KAUTILYA
SCHOOL OF
PUBLIC POLICY

CAPSTONE PROJECT

Deriving Critical Success Factors of Startup Incubators in India

Capstone Project Number: CP-2026-06

Submitted by: Ms Yana Gupta (MPP Cohort: 2024-26)

Under the Supervision of: Dr. Rathin Roy, Distinguished Professor, Kautilya School of Public Policy

Cite this Report *as Gupta, Y (2026) Deriving Critical Success Factors of Startup Incubators in India. Available at: https://kspp.edu.in//capstone-project/deriving-critical-success-factors-of-startup-incubators-in-india*

Deriving Critical Success Factors of Startup Incubators in India

Submitted to Kautilya School of Public Policy in Partial Fulfillment of the Requirement for the Degree of

Master of Public Policy (MPP)

2024-26

Yana Gupta

2024031795

Under the Supervision of

Dr. Rathin Roy

Distinguished Professor

Kautilya School of Public Policy,

Gandhi Institute of Technology and Management

(Deemed to be University)

Rudraram, Telangana 502329

26.03.2026

SELF-DECLARATION

This is to certify that the thesis titled “Deriving Critical Success Factors of Startup Incubators in India” is my original work and has not previously formed the basis for the award of any Degree, Diploma, Associateship or Fellowship to this or any other University.

Yana Gupta

26.03.2026

CERTIFICATE OF THE SUPERVISOR

This is to certify that the thesis titled "Deriving Critical Success Factors of Startup Incubators in India" is original work undertaken by Yana Gupta under my supervision and guidance as part of her Master's degree in this Institute. The thesis may be sent for evaluation.

Supervisor's Signature

Dr. Rathin Roy

26.03.2026

Distinguished Professor

Kautilya School of Public Policy

GLOSSARY

Term	Definition
Critical success factors	“factors that influence, constitute as well as determine the success of a project” (Han et al., 2012). “those few key areas of activity in which favorable results are absolutely necessary for a particular manager to reach his or her goals.” (Rockart, 1982).
Startup	A startup is a young, innovative company designed to develop a unique product or service, aiming for rapid growth and scalability, often operating in high-risk environments with initially low profitability. Unlike traditional small businesses, startups focus on disrupting existing markets or creating new ones
Stakeholder	“A stakeholder is an individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.” (PMI, 2017, p.550).
Deep Tech Ventures	“Deep tech ventures are those whose innovative solution is grounded in science and technology” (Apodaca et al., 2023).
Startup Incubator	Business incubators are organizations which help budding entrepreneurs to work on developing their ideas, especially in initial phases, to gain access to facilities, expertise, and an institutional network (Atal Innovation Mission, 2024).
Startup Ecosystem	“formed by thousands of startups, entrepreneurs, investors, institutions, and large companies” (Rasińska, 2022).
Triple Helix	A framework for innovation emphasizing the collaborative interplay between academia (university), industry, and government.

Executive Summary

This paper studies the factors that lead to the success or failure of startup incubators in India. Despite hosting the third largest number of startups in the world, a huge percentage of these startups fail in the early stages of their inception. This is where incubators play a role as a bridge to support early-stage ventures by providing administrative and infrastructure requirements, along with mentorship. With policies of both state and central governments focusing on establishing new incubators, it is important to study the critical success factors.

The research has been conducted using mixed methods, combining insights from secondary and primary research for analysis. Secondary research helped the student collect factors that affect startup incubation, and insights from primary research have helped list down the most important factors necessary for the growth of incubators and incubated startups in the country. A multi-stakeholder approach informs the study from multiple angles, including insights from stakeholders at the core, periphery and outside the incubator ecosystem to provide a holistic point of view for this study. In order to situate the Indian incubation ecosystem within a broader global context, the study also draws on comparative insights from the United Kingdom and Israel, which represent distinct models of innovation support through university-led clusters and risk-sharing incubation frameworks, respectively.

Findings from the study suggest that while the government policies have focussed mainly on increasing the number of incubators across the country, their effectiveness and factors contributing to and limiting their effectiveness remain understudied. Homogenisation in the design and planning of incubators leads to standardised models that fail to address local needs and aspirations. There is also a lack of a feedback loop between incubators and government

institutions supporting them, which limits the understanding of gaps and thus, the growth of the incubator itself. Additionally, the study finds that incubator relevance varies across business models, with service-based startups deriving less value from traditional incubation structures.

This paper also provides policy-level solutions that can be made in the system to increase the expanse and reach of the incubation system, cost-effective changes to the design and implementation, creating a feedback system for the incubation ecosystem and addressing fragmentation in the system.

1. Introduction

India has emerged as the world's third-largest startup ecosystem (*India's Startup Revolution*, 2025). There has been an unprecedented rise in entrepreneurial activities; this has been driven by rapid digitalisation, evolving youth ambitions, easier access to technology, increased investment or interest, and encouraging government policies (*Startup Nation: India*, 2024). The success stories of Unicorns and global tech ventures founded by Indians have furthered the cultural acceptance of entrepreneurship as a viable and desirable career path. However, about 90% of Indian startups fail within the first five years of their inception (D'Cunha, 2017). Another paradox in the Indian ecosystem is that unemployment rates are higher among the educated (Banerjee, 2024).

To address this, the Indian government has been encouraging business incubations to bridge the innovation-gaps between entrepreneurship, innovation, and market availability. Business incubators are organizations which help budding entrepreneurs to work on developing their ideas, especially in the initial phases, to gain access to facilities, expertise, and an institutional network. Business incubations in India are generally carried out through organisations having experience in business/technology domains (Atal Innovation Mission, 2024).

2. Background of the Study

The Government of India has recently shifted its focus towards startup incubation, where various bodies are involved through targeted initiatives. These policies look at startup incubators as an economic tool for boosting entrepreneurship with employment generation. The government has been investing in enhancing incubation capacities in various fields and geographies, ranging

from Startup India, TIDE 2.0, NIDHI, and Atal Innovation Mission schemes in the national startup agenda.

TIDE 2.0 targets providing support for 51 incubators and about 2,000 technology ventures over a period of five years in sectors such as health care, education, clean energy, and artificial intelligence (MeitY Startup Hub, n.d.). Atal Innovation Mission has facilitated setting up many incubation centres through competing funding calls, which insinuate innovation for growth in the current government.

