition, due to lower living costs, office spaces are available at cheaper rentals, letting startups function on a larger scale (Jain, 2024). These benefits have motivated many startups to locate their headquarters in Tier 2 and 3 cities. As of 2021, 41 startups have stationed their headquarters in Jaipur, followed by Indore (20), Kochi (18), Chandigarh (15), and Vadodara (12) (Agarwal et al., 2021). Next, the twin successes of internet connectivity and digitisation have enabled the rise of a substantial population of online shoppers - 50% of them live in lower-tier cities and this figure is expected to climb to 60% by 2030 (Ojha, 2023). This shift in consumer shopping behaviour has opened up opportunities for startups to tap into local markets (Ojha, 2023).

National-level schemes like the AIM and various state-level initiatives as part of their own startup policies have put Tier 2 and 3 cities in the forefront as credible hosts of a burgeoning startup landscape.[2] Fig. 4 shows the reconfiguration of startup hubs from Tier 1 to lower-tier cities in recent years. As of July 2024, 31 states and federal territories have their own startup policies offering a range of support mechanisms for founders and investors alike, both in sprawling Tier 1 cities and upcoming Tier 2 and 3 cities. For instance, Rajasthan's startup policy aims to inculcate an entrepreneurial spirit among school and college students through a slew of measures like granting a gap year to students interested in pursuing full-time entrepreneurship at state-recognised incubators (Government of Rajasthan, 2015). Another example is Kerala, which disbursed over Rs 25 crores by way of an innovation grant to technology startups. To provide an impetus to expand the tech industry in the state, schools and colleges are also involved in the 'Mini Fab Lab' project, where individuals can hone their skills in design and fabrication (Kerala Startup Mission, 2017). An interesting feature of all state-led efforts in transforming their jurisdictions into startup hubs is the focus on school-goers - such early attempts help create a wide base of young human capital endowed with the necessary skills and expertise to startup in the future.

[2]Unless stated otherwise, all information on startup policies at the subnational level are obtained from the Startup India website: https://www.startupindia.gov.in/.

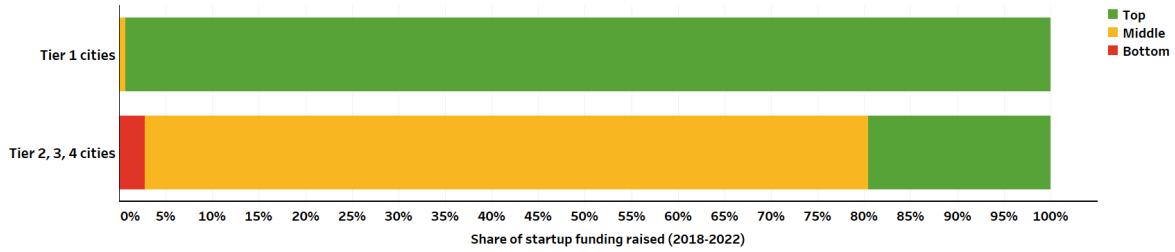
Figure 4: **Percentage growth of startups across Tier 1, 2 and 3 cities**



Source: Primus Partners. (2024). Small Towns, Big Ideas: The Rise of Innovation and Entrepreneurship in India's Tier 2 and Tier 3 Cities

Besides startups accumulating at an increasing rate in lower-tier cities, their performance in attracting funds is promising, as seen in Fig. 5. The chart shows that startups in the lower-tier cities that belong to states classified as Middle and Bottom amass a significant share of funds compared to Tier 1 cities situated in Top states.

Figure 5: **Startup funding raised in India (2018-2022)**



Source: Authors' calculations using data from Startup Talky

Motivations behind low-tier cities emerging as favourable startup hubs Four factors drive the recent startup momentum in low-tier cities. First, investors are more likely to invest in startups originating from their hometowns (Jain, 2024). Investors have a vested interest in driving the growth of startups out of their own communities and localities to set in motion a positive, reinforcing cycle of growth (Feld, 2020). A recent study conducted by Crunchbase using data of over 82,000 investor-company relationships in the US found heavy intra-regional flows of venture deals. This suggests that investors are inclined to invest more in their own geographical regions or hometowns (Rowley,

2017). Finally, since such an investor is familiar with their own city and culture, one might take advantage of such specialised knowledge to become a successful entrepreneur in their respective towns (Rowley, 2017).

Second, relatively lower costs of operation due to lower rentals and cost of living result in positive unit economics (Jain, 2024).[3] In general, Tier 2 cities have rentals that are 50% cheaper and utilities like electricity and water that cost over 40% less than in Tier 1 cities (Sohil, 2023).

Third, the measures associated with Startup India Initiative provide exposure and mentorship opportunities for startups (see Section 3). In a survey of around 30 Tier 2 and 3 cities, approximately 67% of the investors responded that they used government-facilitated networking platforms, be it central or state, to interact with local startups (Primus Partners, 2024).

Finally, the availability of talent and skill in lower-tier cities has long been undeniable. According to a survey of employers in India, over 50% of them expressed their inclination to recruit prospective employees from Tier 2 cities and a study of job postings on LinkedIn and other hiring portals revealed a 16% dip and a 12% surge in active job postings in Tier 1 and 2 cities respectively (Popli, 2023). Furthermore, second-tier cities like Lucknow, Mangaluru and Coimbatore are among the most employable cities in India due to the population's niche skill sets - Coimbatore, for example, is known for its prowess in engineering services (Popli, 2023). Therefore, it is easy to see the reason behind the investors' proactive nature in extending their monetary support and mentorship to startups that establish themselves in lower-tier cities and draw from the diverse pool of talented local individuals.

