



## **Incubation in India – A Multilevel Analysis**

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## Incubation in India – A Multilevel Analysis

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### Abstract

This chapter undertakes a multi-level analysis of incubation in India with an objective to assess the landscape of incubation, the role and impact of incubators on startups, and understand challenges faced both by incubators and incubatees. Secondary data from 284 incubators across India and four largest incubator support schemes, survey of 22 incubation centres funded by a support scheme, and in-depth interviews of incubated entrepreneurs were collected and analysed. The purpose, objectives, processes and success metrics of incubators specific to Indian context are discussed. Contributions from this chapter will be useful to researchers, policy makers and incubation champions. The chapter may be of particular relevance to countries that are developing strong startup and incubation ecosystems.

*Keywords:* incubation, India, startups, technology business incubators

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## Introduction

The entrepreneurial process is marked with challenges of working with the unknown and building resources for survival (Brush, Greene & Hart, 2001). Several micro and macro level factors including the personality and attitudes of the entrepreneur (Rauch & Frese, 2007), identification and creation of opportunities (Shane, 2003), regulatory frameworks and market conditions, presence of other startups, cultural makeup of the location (Gnyawali & Fogel, 1994), access to trained talent, technology, market, finance and mentors (Spigel, 2017) influence the success (or failure) of a young enterprise.

Over the history of business, support for young enterprises has been available in a variety of forms. In the family or community business context, young enterprises receive significant nurturance and support (Lester & Cannella Jr., 2006; Sharma & Manikutty, 2005); this nurturance could take the shape of access to resources, information sharing, and passing of wisdom over generations, among others. In the modern business context, trade associations and chambers of commerce replicate such community-like support, not just for small but mid-sized businesses as well (Wilts & Meyer, 2005). For technology businesses and startups, incubators are known to provide this critical support and, thereby impact the economy positively (Lamine et al., 2018; Ogotu & Kihonge, 2016).

India, acknowledged as one of the hotbeds of entrepreneurship, is known to have well over 20000 startups across various domains and focus areas (Tracxn, 2019). In 2018, over USD 65 billion was invested in about 1800 rounds in startups in India; this was about 4% and 6% of the global investment amount and number of rounds, respectively (Tracxn, 2019). While these numbers may seem small to the critical eye, the rate of growth in the Indian ecosystem is inspiring. A study published in 2018, observed Bengaluru and Delhi to be among the top 20 cities that attracted most venture capital investment between 2015-2017 (Florida & Hathaway, 2018). A recent study also ranked India third (after USA and China) on the number of incubators (Sharma, 2017). Much of this growth in the startup ecosystem has happened over the last three decades. Therefore, insights from India are likely to be relevant for economies pushing towards creating more vibrant startup ecosystems (Lalkaka, 2006).

This chapter lays out historical, spatial, activity and policy landscape of incubation in India. We examine the temporal or evolutionary pattern of incubation in India. Data was collected

and examined from four distinct sources– ecosystem, incubation schemes, incubators, entrepreneurs – to understand incubation in India and identify the opportunities for incubation in future.

### **Incubation – What? How? Why?**

Incubators have been defined and understood in a variety of ways. While many conceptualisations are centered around incubator as a physical facility, others highlight the process or inputs of incubation. According to Allen and Rahman (1985; p.12) an incubator is a ‘facility that aids the early stage growth of companies by providing rental space, shared office services and business consulting assistance’. Hackett and Dilts (2004; p.57) define an incubator as ‘a shared office space facility that seeks to provide its incubatees...with a strategic, value-adding intervention system (i.e. business incubation) of monitoring and business assistance’. Peters, Rice and Sundarajan (2004; p.83) lay emphasis on the process of incubation and view it as a ‘support environment for startup and fledgling companies’. The International Business Incubation Association (InBIA), the global association of incubators, defines incubation as, ‘a business support process that accelerates the successful development of startup and fledgling companies by providing entrepreneurs with an array of targeted resources and services...a business incubator’s main goal is to produce successful firms that will leave the program financially viable and freestanding. These incubator graduates have the potential to create jobs, revitalise neighborhoods, commercialise new technologies, and strengthen local and national economies’ (p.11, as cited in Information for Development Program, 2010).

Literature recognises different types of incubators largely based on various parameters such as economic models, objectives, service areas, and strategic focus. Economic models have been referred to distinguish for-profit incubators from non-profit ones (Aernoudt, 2004; Grimaldi & Grandi, 2005). Incubators have also been classified based on their fundamental objective; these include social incubators, research incubators, technology business incubators etc (Aernoudt, 2004). Other sources of differentiation include service offerings and competitive focus, industry and sector, types of ventures supported and geographical reach (Vanderstraeten & Matthyssens, 2012). Most recently, Barbero et al. (2014) classified incubators into four categories based on their strategic focus and location, and ownership - (a) business innovation centres focusing on economic development of the region (b) university incubators that aim at

commercialising technology (c) research incubators (also based in educational institutions) to valorise the research undertaken in-house, and (d) stand-alone incubators that focus on selecting and supporting nascent ventures with high potential. Scholars referring to multiple theoretical foundations such as institutional theory (Phan et al. 2005), social network theory (Hansen et al., 1985), stakeholder theory (Mian, 1997), resource based view (Mian et al., 2012), transaction cost and learning models (Peters et al., 2004) further highlight the diversity embedded in the conceptualisation of incubation.