While 51% of startups now emerge from Tier II/III cities, major hubs like Bengaluru, Hyderabad, Mumbai, and the Delhi-NCR region remain at the forefront, producing major unicorns (*India's Startup Revolution*, 2025). Marquee institutions such as IIT Madras Research Park, T-Hub, and NSRCEL have produced strong outcomes, but most incubators in India today struggle with:

- Lack of domain expertise or leadership knowledgeable in specialised industries
- Insufficient funding or unsustainable financial models
- Inadequate infrastructure or poor-quality services
- Weak selection processes leading to low-quality incubatees
- Limited industry linkages and mentor networks

This implies that merely replicating the organisational form or infrastructure of successful incubators does not essentially guarantee success. Shankar & Rao (2012) assert that leading incubators attribute their effectiveness to factors such as strong institutional support,

well-connected mentors, and links with academia and industry. IIM Ahmedabad's Centre for Innovation, Incubation, and Entrepreneurship or CIE model, demonstrated how innovation diffusion could be fuelled through innovation mentoring, innovation funding, and innovation partnerships Sachdeva, n.d.).

3. Research Questions

1. What factors influence the success and failure of startup incubators in India?
2. How does homogenisation in incubator design interact with regional ecosystem conditions, particularly in Tier-2 and Tier-3 cities?

4. Literature Review

Conceptualisation of Startup Incubators

Startup incubators have been described in the literature as a means to overcome some market failures associated with entrepreneurship during the initial stages. While early definitions viewed incubators primarily asmainly described in terms of subsidized physical infrastructure support services for start-ups, this definition has subsequently broadened to highlight their role as support systems that facilitate learning, networking, and capability development among startups. Hackett and Dilts (2004) define incubators as “business support processes” that enhance the likelihood of tenant firm survival and growth through structured interventions. Aernoudt (2004) described it in

a broader definition that focuses on a framework for economic development in a social context. Both definitions perceive incubators as a tool for government to enable the overcome of informational asymmetries or other failures that young businesses experience during initial stages.

There is a lack of a universally accepted definition of incubators (Phan, Siegel, and Wright, 2005). This is because incubators often function under diverse objectives, ownership structures, and models. Such diversity in definition often hampers processes in the developing countries where incubators are set up under various institutional arrangements, such as universities, government agencies, public–private partnerships, and private entities. Therefore, incubators vary considerably in their mandates, target sectors, and operations.

Terminology Used in This Study:

Academic literature and government policy documents use multiple terms to describe institutions that support early-stage ventures. These definitions or terms are as follows: *incubator*, *business incubator*, *technology business incubator (TBI)*, *tech incubator*, *startup incubator*, and *innovation incubator*. While these terms differ in sector emphasis, their core function remains providing structured assistance to early-stage ventures through mentorship, infrastructure, networks, and access to resources.

In light of the policies of the Indian government that focus on the creation of successful

startups and the development of young ventures as the focus areas of incubation, this study proposes to use the umbrella term of "Startup incubator" that includes all of the aforementioned diverse terms.

4.1. Evaluation of Incubator Performance

Literature on incubators today lacks a consensus on how to evaluate and define the performance of incubators. The early methods of evaluation focused extensively on second-level outcomes like the rate of survival of startups, employment creation, and an increase in revenues. According to Mian (1997; 2011), in particular as it applies to university incubators, incubator evaluation needs to move beyond the evaluation of startup survival to the measurement of knowledge spill-over, technology commercialisation, and collaboration between industry and academia. Odemir and Sehitoglu (2013) support multi-dimensional evaluation of incubator success and include non-financial parameters related to innovation capacities and network development. Abduh et al. (2007) discuss that a dilemma seems to exist for incubators seeking to balance developmental requirements and a commercial mandate for sustainability and survival of incubators sponsored by governments.

Hackett and Dilts (2004) provide a criteria-based model to evaluate the effectiveness of an incubator through the survival, growth, and graduating performance of tenants. Although a very influential model, it has faced criticism for focusing more on short-term measures.

Despite these advances, the literature does not offer a standardised framework for evaluating incubator performance across contexts. This lack of methodological consensus limits comparative analysis.

4.2. What factors influence the success and failure of startup incubators in India?

(a) Internal Factors

A substantial body of literature identifies internal organisational factors such as leadership quality and management capability as paramount for the success of incubators. The concept of "networked incubators," by Hansen, Birley, and Kiss (2000) places network connectivity as a crucial element defining the success of start-ups. Bergek and Norrman state in 2008 that there are intermediary tasks in incubator management, such as tenant selection, mobilisation of resources, and brokerage in networking, and strong leadership is also crucial in aligning services and adjusting them regarding changes in market conditions.

According to Hackett and Dilts (2004), tenant selection must be met with strict selection procedures to enhance their survival and success. Aerts, Matthyssens, and Vandenbempt (2007) found that such a selection would improve overall organisational quality by mitigating expenses and efficient use of financial resources.

Clarysse et al. (2005) state that what distinguishes high-performing incubators from less effective ones, particularly in knowledge-intensive sectors, is their professional management practices. However, in more recent trends, the nature of services provided by incubators has shifted from tangible inputs (such as office space) to intangible but knowledge intensive services (such as mentorship, access to investors, etc) (Bruneel et al., 2012)

(b) External Ecosystem Factors

The ecosystem incubators function in is also shaped by external factors. Autio and Kovalainen (1999) argue that regional characteristics, such as industrial structure and institutional density, shape the effectiveness of incubator interventions. Although, according to Hansen et al. (2000), and Schwartz & Hornych (2008), sector-specific incubators offer very important advantages, such as specialised services, and economies of scale. At the same time, over-specialization might result in rigidity and exclude local patterns of entrepreneurial activities, especially in regions that have diverse economic structures of the economy. The Triple Helix model of incubators, as proposed by Etzkowitz and Leydesdorff (2000) asserts the interdependency of universities, business, and government in innovation processes.

4.3. Do Homogenised Design Patterns Limit Effectiveness, Especially in Tier-2 and Tier-3 Cities?

Isabelle (2013) asserts that standardised designs might disregard local entrepreneurial strength, composition by industry, and socio-economic factors. Homogeneity might promote

administrative efficiency and scalability of policy; however, it might disregard experimentation by reducing the importance of local needs satisfaction. Narayanan and Shin (2019) argue that incubators are rooted in a market failure logic. This thought process remains behind the design of most incubators today and leads to standardised institutional solutions.