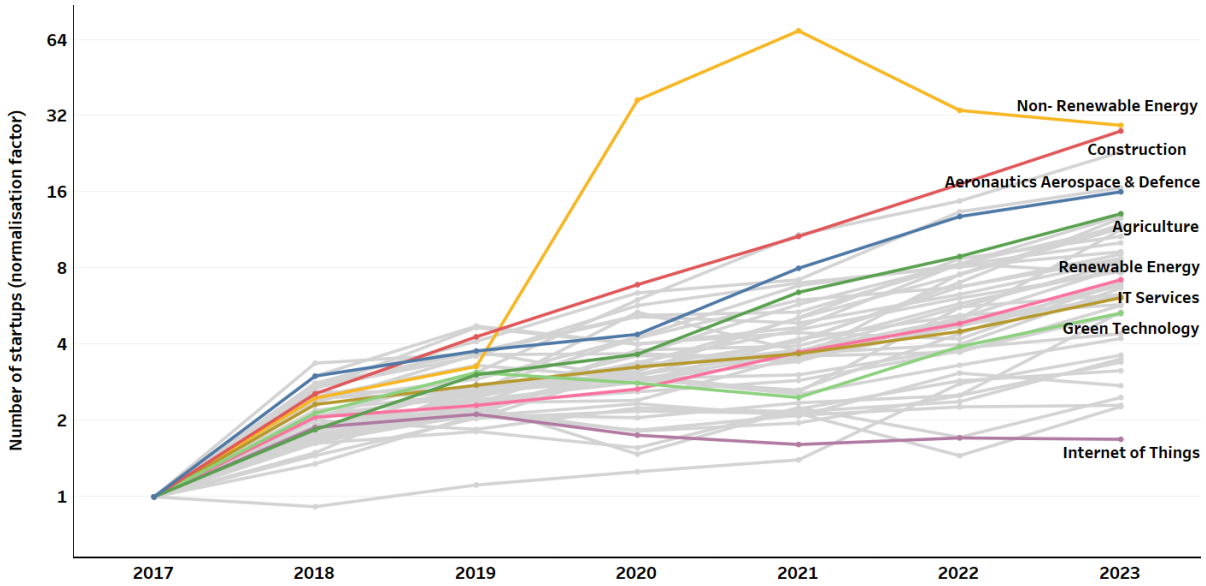
4.2 Industrial specialisation of startups

Fig. 6 shows the startup growth in India at the industry level. Startups operating in non-renewable energy peaked in 2021 before gradually declining. This reflects India's commitment to achieving its long-term net zero emissions target by 2070 and a series of short-term targets aimed at increasing non-fossil fuel energy capacity, meeting a reasonable level of energy generation from renewable sources, and curbing CO_2 emissions by 2030.

The creation of a robust startup ecosystem is imperative in realising the *Viksit Bharat 2047* ambition - the government's vision to transform India into a US$30 trillion developed nation by its 100^{th} year of independence in 2047 (Acharya, 2024). The road map changes by augmenting India's skilled workforce with frontier technologies, nurturing innovation and startup growth, increasing investments in rural infrastructure, R&D, and furthering the utilisation of green energy (Krishna, 2024). The highlighted industries in Fig. 6 shows eight key industries that are key to achieving India's Viksit Bharat 2047 ambitions.

[3]The state of generating more revenue per customer than the costs of acquiring one - an indicator of the profitability of one unit of a product or service sold by the startup.

Figure 6: **Number of startups by industry**

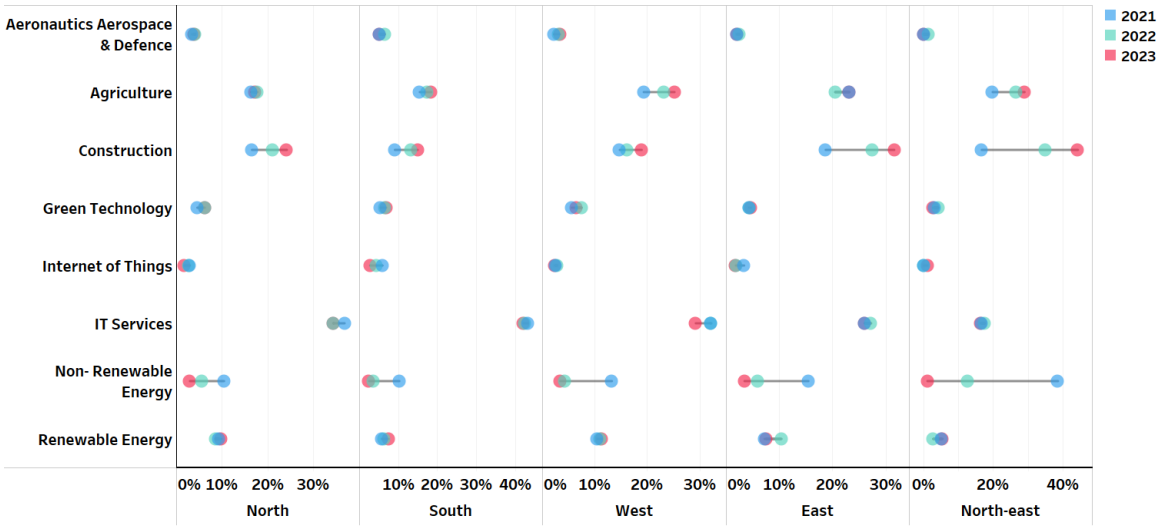


Source: Authors' calculations using data from DPIIT, data.gov.in

Note: Number of startups normalised to values in 2017 for each industry and the y-axis is log-scaled to the base 2; the grey lines denote the other 42 industries.

Startup push in the North-east Fig. 7 shows the percentage change in startup numbers for each of the eight selected industries from Fig. 6 across five regions of India during the post-pandemic years of 2021 to 2023. The eastern and north-eastern regions exhibit more pronounced variation in startup growth as compared to other regions, particularly in the construction and non-renewable energy sectors. Several factors have contributed towards the startup momentum in the northeast.

Figure 7: **Startup growth by industry across regions (2021-2023)**



Source: Authors' calculations using data from DPIIT, data.gov.in

First, multiple infrastructure development projects have been undertaken in the last five years in the north-eastern region to strengthen air, rail, road, water, power and telecom connectivity. For example, the North Eastern Region Power System Improvement Project (NERPSIP) covers six of the eight states to enhance intra-state power distribution and transmission. Under the *Saubhagya* Scheme, over 26 lakh households secured access to electricity within four years of the scheme's launch. To ensure accessibility and seamless transportation of goods and people within the region and beyond, road connectivity projects worth Rs. 15,570.44 crore have been accomplished in the last five years (Press Information Bureau, 2022b).

Secondly, the North East BPO Promotion Scheme (NEBPS) as part of the Digital India Programme, enables capacity building in IT and IT-enabled Services, generating direct employment opportunities for its well-trained engineering and computer science workforce. Furthermore, the region boasts superior IT infrastructural capabilities in the form of a technology park in Meghalaya, a 100-acre Tech City in Assam instituted by the state government, and incubation and training centers spread across Assam, Manipur, and Tripura (Ministry of Development of North-East Region, 2023a).

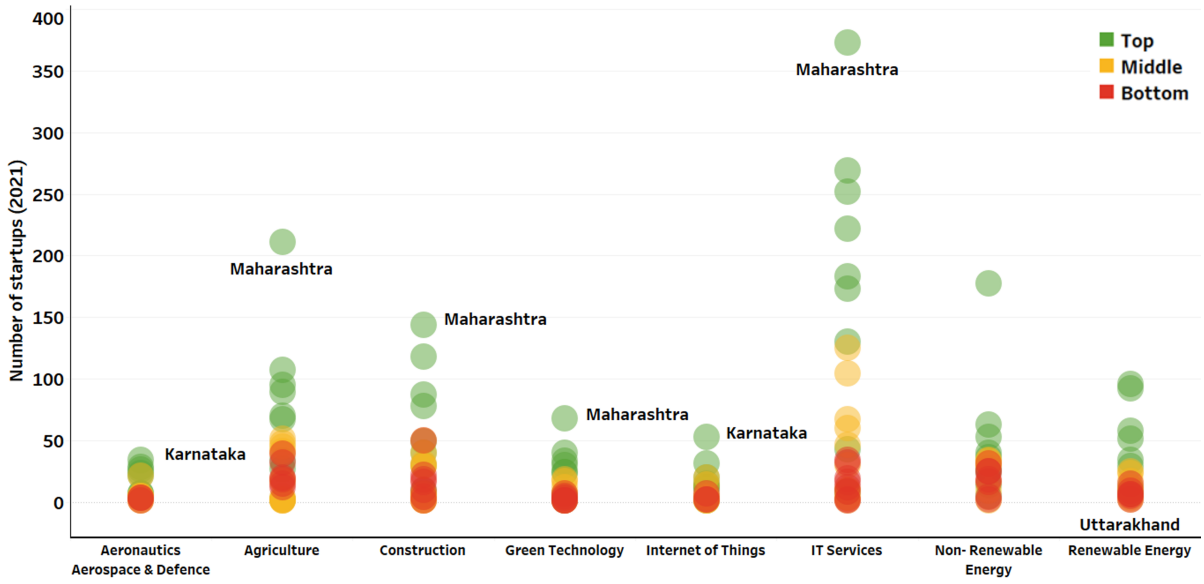
Thirdly, on the renewable energy front, investments of £980 million have been designated to upgrade the region's power systems and the Arunachal Pradesh and Sikkim governments have crafted policies in small hydropower and power projects to encourage private sector participation and capital flows. To harness the vast trove of sunlight that the region receives, the Ministry of New and Renewable Energy rolled out a scheme to raise solar rooftop capacities by 2700 MW (Krishna, 2022).

Finally, the North East Venture Fund (NEVF) was set up as a Rs 100 crore corpus with

contributions from the North Eastern Development Finance Corporation Ltd. (NEDFi), Small Industries Development Bank of India (SIDBI) and Ministry of Development of North Eastern Region (MDoNER). In terms of tangible outcomes, investments worth Rs 5684.50 lakh have been invested in startups from tourism to agriculture and the Internet of Things (IoT) to biotechnology. The NEVF-funded startups have also employed close to 5000 people in various capacities from 2017-18 to 2023-24 (Ministry of Development of North-East Region, 2023b).