There is further conflict in the present literature regarding the spatial concentration of incubators in Tier-1 cities versus their expansion into Tier-2 and Tier-3 cities. Incubators tend to cluster in large metropolitan centres where innovation ecosystems is characterised by proximity to qualified human resources, research institutions, venture capital, and mature industry networks (Etzkowitz & Leydesdorff, 2000; Autio & Kovalainen, 1999). Thus, establishing incubators in innovation hubs such as Bengaluru, Hyderabad, and Delhi-NCR enhances their effectiveness where they operate in environments conducive to startup growth. But according to literature on policy, incubators can also act as instruments of balanced and equitable regional development by extending incubation benefits to Tier-2 and Tier-3 cities (Aernoudt, 2004). Since these incubator models are designed for metropolitan ecosystems, their replication in smaller cities, which represent local strengths but weaker market networks, may lead to contextual mismatch.

The literature overall presents a fragmented and sometimes contradictory understanding of startup incubators, on what factors are crucial to the success of an incubator and what may be environmental factors. Much of the expansion in this sector due to targeted policies has proceeded through the replication of broadly similar incubator models, often prioritising coverage, standardisation, and measurable outputs over contextual differentiation. Given India's heterogeneous entrepreneurial landscape, this raises an important policy question: whether

existing incubation approaches are adequately aligned with diverse regional ecosystems, sectoral needs, and founder capabilities. This study seeks to contribute to this policy debate by examining incubator success and failure through the perspectives of ecosystem actors and comparative design analysis, to inform policymakers on India's current incubation strategy, and adaptation and reorientation that may serve the evolving startup ecosystem better.

4.4. Emerging Gaps in Literature

Lack of consensus on performance metrics: There is no universally accepted way of assessing the performance of incubators due to differences in definitions and goals (Phan et al., 2005; Odemir & Sehitoglu, 2013; Abi-Fadel & Peeters, 2019).

Limited India-specific analysis of success factors: While government schemes emphasise funding and infrastructure, there is limited literature related to internal as well as External Critical Success Factors (CSFs) in a context-specific manner relevant to the country.

Absence of research exploring homogeneity of incubator design: No study empirically investigates whether incubators are homogenous in design, structure and processes in India.

Insufficient comparison with global practices: Countries like Singapore, Israel, and South Korea have formulated sector-specific and contextually grounded incubation models, the application of which in the Indian context has been inadequately researched.

Weak evidence on incubator failures: While common failure reasons are known, they are not systematically mapped into a framework.

5. Methodology

This study adopts an exploratory research design using a mixed-methods approach, combining qualitative and documentary analysis to examine the factors that influence the success and failure of an incubator. Since there are no established parameters to measure the performance of start-up incubator ventures in the related field. There will be a two-stage approach to include both secondary and primary qualitative research.

5.1. Secondary Research

The secondary research stage builds a base for the entire research and enables the development of an evidence-based insight into incubation models, policy objectives, and their documented outcomes. This includes a thorough study of scholarly publications, government policy and schemes (TIDE 2.0, MeitY Startup Hub, NIDHI-TBI, Atal Innovation Mission Reports, and respective state startup policies), incubator annual reports, and existing outcome-based evaluation studies.

5.2. Comparative Analysis

To put the Indian incubation scenario in a broader policy perspective, secondary research also includes a comparative analysis of trends and best practices from international incubation models. Two such models that will be briefly evaluated for comparison purposes are the United Kingdom and Israel. The rationale behind this comparison is that both models have very distinct and well-documented approaches when it comes to incubation policies. The United Kingdom is a model with a government-aggregated and university-meshed incubation network. Silicon Fen of

Cambridge University and the Catapult network of incubators explicitly showcase how deep-tech can be integrated into the startup ecosystem. Israel is a risk-sharing and public-private co-partnership for incubation purposes. It is a model formulated under the successful implementation of the Technological Incubators Program and is designed for high-risk, highly innovative startups and collaborative co-investments for such ventures (Avnimelech & Teubal, 2006).

Interview guides for primary research are developed based on themes emerging from the secondary research, including expertise of leadership, processes of tenant selection, quality of infrastructure, mentorship networks, funding and sustainability models, and local ecosystem characteristics.

5.3. Primary Research

Results of secondary studies are used to guide participant selection as well as tools for gathering primary data. Interviews are seen as a research strategy/technique for theory eneration/theoretical framework generation and qualitative interviews have the potential to generate insights and concepts and expand our understanding (Knight and Ruddock 2008). Different authors have recommended a different number of interviews to arrive at saturation in qualitative studies. Creswell (1998) recommended between five and twenty-five interviews while Kuzel (1992, p. 41) recommended six to eight interviews (Creswell 1998, p. 61; Kuzel 1992, p. 61cited in Guest et al. 2006). Galvin (2015) found 8–17 interviews as the most common range and Hennink et al. (2017). For this study, the student has conducted 7 interviews across multiple stakeholders.

The primary data will be collected through semi-structured interviews. Semi-structured interviews are used to 'learn the respondent's viewpoint regarding situations relevant to the broader research problem' (Blumberg et al. 2008, p. 386 cited in Davis 2017), provide rich data collection and allow for clarifications and extension of questions and answers during the interview (Davis, 2017).

The study follows a non-hierarchical, research-participant relationship. Interactions are framed more as conversations about knowledge sharing, rather than performance evaluations. Since participants are from varied backgrounds and sectors, questions to them, while remain under the similar broader theme, will be tailored to their expertise to bring out their knowledge for effective use in the study. Ethical considerations, including informed consent, voluntary participation, and confidentiality, will be followed throughout the research process.

5.4. Multistakeholder Approach

This investigation also focuses on varied stakeholders in an ecosystem, such as managers of incubators, startup founders, mentors, policymakers, and other stakeholders of incubation programs. This is necessary to understand differences in perceptions of success, failure, or effectiveness of incubators. Participants are chosen to represent variety according to the location of incubators (Tier-1 cities or Tier-2/Tier-3 cities), roles played in incubator ecosystems. Participants outside the ecosystem have also been chosen, such as startups that don't operate in incubators, to understand the barriers faced by them. [1]

Interviewee profile according to their relevance in the study:

[1] Interviews with stakeholders from the government, particularly from MeitY Startup Hub, could not be conducted within the study period due to access limitations. This represents a limitation of the primary research component.