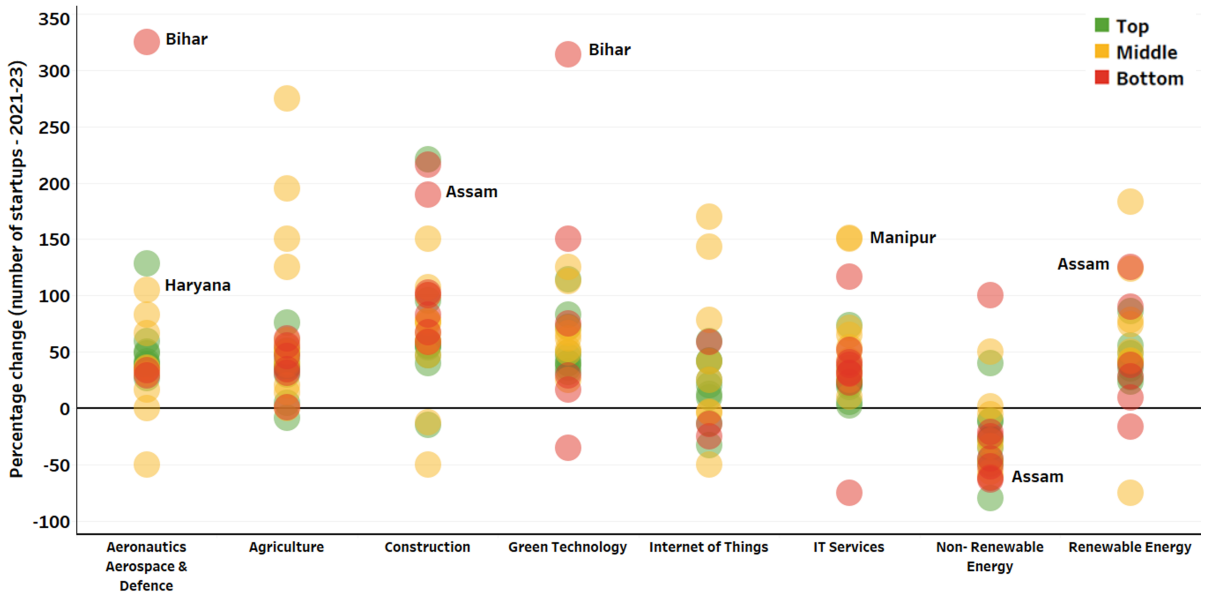
Less competitive states as emerging startup hubs in frontier industries Next, we examine the startup trends in the eight key industries at the state level. Fig. 8 shows that Top subnational economies like Maharashtra and Karnataka have a large base in terms of startup numbers in 2021. However, such Top states are overshadowed by Middle- and Bottom-ranking states like Bihar, Haryana and Assam in terms of the post-pandemic startup growth from 2021 to 2023 (see Fig. 9).

Figure 8: **Number of startups by industry for each subnational economy (2021)**



Source: DPIIT, data.gov.in

Figure 9: **Percentage change in number of startups by industry for each subnational economy (2021-2023)**



Source: Authors' calculations using data from DPIIT, data.gov.in

The findings raise two pertinent questions - did the Top-ranking states reach a slowdown or near-stagnation in startup accumulation? Or are there significant de-agglomeration effects at play that persuade founders to shift away from well-established startup clusters towards the emerging startup hubs in Middle- and Bottom-ranking subnational economies? While evidence for the first question is scarce, literature exists in support of the second. Sorenson and Audia (2000) and Sorenson and Sorenson (2003) uncover diminished survival rates of new entrants into a cluster composed of well-established firms. Specifically, Shaver and Flyer (2000) finds that for incoming foreign greenfield investments amongst manufacturing industries in the US, new firms entering states concentrated with a greater proportion of existing firms faced a higher probability of failure - on average, for a 1% rise in the proportion of already established entities, new entrants' probability of failure rises by 0.7%. This is especially true for startups that belong to the same or similar industrial categories that forge interdependent and close-knit ties. This renders a stronger concentration of established startups, making it difficult for new entrants to survive. Hence, while agglomeration and the sharing of best practices amongst startups are the expected outcomes in a geographical location, often de-agglomeration effects dominate, pushing new firms away from clustering.

In the India context, DPIIT data from 2017 to 2020 show that 50% of all startups are located in states that have long showcased their prowess in business and industrial activity - Delhi, Gujarat, Karnataka and Maharashtra. Also, startups in similar industries like Artificial Intelligence (AI), computer vision, analytics, Augmented and Virtual Reality (AR/VR), IT services, IoT, green technology, nanotechnology, robotics, and enterprise software make up over 20% of startups across all industries for each of the aforementioned

states. This is a plausible explanation for why in the post-pandemic period, Fig. 9 shows states like Bihar and Manipur displaying considerable growth of startups in green technology and IT services, besides the IT services push in Manipur from enabling government policies as explained above.

Studies like Pe'er and Keil (2013) shows that less endowed startups (those with assets less than the top quartile amongst their competitors) face a lower probability of failure relative to their better-endowed competitors, especially when the supply of skilled labour is high in that local area. While our data is insufficient to speculate or view this finding through the Indian perspective, given the high level of technical talent and skill among dwellers in Middle- and Bottom-ranking subnationals, it is likely that by leveraging advantages that are similar to the ones enjoyed by Tier 2 and 3 cities, new entrants have managed to coexist and sometimes thrive alongside dominant companies.

4.3 Startup funding patterns

The redistributive transformation of the Indian startup ecosystem with middle and low-tier states emerging as startup hubs is also evident in the context of funding. The pie charts in Fig. 11 shows that the flow of funds into Top-ranking subnationals dwarfs that of its Middle- and Bottom-ranking competitors. Middle- and Bottom-ranking states display elevated startup funding levels in the Seed and Series A rounds that belong to the ideation and early stages (see Box for more information on funding rounds). Such states are mostly emerging/aspiring startup hubs, hosting more upcoming or newly-established startups that require considerable early-stage funding than those in Top-ranking subnationals.

A brief description of startup funding rounds

Startup funding entails a lot of risk due to the uncertainty involved with an entity's sustained survival and the lack of profits in the early stages as startups burn money to integrate themselves into the market. Therefore, startups have different avenues to draw capital in addition to banking institutions. (Fig. 10) elaborates on the major funding rounds that correspond with how established a startup is - from early/ideation to growth. It also lists the key investors or channels that startups have at their disposal for each round.