(a) Respondent 1- Policy researcher at a major Indian Incubator

(b) Respondant 2- CEO and Founder, Incubated startup

(c) Respondant 3- Managing Director of a startup looking to get incubated

(d) Respondant 4- Founder of a startup not looking to get incubated

(e) Respondant 5- Researcher based in Germany and former research assistant at IISc

(f) Respondant 6- CEO, Indian Incubator based in tier 2 city

(g) Respondant 7- CEO, Indian Incubator based in tier 3 city

Analysis of the data is thematic and iterative. Documentary analysis of the secondary research identifies patterns in the incubation programs. The text data from the interviews is coded in a thematic way that uses both deductive themes from the literature (like leadership, governance, and linkages) and the inductive themes that emerge from the narratives. There is also a strategy for validating the themes through comparisons and contrasts.

Comparative analysis is used for comparison purposes to identify similarities and differences between the types and regions mentioned, especially between metro cities and Tier-2 and Tier-3 cities.

United Kingdom represents a state-coordinated, university-linked Catapult Network of innovation clusters, such as Cambridge's "Silicon Fen". It demonstrates how coordinated innovation centres and spatial clusters can accelerate deep-technology entrepreneurship and technology transfer (Rezaei & Kamali, 2022). Israel's risk-sharing incubation framework, shaped by the Technological Incubators Program, is recognised for its effectiveness in supporting high-risk, innovation-intensive startups through public–private co-investment

(Avnimelech & Teubal, 2006).

6. **Government Incubation Programs in India**

The expansion of startup incubators in India has been significantly shaped by government policy initiatives aimed at strengthening the country's innovation and entrepreneurship ecosystem. A startup ecosystem is "formed by thousands of startups, entrepreneurs, investors, institutions, and large companies" (Rasińska, 2022). Over the past decade, policymakers have increasingly recognised startups as drivers of economic growth, technological development, and employment generation. As a result, several ministries and agencies have introduced programmes designed to support early-stage ventures through incubation infrastructure, mentorship networks, funding mechanisms, and institutional partnerships. The Government of India thus acts as a facilitator of this ecosystem, which connects research institutions, entrepreneurs, investors, and markets.

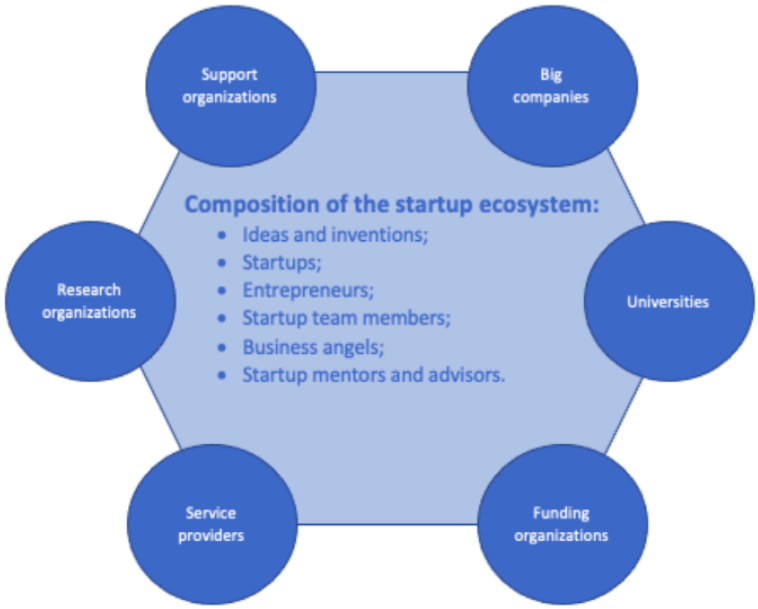

Fig. 1: Startup ecosystem components

Source: Masłoń-Oracz, P. A. Startup ecosystem in emerging economies: the case of India.

6.1. Startup India

Startup India is one of the most prominent umbrella initiatives to drive an increase in number of startups in the country. Launched by the Government of India in 2016, it aims to create a supportive environment for startups by simplifying regulatory procedures, offering tax incentives, facilitating access to funding, and strengthening institutional support systems such as incubators and accelerators. “Over the past decade, the initiative has evolved from a policy-focused framework into a comprehensive, multi-dimensional platform supporting startups at every stage from ideation to scaling operations”. It drives the whole startup ecosystem by providing funds, credit guarantee for startups, seed funding, etc. A comprehensive state ranking framework has been developed “[to] assess states and Union Territories based on their startup-friendly policies and implementation, fostering competitive federalism” (Press Information Bureau, 2026). It has also launched various digital portals, such as, Startup India Investor Connect Portal, Startup India Hub, etc to connect different stakeholders. The initiative has also played a role in increasing the number of incubators across the country by encouraging both public and private institutions to establish incubation centres that provide mentorship, networking opportunities, and infrastructure for early-stage ventures.

6.2. NIDHI – Technology Business Incubators (DST)

The National Initiative for Developing and Harnessing Innovations- Technology Business Incubators (NIDHI- TBI) is a flagship scheme of the Department of Science and Technology (DST). NIDHI focusing on nurturing knowledge-based and technology-driven startups emerging from academic institutions and research laboratories. A key component of this programme is the establishment of Technology Business Incubators (TBIs) within universities and technical institutions. “Technology based new enterprises are high risk and high growth ventures, and require an enabling environment like NIDHI-TBI to enhance the prospects of their success”. These incubators provide entrepreneurs with access to laboratory infrastructure, mentoring, seed funding, and business development support (Department of Science and Technology, n.d.). By embedding incubators within academic institutions, the NIDHI programme seeks to strengthen the link between scientific research and entrepreneurial activity. This institutional arrangement aims to facilitate the commercialisation of research outputs and encourage researchers and students to translate technological innovations into market-ready products and services.

6.3. Atal Innovation Mission (AIM)

The Atal Innovation Mission (AIM) was launched by NITI Aayog to support the establishment of Atal Incubation Centres (AICs) across the country, especially in schools, universities, and research institutions. More than 10,000 Atal Tinkering Labs are spread across schools in 733 districts, aiming to equip students with 21st-century skills such as AI, robotics, IoT, 3D printing, etc through entrepreneurship. While engaging over 1.1 crore students, it has enabled 16 lakh+ innovation projects. In partnership with United Nations Development Programme, AIM has also launched fellowships to provide hands-on experience to aspiring researchers. “While AIM 1.0

focused on establishing innovation infrastructure and nurturing India's emerging ecosystem, AIM 2.0 (2024) is centred on piloting new initiatives that address ecosystem gaps and scaling proven models in collaboration with Governments, industry, academia, and communities. It is also strengthening the early-stage innovation pipeline by scaling the Atal Tinkering Labs (ATLs)" (Press Information Bureau, 2026). By supporting innovation from school-level experimentation to startup incubation, AIM seeks to build a long-term pipeline of entrepreneurs and innovators in India.