Figure 10: **Description of funding rounds**

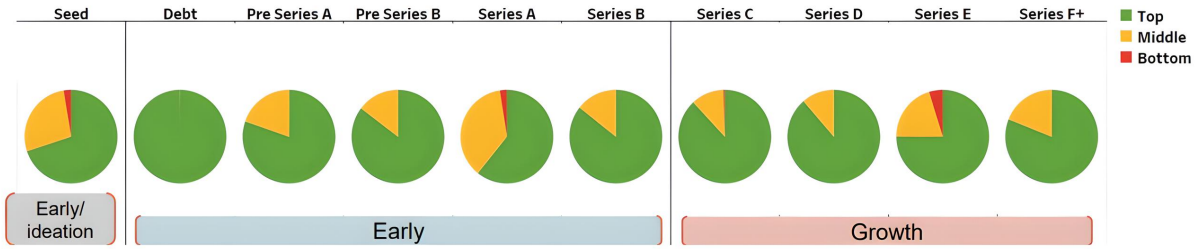
Funding Round	Startup Stage	Description	Investor type/nature of funds raised
Seed	Early/ideation stage	Securing capital to transform an idea into a viable business	Incubators, Government loan schemes, Angel investors, Crowdfunding
Debt	Early stage	Looking to raise funds but have not established a proven track record of generating revenue	Banks, Private Equity (PE) firms, Asset managers, Angel investors, Corporate bonds
Pre Series A		Seeking funding to bridge the gap between their initial seed capital and subsequent rounds due to some degree of market traction	Incubators, Government loan schemes, Angel investors, Crowdfunding
Pre Series B		Seeking funding to expand market presence and scale operations having demonstrated some growth potential and financial stability	
Series A		KPIs: customer base, revenue, app downloads, etc. become important	Venture Capital (VC) funds, Banks/Non-Banking Financial Companies (NBFCs), Venture Debt funds
Series B		Experiencing a fast rate of market growth and increasing revenues	VC, PE/Investment firms
Series C	Growth stage		
Series D			
Series E		Running at scale, successfully established, prepared for IPO	Late-stage VCs, PE firms, Hedge funds, Banks
Series F+			

Source: Compiled by authors using information from David et al. (2020); Startup India

Note: Among the Early stage funding rounds, no particular order applies to Debt funding's position on the list unlike the other letter rounds. Also, while we classify Debt financing as an early-stage funding avenue, it is considered by startups at any point in their journey, not just in the initial stages.

A well-established entity (in the growth stage) can raise capital from banks before proceeding towards an initial public offering (IPO) whereas startups in the early/ideation and early stages turn to angel investors and even friends and family.

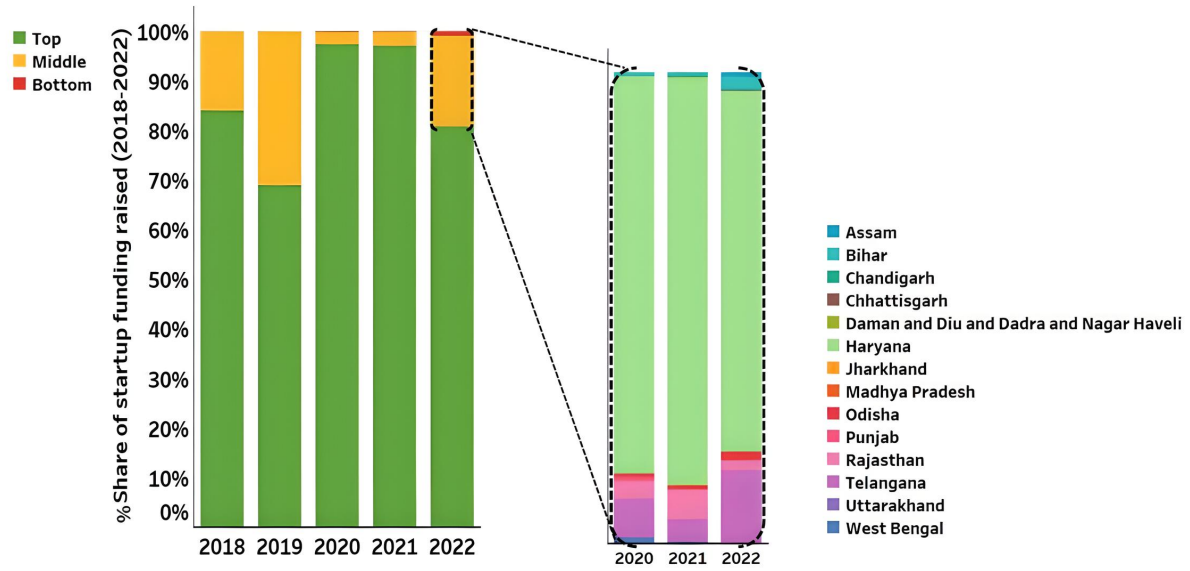
Figure 11: **Startup funding raised in India, by rounds (2018-2022)**



Source: Authors' calculations using data from Startup Talky

Aspiring startup hubs located in states like Andhra Pradesh, Telangana, Assam, Goa, West Bengal, Odisha and Rajasthan raised over US$4.5 billion in startup funding from 2014 to 2022, housing close to 10,000 startups (Inc42 Media, 2022; Kashyap, 2022). Some of these states are highlighted in Fig. 12, zoomed in based on funding data in 2022. Hyderabad, the capital city of Telangana, is one of the fastest-growing startup hubs in the country, specialising in SaaS and other IT services. It also holds the status of the only state with two SaaS unicorns - *Darwinbox* and *Zenoti* (Kashyap, 2022). Some of these states nurture budding startups through angel investor networks and partnerships with privately-operated investment initiatives directed at startups in their ideation/early stages. Others extend targeted seed funding and incubation support to bolster their presence in specialised industries like hardware in Kerala (Kerala Startup Mission, 2017) and IT in Goa (Agarwal et al., 2021; Inc42 Media, 2022).

Figure 12: **Startup funding raised in India**



Source: Authors' calculations using data from Startup Talky

In addition, Fig. 12 reveals how startup funding is heavily skewed towards Haryana - a Middle-ranking state. Like Surat, Gurugram in Haryana derives most of its gains

from proximity to Delhi. As a Tier 2 city, Gurugram also enjoys widespread investor attention and support amidst enviable transportation and infrastructural connectivity, and relatively economical rental rates on office spaces than Delhi (Balachandran, 2019; Malik, 2017).