6.4. TIDE 2.0 and GENESIS (MeitY)

The Technology Incubation and Development of Entrepreneurs (TIDE) 2.0 scheme was launched in 2019 by the Ministry of Electronics and Information Technology (MeitY) as its flagship initiative to strengthen India's technology entrepreneurship ecosystem. Building on the earlier TIDE program, TIDE 2.0 provides financial and technical support to incubators housed in academic and Research and Development institutions to nurture startups working in emerging areas such as artificial

intelligence (AI), the Internet of Things (IoT), robotics, 3D printing, healthcare, agriculture, and clean energy. The programme aims at strengthening 51 incubators and supporting 2,000 technology startups across the country. Such a vast network of incubators also aligns with the broader goal of India positioning itself as a global technology hub (MeityStartupHub, n.d.).

Complementing TIDE 2.0 is the Digital India GENESIS (Gen-Next Support for Innovative Startups) initiative, which aims to strengthen the startup ecosystem in Tier-2 and Tier-3 cities. By emphasising regional inclusion, the programme attempts to address spatial disparities in India's startup ecosystem and encourage innovation in emerging entrepreneurial hubs. The scheme aims to support approximately 1600 tech start-ups over the course of next 5 years. GENESIS focuses on capacity-building for incubators, mentorship development, and improving access to funding and markets for startups located outside major metropolitan centres. It is also a targeted initiative to achieve "[the] consolidation of startup-related schemes and assets of MeitY for greater efficiency, asset utilisation and enhanced support for startups". GENESIS also provides support to startups that have "validated their idea and need to pilot their product" and deep-tech startups (MeitY Startup Hub, n.d.)

6.5. Policy Implications:

These initiatives highlight how incubation has become central to India's innovation and entrepreneurial goals and policy frameworks. While government programmes have significantly expanded the incubation network and infrastructure, such a rapid growth calls for studying their effectiveness, design, and alignment with diverse regional ecosystems.

7. Deep-Tech Startup and Research Ecosystem in India: A Comparative Perspective

India's deep-tech ecosystem has seen a rapid surge and now ranks 6th globally ((NASSCOM, n.d.). Deep Technology refers to innovations founded on advanced scientific and technological

breakthroughs (NDTSP: Transforming India Through Deep Tech Innovation, n.d.). These ventures typically emerge from fields where scientific discovery and engineering innovation form the foundation of new products and services.

For the startup ecosystem of India, deep tech ventures are increasingly becoming an important segment and a focus point of government policies as well. Deep technology ventures gives a country an edge over competitors in areas such as defence, finance, etc. They also help position a country as an indispensable link in global supply chain networks by enabling strategic technologies (such as semiconductors, Quantum, AI, etc), bringing technological sovereignity. This also increases the nation's relevance in geopolitical and economic alliances.

Unlike conventional digital startups, deep-tech ventures depend heavily on scientific research, specialised infrastructure, and long-term investment. "*Research and innovation takes longer gestation" (Respondent 6, 2026).* They also require higher capital investment and specialised infrastructure as compared to digital or service-based startups. As pointed out during primary research, startups in deep tech sector have an extensive and extended need for incubation. Thus, incubators and innovation clusters become particularly important in supporting these ventures, by providing infrastructure, mentorship, and industry partnerships. As pointed out be Respondent 7, Incubators that support deep technology ventures also find it beneficial operating from educational institutions by increasing access to laboratories, professors, etc. A major service provided by incubators here is linking incubatees to emerging technological needs of the industry to increase research commercialisation pathways.

Recognising the strategic importance, this development is also supported by government initiatives, such as the National Deep Tech Startup Policy, India Semiconductor Mission,

National Quantum Mission, and Innovations for Defence Excellence (iDEX), etc. India possesses several enabling conditions for the development of deep-technology innovation. The country produces a large number of engineering graduates each year and hosts globally recognised research institutions such as the Indian Institutes of Technology (IITs), Indian Institute of Science (IISc), and several national laboratories.

However, the ecosystem remains comparatively underdeveloped despite its strategic importance for technological sovereignty, national security, and long-term economic competitiveness. A major reason for this, as recognised by Speciale Invest and Oister Global, is the gap in funding between India and other leading nations (ANI, 2024).

Dominant Technologies in Deep tech:	**Government Focus Industries in Deep Tech:**
Aartificial Intelligence	Semiconductors
IoT	Space
Big Data	Defence
Blockchain	Quantum Technology
AR/VR	

A further challenge lies in the fragmentation between academic research and startup ecosystems. While India produces significant volumes of scientific research, mechanisms for translating academic discoveries into commercially viable technologies remain relatively weak. This gap is also reflected in the experiences of researchers working within Indian institutions. As one interview participant, a former researcher at the Indian Institute of Science, observed:

"I left India because research is repetitive and there are many researchers competing for limited resources. The project I was working on, that technology has been discarded long ago as ineffective in large scale by India and other countries but government continues to fund it. I had to wait days to use lab equipment necessary for my research at IISc. We have a huge population but the access to that talent pool is very limited. It is not an intellect issue, it is a systemic issue."

(Respondent 5, 2026)

The participant noted that some research projects continue to receive institutional or government approval even when the underlying technologies have already been abandoned internationally, raising concerns about the strategic direction and quality of research output. These perceptions align with broader assessments of India's research landscape. While India ranks 4th in research output, ie, the number of papers published, it lags behind in number of papers cited (Chhapia, 2023). Thus, the impact and quality of these publications remain comparatively lower, as measured through citation metrics and global research rankings.

This suggests that India's research ecosystem is faced with major loopholes and systemic challenges. Quality of research and areas of research are also important factors to consider when funding research projects as they directly affect technology translation and commercialisation.

"You see in the US, most research grants and funding come from private companies. There must be a reason why they see business potential in those research. This is also a very way to determine what research is actually required by the market currently"

(Respondent 5, 2025)

Strengthening linkages between academic institutions, industry partners, and startup ecosystems therefore becomes critical for improving both the impact of research and the development of deep-technology ventures.

A comparative example can be found in deep-technology clusters in the United Kingdom, such as the Silicon Fen, which is a cluster of high-tech firms located around the University of Cambridge (Rezaei & Kamali, 2022). These clusters foster collaboration between academia, industry, and government, driving the commercialization of deep tech,... [by enabling] scientists and engineers to work on mission-driven projects that support strategic national priorities (United Nations Development Programme, 2025). Silicon Fen's growth has been strongly supported by university-industry collaboration, venture capital availability, and specialised research infrastructure. While India's technology sector is fragmented, Indian cities also have existing specialised ecosystem in certain areas, which hold a major potential to be converted into innovation clusters. For example, Pune's pharmaceutical industry can be leveraged to develop a medical and biotechnology innovation cluster. Shared infrastructure make it cost-effective to develop such a cluster with knowledge spillovers and collaborations between organisations already working in this sector in the city. More such zones can be recognised in Tier-II and Tier-III cities as well. Developing such clusters, especially in cities with strong academic institutions and existing industry bases, could help India better integrate academic research, startup formation, and industrial innovation.

The UK consistently ranks among the top innovation economies globally, "placing 4th in the Global Innovation Index 2023" (World Intellectual Property Organization, 2023). The country

also hosts one of the largest startup ecosystems in Europe, particularly in deep-technology sectors such as artificial intelligence, life sciences, and advanced engineering. It constantly ranks among the top countries worldwide in terms of highly cited scientific publications, indicating strong research quality and international collaboration. These indicators suggest that institutional mechanisms such as the Catapult Network operate within a broader ecosystem that effectively connects academic research, technological development, and entrepreneurial activity.

Another model for supporting innovation-intensive startups can be observed in Israel's Technological Incubators Program, which was established in the early 1990s to commercialise technologies emerging from research institutions and immigrant scientific talent. The programme was designed to address a key market failure in early-stage deep-technology ventures: the lack of private investment for high-risk, research-driven innovations with long development timelines. Under this framework, incubators are operated by private investors or industry consortia, while the government shares the financial risks of early-stage technological development. Startups admitted to the programme typically receive significant government funding for research and development during their initial incubation period, while private operators provide managerial expertise, industry networks, and additional investment. If the venture succeeds commercially, the government recovers its investment through royalty payments, thereby recycling public funds into future innovation programs. As a result, between 1999 and 2002 VC (venture capital) investments as a percentage in Israel were higher than any other Organisation for Economic Co-operation and Development (OECD) country, including the US (Avnimelech & Teubal, 2006).

This risk-sharing structure has been widely recognised as a key factor in the success of Israel's innovation ecosystem, as it lowers the barriers for private investors to support highly uncertain

technological ventures while maintaining strong incentives for commercialisation. The model illustrates how targeted policy design can enable the development of deep-technology startups that might otherwise struggle to secure early-stage financing.

8. Findings from Primary Research

8.1. Mentorship Gaps in Academic Incubators

"*Mentorship is definitely the service all incubatees look for." (Respondant 7, 2025).* Despite being the most important and sought after service by incubators, participants noted that there is limited mentorship within academic incubators. While university-based incubators often provide strong technical guidance through faculty mentors, founders often lack guidance by experts in business strategy, market positioning, and scaling is frequently lacking.

> *"One major issue I face with my incubator is that there is no one to guide us as entrepreneurs. My college professors are very good and guide us on technical part but there is no one who understands how market works. Most business decisions are taken by me without any guidance from the incubator."*
>
> *(Respondant 2, 2026)*

This observation suggests incubators may require stronger integration with industry practitioners and experienced entrepreneurs to provide balanced mentorship. Respondent 6 and 7 also highlighted the same, speaking on the lack of manpower:

"A major operational challenge we often face is the lack of manpower. We always have openings because there are really less people in this industry. Incubators in tier-2 and tier-3 cities also have less employee retention."

(Respondent 7, 2026)

"Government benchmarks manpower skills and availability to national average and that is why policies are also made like that. But the skills that manpower in a tier-2 city are there, it is not similar to what metro cities have to offer."

(Respondent 6, 2026)

8.2. Standardisation of Incubation Programs:

Founders reported that many incubators follow a uniform structure of workshops, mentoring sessions, and networking events regardless of the specific needs of the startup. One founder explained:

"All these incubators follow the same structure, the same workshops and mentoring sessions even when it is not suited to the type of startup or their operation model. Our business needed very specific inputs related to our sector, but most incubators felt too generic. They don't have subject matter experts available all the time."

(Respondent 4, 2026)

Such experiences indicate that a one-size-fits-all incubation model may limit the effectiveness of incubators in supporting specialised or emerging sectors. However, a different perspective from Respondent 6 highlighted institution level innovations taking place:

> *"All the incubators have a similar model. Maybe some innovation might happen in one or two cases, but it is rare. We did some innovation at our level too in operations level."*
>
> *(Respondent 6, 2025)*

8.3. Alternative Perspectives on Incubator Success

Founders interviewed for this study also emphasised that incubator success should be measured through long-term outcomes rather than short-term activity metrics.

> *"I wouldn't judge success by how many startups an incubator hosts. I'd look at whether those startups are still alive two or three years down the line and whether the founders are capable of running the business independently."*
>
> *(Respondent 1, 2025)*
>
> *"Important parameters are the survival rate of startups, the number of exits from the incubator, and the investor portfolio of the incubator."*
>
> *(Respondent 7, 2025)*

These perspective highlights the importance of evaluating incubator effectiveness through sustained entrepreneurial outcomes rather than programme outputs.

8.5. Uneven Relevance of Incubators Across Business Models

Not all startups perceive incubators as equally valuable. Interview evidence suggests that the usefulness of incubators may vary depending on the nature of the business model and sector. In particular, service-based startups may rely less on incubation support compared to technology-intensive ventures that require access to specialised infrastructure, research networks, or technical mentorship.

One founder operating a health-services startup noted that the structure of incubators is often better suited for technology startups rather than service-oriented ventures:

> *"Ours is a service-based business, so we don't really need an incubator because it has nothing to offer us. Those are usually beneficial for tech businesses. Our work involves a lot of people coming in and going out. I also already have my own sources of funding and mentorship."*
>
> *(Respondent 4, 2025)*

This perspective suggests that incubation programmes may generate the greatest value for startups operating in research-intensive or technology-driven sectors, where access to specialised infrastructure, technical mentorship, and industry networks plays a critical role. In contrast, service-based ventures may rely more on market access, operational networks, and independent

funding sources rather than institutional incubation support. These differences highlight the importance of aligning incubator design with the specific needs of different types of startups.