Finally, in 2019, Middle-ranked subnationals secured a little above 30% of the total funding amount, significantly eating into the share of Top-ranked states. Overall, this was a successful year for Indian startups as the funding numbers were 25 times higher than in 2010 to reach a total of US$14.5 billion. As far as the Middle-ranking states are concerned, Haryana was a key driver. *Oyo Rooms*, a Haryana-based hotel booking service provider secured the lead with US$1.5 billion. Also, *Delhivery* and *Lenskart*, two Haryana-based startups, joined the coveted list of unicorns (Arakali, 2020).[4]

5 Front-runners of Middle- and Bottom-rankers: Select subnational experiences

This section presents two case studies of subnational economies that exhibited significant startup growth in recent years - Haryana and Bihar - which belong to the Middle and Bottom categories, respectively, in subnational competitiveness.

5.1 Haryana: A more desirable startup location than Delhi

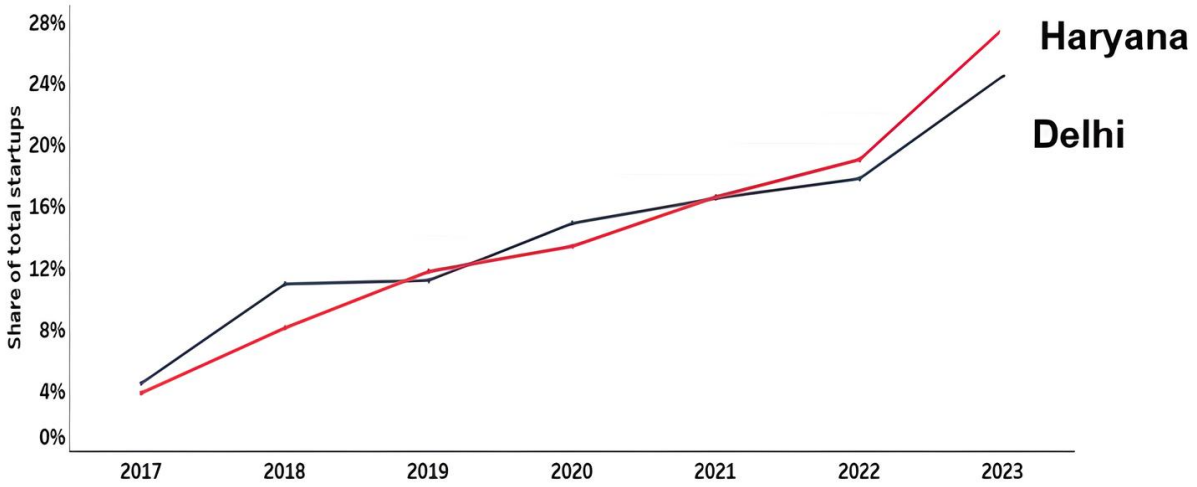
Startup growth in Haryana is driven by the city of Gurugram, which evolved from a centre for food processing and dairy into a leading startup destination (Malik, 2017). Gurugram's greatest advantage lies in its proximity to Delhi. With Delhi facing constraints such as limited land supply and high real estate prices, Gurugram emerged as a more favourable destination for startup growth (Malik, 2017; The Economic Times, 2013; Malik, 2017; Balachandran, 2019). While housing prices have gradually risen in Gurugram as well, the initial shift was enough to spur the innovation and startup culture that the city is known for. Haryana has more than 4700 startup entities (Department of Information Technology Electronics & Communication, Haryana, 2023).

Gurugram is also expected to benefit from being situated close to Delhi through the Dwarka Expressway - a one-of-its-kind eight-lane expressway whose Gurugram stretch was inaugurated in early 2024 after years of planning and construction that began in 2006. Its principal objective is to reduce traffic congestion and enable seamless connectivity between the two cities. Also, the expressway reduces commuting time between Delhi's Indira Gandhi International Airport and Gurugram by over 30 minutes (The Indian Express, 2024; Balasubramanian, 2024; The Economic Times, 2024). The anticipation of this expressway along with the abovementioned merits may have paved the way for the expansion of startups and the establishment of a robust business ecosystem in Gurugram,

[4]Startup companies valued at US$1 billion or higher

which outpaced Delhi in the past couple of years in terms of percentage growth in startups and funding as revealed in Fig. 13 and Fig. 14.

Figure 13: **Percentage share of startups in India**

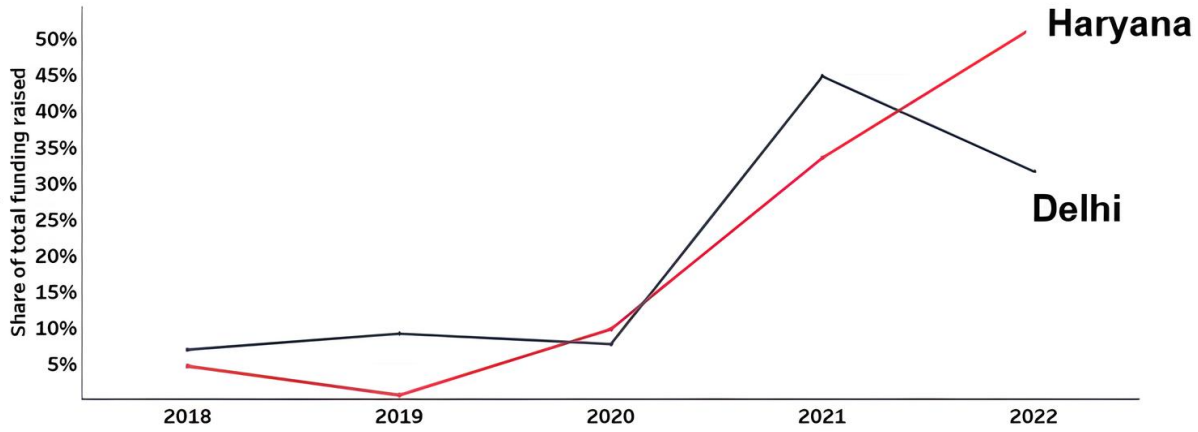


Source: Authors' calculations using data from DPIIT, data.gov.in

Note: Share of total startups (y-axis) refers to startup numbers as a percentage of total startups for each given year.