8.6. Weak Industry–Academia Research Linkages

Another theme emerging from the interviews relates to the limited involvement of private industry in academic research in India. Several participants noted that while universities produce large volumes of research, industry participation in funding and guiding this research remains relatively limited compared to leading innovation ecosystems.

> *"In the USA and Europe, most research is funded by companies and conducted by universities, so there must be some business advantage they are getting. Even my current research in Germany is being funded by a large automobile conglomerate. I think businesses in India just don't see that benefit."*
>
> *(Respondent 5, 2026)*

Research grants in India are primarily funded by government agencies, including the Department of Science & Technology (DST), Department of Biotechnology (DBT), Council of Scientific & Industrial Research (CSIR), and the Science and Engineering Research Board (SERB). Other major sources include the Indian Council of Medical Research (ICMR), Indian Council of Social Science Research (ICSSR), and the Defence Research & Development Organisation (DRDO).

> *"Companies that come to india have trading tendency, or at least how they enter the market. Research and innovation takes longer gestation. US and UK have lower bank*

interest rates. In India because it is high, so the return on investment doesn't come very fast and startups can't fund themselves sustainably."

(Respondent 6, 2026)

This hints at a larger policy issue where there is disconnect between economic policies of furthering incubation and the role of startups in the Indian economy and supporting monetary policies. India, with its massive population offers cheap labour and trading opportunities to businesses. A shift to becoming tech-front economy thus requires holistic approach to improving the startup incubation ecosystem, from core policies and nodal agencies to those at the periphery, having an indirect impact.

Respondent	**Respondent Profile**	**Critical Success Factor 1**	**Critical Success Factor 2**
1	Policy researcher at a major Indian Incubator	Integrated Ecosystem for access to market, funding and mentorship	Supportive Policy with state as a major stakeholder
2	CEO and Founder, Incubated startup	Mentorship	Flexible Incubator Design
3	Managing Director of a startup looking to get incubated	Mentorship	Strong selection criteria (quality over volume)
4	Founder of a startup not looking to get incubated	Flexible Incubator Design	Networking opportunities

5	Researcher based in Germany and a former research assistant at IISc	Private sector funding	Quality of R&D by incubatees
6	CEO, Indian Incubator based in tier 2 city	Incubation of first mover startups	Commercialisation of R&D by incubatees
7	CEO, Indian Incubator based in tier 3 city	Localisation and contextualisation of incubators	Knowledge sharing

The analysis identifies five key critical success factors (CSFs): (1) quality and diversity of mentorship, (2) flexible incubator design, (3) strong incubator-funding agency linkages (4) commercialisation capacity of research and development projects (5) broader ecosystem integration. These factors were consistently observed across interviews with founders, incubator managers, and researchers, indicating their central role in shaping incubator performance.

9. Policy recommendations

9.1. Heterogeneity as a policy objective: Tech Incubators in India may benefit from diversity and heterogeneity in policy design. For example, when incubators choose tenants from various age groups, providing a space for young and old firms to interact actively enables them to actively shape their organisational structure, processes, and routines, while also building stable, long-term structures (Bruneel et al., 2012). This may be done by creating funding streams earmarked for non-replicable models (community incubators, sectoral hybrids, municipal labs).

9.2. Codesigning with local stakeholders: Government bodies should also incentivise co-design with local stakeholders (industry bodies, panchayats, vocational institutes). This would make the design model a bottom-up approach, as opposed to the current top-down approach within ministries. TEXMiN, an incubator based out of IITISM (Dhanbad) and working mainly on mining exploration successfully depicts usage of local strengths in incubation. It is now recognised as one of India's four Technology Translation Research Parks (Technology Innovation in Exploration & Mining Foundation, n.d.). A public-private partnership, such as T-hub in Hyderabad, Telangana, also encourages local and private investment in this sector, fostering competitiveness among incubators.

Respondent 7 suggests linking incubation projects to the RAMP (Raising and Accelerating MSME Performance) scheme could benefit both the incubatees and MSMEs, expanding innovation and entrepreneurship to rural regions. India's alignment with the Sustainable Development Goals also suggests a significant need for innovation in agriculture and the agro-processing industry, which is prevalent in rural areas. Incubators could further include establishing a satellite innovation wing in rural clusters or collaborating with panchayats, district industry centres, Krishi Vigyan Kendras, or ITIs to identify local entrepreneurs and context-specific technological needs.

9.3. Contextual metrics for evaluation: Startups in India play a dual role of innovation and providing jobs to a country with up to 5.2% unemployment rates (The Economic Times, 2025). While the number of startups supported is an important metric for judging the success of an incubator, the long-term impacts of technology-driven startups from these incubators must also be considered to assess the overall performance of an incubator. Thus, local jobs were created, failed-but-learned ventures emerged, public service innovations deployed, value-chain linkages

formed, and gender/geographic inclusion must also be made important criteria for evaluation to capture system effects.

9.4. National Incubation Alignment Framework: A National Incubation Alignment Framework can be introduced under a central coordinating body or a joint committee of concerned ministries. This would enable tenants to navigate bureaucratic hurdles by providing a predictable business ecosystem. However, a federal structure must be adopted to ensure state participation and inter-ministerial convergence.

9.5. Conceptual Model of Incubator Effectiveness in India: This study proposes a conceptual model of incubator effectiveness in India based on insights derived from primary research across multiple stakeholders. The model conceptualises incubator performance as a function of the interaction between institutional inputs, critical success factors, and resulting outcomes.

Layered Model:

Inputs		
Policy Support	Funding	Infrastructure

Critical Success Factors				
Quality and diversity of mentorship	Flexible Incubator Design	Strong incubator-funding agency linkages	commercialisation capacity of R&D projects	broader ecosystem integration

Intermediate Outcomes			
Capability Development	Market Access	Product–Market Fit	Commercialisation

Final Outcomes		
Startup Survival	Innovation Quality	Economic Impact

A layered model for evaluation of incubator effectiveness helps divide evaluation into stages according to the age of the incubator and incubatees. It addresses key systemic issues that emerge throughout the process and lifetime of an incubator, not just focussing on the design and outcomes. A multi-level evaluation helps incubator management and board of directors identify where the gap is occurring in the pipeline. The model includes flexibility to conduct comparative analysis across incubator models and regions, allowing context specific analysis, taking into account tier-2 and tier-3 city startup ecosystems.