During the global funding winter from 2021 to 2023, startup funding declined more in Delhi than in Haryana (see Fig. 14). At the city level, both Gurugram and Delhi had a similar drop in the number of funding rounds - Delhi experienced a 74.6% slump, while for Gurugram, the decline was at 70.7%. However, funding secured by the top startups in Gurugram exceeded that of Delhi in 2023. In Gurugram, the top three startups amassed around US$675.2 million while the top three startups in Delhi raised US$220 million (Tracxn, 2021, 2023).

Figure 14: **Percentage share of startup funding raised in India**



Source: Authors' calculations using data from Startup Talky

Note: Share of total funding raised (y-axis) refers to funding raised as a percentage of total funding for each given year.

5.2 Bihar going green: A survival story featuring the State government

Bihar exemplifies a bottom-ranked state exhibiting catch-up in startup growth. With the nationwide trend of entrepreneurial youth returning to their home states, the startup landscape in Bihar is flourishing. For instance, the number of startups registered in Bihar increased by 54.6 percent from 2022 to 2023.

The Bihar Startup Policy, initially conceptualised in 2016 and revised in 2022, was established to provide funding and shared infrastructure from an initial corpus of Rs 500 crore. Some prominent incentives include the provision of free seed grants for startups of Rs 10 lakh up to 10 years and a 'success fee' of 2% of the investments that entities raise from state-recognised angel investors. For incubators, those supporting startups operating in nutrition, healthcare, education, and related social sector areas stand to obtain a 5% grant when the assisted startup receives investments.

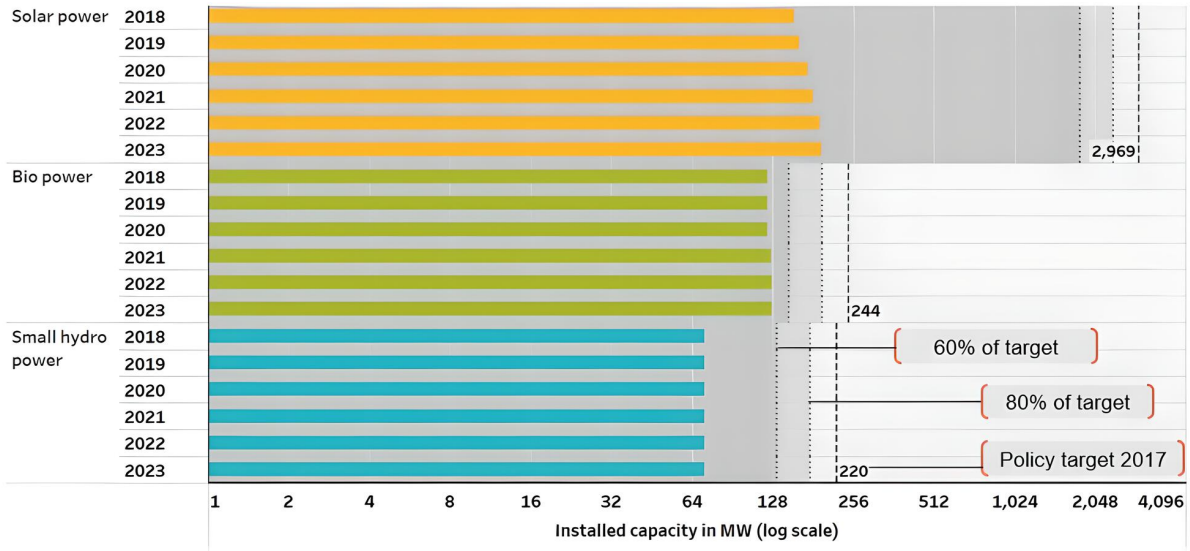
These and more state-backed incentives were crucial in shaping Bihar's startup ecosystem since the state faces a dearth of accelerators, investors and mentors, and these have long stifled startup growth. The state government in Bihar has instituted many incubators that have produced favourable outcomes. For instance, VenturePark is jointly established and managed by the Bihar Industries Association (BIA) and the Indian Angel Network. They provide mentorship services from industry experts in India and beyond alongside infrastructure support. As another example, the Bihar Entrepreneurs Association set up Enterprising Zone, an incubation center supported by nodal government agencies like the state's Department of Industries, Startup India, and the Centre's Ministry of Electronics and Information Technology (MeitY). Enterprising Zone seeks to address the challenges raised by local entrepreneurs, the major being a lack of exposure to entrepreneurship in the education system. The organisation conducts workshops for

students and entrepreneurs spanning various themes, from programming frontier technologies to business development. Enterprising Zone claims to have supported more than 150 entrepreneurs and startups since their establishment (Bhatt, 2020).

In recent times, the state government has focused on promoting Bihar as a leader in green and renewable energy adoption. In 2017, the government cabinet cleared the 'Bihar Policy for Promotion of New and Renewable Sources, 2017'. With economic incentives to de-risk private sector investment, this encompassing initiative was envisioned to make the state self-reliant by adding 3343 MW of renewable energy to its power grid by 2022. Disaggregated by category, the targets were 2969 MW solar, 220 MW hydro, and 244 MW bio power by 2022 (Mondal, 2017; Centre for Environment and Energy Development, 2017). Fig. 15 shows that the government fell short of the targets six years after the Policy was cleared for implementation, with marginal gains in solar power installation from 2018 to 2023 (Centre for Budget and Governance Accountability, 2022).