Conclusion

This study set out to examine the factors that influence the success of startup incubators in India, with particular attention to the role of standardised design models and their effectiveness across diverse regional contexts. The findings suggest that while India has made significant progress in expanding its incubation infrastructure through policy initiatives, the effectiveness of these

incubators varies considerably depending on how well they align with the needs of startups and the characteristics of local ecosystems.

A key insight emerging from the research is that incubator success is not determined solely by the availability of infrastructure, funding, or policy support, but by the quality and relevance of support services provided to startups. In particular, mentorship quality, industry linkages, and the ability to adapt incubation models to sectoral and regional needs emerge as critical determinants of effectiveness. The study also highlights that homogenised incubation models, often driven by policy replication, may limit the ability of incubators to respond to diverse entrepreneurial contexts, especially in Tier-2 and Tier-3 cities where ecosystem conditions differ significantly from established startup hubs.

The analysis further indicates that incubators are not uniformly valuable across all types of startups. While technology-intensive and research-driven ventures derive substantial benefits from incubation support, service-based startups often rely on alternative networks, funding sources, and market access mechanisms, other businesses with different operational model may not benefit from the same. This suggests the need for a more differentiated approach to incubation policy, where support structures are tailored to the specific requirements of different business models.

Weak industry participation in research funding shows weak linkages between technology and innovation that the current industry and businesses require and the research that is being pursued. The study argues that the next phase of India's incubation policy should move beyond expanding the number of incubators towards improving their design, functionality, and contextual

relevance. Policymakers should prioritise flexibility, localisation, and stronger ecosystem integration to ensure that incubators can effectively support diverse entrepreneurial pathways.

References

Ministry of Commerce & Industry. (2025, February 1). India's Startup Revolution: 1.57 lakh startups and 17.28 lakh jobs mark a decade of progress [Press release]. Press Information Bureau. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2098452

MeityStartupHub. (n.d.). https://msh.meity.gov.in/schemes/tide

Bruneel, J., Ratinho, T., Clarysse, B., & Groen, A. J. (2012). The evolution of business incubators: Comparing demand and supply of business incubation services across different incubator generations. Technovation, 32(2), 110–121. https://doi.org/10.1016/S0166-4972(11)00165-9

Sachdeva, S. (n.d.). Entrepreneurship Innovation And Startups: Catalyst For Innovation And Economic Growth Of India. International Journal of Environmental Sciences, 2513–2526. https://doi.org/10.64252/xymrse11

D'Cunha, S. D. (2017, May 18). 90% of Indian startups will fail because of lack of innovation, study says. Forbes. https://www.forbes.com/sites/suparnadutt/2017/05/18/startups-in-india-fail-due-lack-of-innovation-according-to-a-new-ibm-study/

Banerjee, D. (2024, September 24). The Great Indian employment paradox: The more you learn, the less you earn. The Times of India. https://timesofindia.indiatimes.com/education/news/the-great-indian-employment-paradox-the-more-you-learn-the-less-you-earn/articleshow/113627394.cms

Atal Innovation Mission. (2024, January 3). What is an Incubator? Retrieved from https://www.aim.gov.in/what-is-an-incubator.php

Startup Nation: India. (n.d.). https://www.pib.gov.in/PressReleasePage.aspx?PRID=2087835#:~:text=With%20over%20100+%20unicorns%2C%20the,challenges%20with%20cutting%2Dedge%20solutions

India's startup Revolution. (n.d.-c). https://www.pib.gov.in/PressReleasePage.aspx?PRID=2098452

Avnimelech, G., & Teubal, M. (2006). Creating venture capital industries that co-evolve with high-tech: Insights from an extended industry life-cycle model and the case of Israel. Research Policy, 35(10), 1477-1498.

NASSCOM. (n.d.). India's deeptech dawn: Forging ahead. https://nasscom.in/knowledge-center/publications/indias-deeptech-dawn-forging-ahead

NDTSP: Transforming India through Deep Tech Innovation. (n.d.). https://www.psa.gov.in/deep-tech-policy

ANI. (2024, December 19). India among top 10 deep tech markets, but faces huge funding gap: Report. ThePrint. https://theprint.in/economy/india-among-top-10-deep-tech-markets-but-faces-huge-funding-gap-report/2410279/

Rezaei, A., & Kamali, A. R. (2022). Evaluation of technological knowledge transfer between silicon fen firms and University of Cambridge based on patents analysis. Journal of Open Innovation: Technology, Market, and Complexity, 8(4), 216. https://www.mdpi.com/2199-8531/8/4/216

United Nations Development Programme. (2025). Global deep tech ecosystems: Catalyzing innovation for sustainable development. UNDP Global Centre for Technology, Innovation and Sustainable Development. https://www.undp.org/sites/g/files/zskgke326/files/2025-06/undp-global-deep-tech-ecosystems.pdf

Wilkes, D. (2023, December 14). Innovate UK's Catapults highlighted as catalysts for innovation. UK Research and Innovation. https://www.ukri.org/blog/innovate-uk-catapults-highlighted-as-catalysts-for-innovation/

Chhapia, H. (2023, March 23). India is world's 4th in research output, but ranks 9th in citations. The Times of India. https://timesofindia.indiatimes.com/india/india-is-worlds-4th-in-research-output-but-ranks-9th-in-citations/articleshow/98924312.cms

World Intellectual Property Organization. (2023). Global Innovation Index 2023: Innovation in the face of uncertainty (16th ed.). https://www.wipo.int/en/web/global-innovation-index/2023/index

Masłoń-Oracz, P. A. Startup ecosystem in emerging economies: the case of India.

MeitY Startup Hub. (n.d.). GENESIS (Gen-Next support for innovative startups). Ministry of Electronics and Information Technology, Government of India. https://msh.meity.gov.in/schemes/genesis

Press Information Bureau, Government of India. (2026, January 15). A decade of Startup India: Scaling innovation, shaping India's growth story. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2214872&reg=3&lang=2

Department of Science and Technology, Government of India. (n.d.). Technology Business Incubator (NIDHI-TBI). National Initiative for Developing and Harnessing Innovations (NIDHI). https://nidhi.dst.gov.in/nidhitbi/

de Apodaca, O. R., Murray, F., & Frolund, L. (2023). What is "deep tech" and what are deep tech ventures. https://reap.mit.edu/assets/What_is_Deep_Tech_MIT_2023.pdf

Technology Innovation in Exploration & Mining Foundation (TEXMiN). (n.d.). *TEXMiN: Technology innovation hub for mining and exploration.* https://texmin.in/