Figure 15: **Installed capacity for different renewable energy sources in Bihar**

Targets set in 2017 vs. actual capacity (in MW) (2018-2023)



Source: Authors' representation using data from Ministry of New and Renewable Energy - Government of India

Note: The bold numbers to the right-hand side indicate the 2017 Policy targets, and the light, and dark grey shaded areas denote 80% and 60% limits of the 2017 Policy target, respectively. The coloured horizontal bars represent each category's installed renewable energy capacity each year.

Nevertheless, the government's objectives to make the state sustainable in energy production and consumption are far-reaching. In 2022, Purnia began operating the first ethanol plant in Bihar, and proposals of up to Rs 30,747 crore were received to establish 164 ethanol units across the state. The primary raw material for ethanol production is maize, which proved suitable for the agriculturally-rich Bihar (Gurtoo et al., 2012) as 17 out of 38 districts cultivate the crop. The same year also witnessed heavy investments in startups in food processing, textiles, IT services, and healthcare (Singh, 2022). As of

2023, nine ethanol plants were fully functioning, and 47 projects were approved (Sinha, 2023).

Progressing on its twin agenda of renewable energy generation and transforming Bihar into a startup hub, the state approved its EV Policy in 2023, which aims to push for environment-friendly transportation by turning 15% of all newly registered vehicles into EVs and obtain 400 electric buses as part of the state transport department by 2028. It includes comprehensive purchase benefits and relaxations in Motor Vehicle Tax of up to 75% and a 30% subsidy on power tariffs for three years to install charging stations in residential areas (Bhelari, 2023). In March 2024, the draft 'Climate Resilient and Low Carbon Development Pathway for Bihar' was unveiled, a pioneering climate strategy across India. Announced during the Bihar Climate Action Conclave, 26 projects were launched by the Department of Environment, Forest and Climate Change (DoEFCC). A Declaration on Climate Action was also unveiled, including relevant stakeholders to implement effective strategies for climate change mitigation across Bihar (Bhelari, 2024).

The proactive stance of the government on climate change and clean energy practices has likely created a supportive ecosystem for Green Tech startups in Bihar. From 2021-2023, Bihar experienced the highest growth of green technology startups in India (see Fig. 9).

A prominent startup called 'Husk Power Systems' is a case in point. Husk uses rice husks left behind as 'waste' post harvest to run mini power plants in Bihar. Through biomass gasification, the founders of Husk cater to the electricity needs of households and businesses across villages. As an estimate, around 500 houses can be powered using 50 kilograms of rice husks per hour. Husk functions in India, Nigeria, and Tanzania, with plans to expand its reach to more energy-scarce countries in Asia and Africa (Zeldovich, 2018). The startup recently raised series D funding worth US$103 million (Fakiya, 2023), aiding it in accomplishing its two-fold objective of access to electricity and the shift from generating power from fossil fuels to renewable sources.

6 Concluding remarks

In 2023, entrepreneurs faced significant challenges due to global uncertainties and cautious investors, leading to limited startup funding. Despite the challenges, India's startup ecosystem showed resilience, bolstered by government initiatives to enhance digital connectivity, internet access, and support for new businesses. Our analysis of India's startup ecosystem presents two key findings. First, Tier 2 and 3 cities are catching up with their Tier 1 counterparts in terms of startup growth and funding. Second, there is industrial specialisation emerging with increased startup activity in frontier and traditional industries among the the Middle- and Bottom-ranking subnational economies. At the regional level, the north-eastern region witnessed larger momentum in startup expansion after the COVID-19 pandemic. The region recorded the highest growth in construction-related startups and the largest drop innon-renewable energy startups.

Our study also presents case studies on Haryana and Bihar to examine the major

drivers of the startup momentum among these front runners belonging to the Middle and Bottom competitiveness categories, respectively. Haryana's gains can be primarily ascribed to its proximity to Delhi, India's capital city. The seamless connectivity between Gurugram in Haryana and Delhi lets the former benefit from the latter in terms of legal procedures for setting up a new business. Furthermore, given the limited land supply in Delhi, many startups have made its neighbour - Gurugram, their home. For Bihar, the merits are credited mainly to a robust mix of state policies to transform the state into an ideal space for startups to survive. Bihar has also actively expressed its willingness to promote green and renewable energy. A pioneering climate strategy, an encompassing EV policy, and the establishment of ethanol plants in large numbers have attracted startups, mainly in the green industries.

Our analysis indicates that the Indian startup ecosystem is experiencing a shift, with a surge of startups in lower-tier cities and less competitive states. However, challenges like unsustainable business models and resource mismanagement remain as these ventures grow. The recent troubles at Byju's highlight these issues. Addressing these problems is vital to prevent startups in emerging hubs from stagnating in a survival mode without growth.

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Appendix A: Overall Competitiveness Ranking for 36 Subnational Economies of India

Sub-National Economies of India	Competitiveness Ranking	Competitiveness Classification
Maharashtra	1	
Gujarat	2	
Tamil Nadu	3	
Delhi#	4	
Uttar Pradesh	5	Top
Karnataka	6	
Sikkim	7	
Kerala	8	
Andhra Pradesh	9	
Goa	10	
Haryana	11	
Rajasthan	12	
Chandigarh#	13	
Madhya Pradesh	14	
Telangana	15	
West Bengal	16	
Lakshadweep#	17	
Arunachal Pradesh	18	Middle
Dadra & Nagar Haveli & Daman & Diu#	19	
Punjab	20	
Mizoram	21	
Himachal Pradesh	22	
Puducherry#	23	
Andaman & Nicobar Islands#	24	
Uttarakhand	25	
Manipur	26	
Odisha	27	
Nagaland	28	
Tripura	29	
Chhattisgarh	30	
Jammu & Kashmir#	31	Bottom
Bihar	32	
Assam	33	
Meghalaya	34	
Ladakh#	35	
Jharkhand	36	

Note: #Denotes federal territories.

Source: ACI