Incubators, through their various service offerings to the startups, are also known to influence, if not impact, the entire ecosystem. According to Spigel (2017), entrepreneurial ecosystems are comprised of material attributes (such as infrastructure, regulations and policies, educational institutions, and open and support services), social attributes (such as mentors, role models, worker talent, inexpensive investments, and access to networks), and cultural attributes (such as entrepreneurship histories, and supportive culture and belief systems). The ecosystem is relational i.e. its material, social, and cultural aspects influence and reinforce each other. Examining the wide range of services that are offered by incubators and keeping in perspective various conceptualisations, incubators have the potential to create interventions for gaps in both material and social aspects of entrepreneurial ecosystems and can help reduce the impact of impoverished culture attributes. Tsai, Hseih, Fang, and Lin (2009) argue that incubators function at a meso level; they work on new businesses (micro level) to make an impact on the innovation systems (macro level).

Incubators are typically known to provide support to new enterprises during their early stages. Mainly, categories of services include access to (1) physical resources, (2) office support services, (3) capital, (4) process support, and (5) networking services (Carayannis & Von Zedtwitz, 2005). This access could take the form of a variety of services including shared office spaces, access to a pool of shared services, networking, coaching etc (Bergek & Norrman, 2008). The services offered by incubators have been neatly organised into three categories by Hackett and Dilts (2004). Operating under the *landlord* model, an incubator provides physical resources such as an office, conference room, high-speed internet connections at lower than market prices to fledgling businesses. The *educational model* of incubation focuses on training for fulfilling the gaps faced by the entrepreneur (knowledge of legal, financial aspects etc.); this training can be in the form of accelerators or bootcamps. Finally, the *coaching and friend*

model enables new businesses' access to funds and/or markets and networks as well as coaching and mentoring them towards growth and success (Hackett & Dilts, 2004).

As entrepreneurial ecosystems have undergone changes, there is evidence that the role of incubators has also moved and expanded to a center offering training, networking and consulting in all areas of expertise to startup firms than just a business center that has office facilities (Peters et al., 2004). Notwithstanding the variety and evolution in models and services offered, incubators are primarily focused on improving the success rate of new ventures (Dettwiler et al., 2006, Schwartz, 2013) by helping them overcome their liability of newness and smallness (Mireftekhari, 2017).

The success of incubation has been important especially considering that it is funded by external (most governmental) agencies who expect impact of the incubator as well as the businesses supported by it (Bearse, 1998). The impact metrics suggested and used in research and practice, unsurprisingly, vary significantly from the amount of space leased (Meeder, 1997: as cited in Voisey, Gornall, Jones & Thomas, 2006) to enabling incubatees to develop control systems (Hackett & Dilts, 2004). The diversity in the performance metrics can be attributed to the varied objectives and the models of incubation.

## **Evolution in Incubation**

To reiterate, the concept of incubation and therefore its role, services and outcomes has undergone change. Mian, Lamine and Fayolle (2016) categorised the support ecosystem for new businesses into three waves – pre-1980s, 1980-1990s and 2000-2014. The first wave is predominantly marked by research parks and technology development centres, the second showcases impetus on commercialisation and introduction of mentoring and networking. The third wave from the 2000s, highlights the emergence of specialised incubators and models like accelerators. While incubation has traditionally been defined agnostic of the sector or focus areas, recent literature predominantly focuses on technology business incubation. In these fast-evolving times, two dominant models get significant attention – Technology Business Incubators or TBIs and accelerators.

TBIs were conceptualised by Smilor and Gill (1986) - closer to the end of the second phase of development of startup ecosystem (see Mian et al., 2016) in the context when the need for technology commercialisation or technology transfer from universities was becoming

prominent (Phillips, 2002). They were considered to be a link between technology, entrepreneurial talent and capital (Smilor, 1987). Incubators in this wave were expected to provide a wide range of services including physical space, networking, coaching, access to networks, professional services and capital (Bruneel, Ratinho, Clarysse & Groen, 2012).

The latest addition to startup support models are accelerators. Unlike incubators that are physical ‘entities’, accelerators are fixed term ‘programs’ that provide inputs to the participating entrepreneurs, coaching and equipping them to address their challenges, and thereby preparing them to present their businesses to investors and raise capital (Cohen and Hochberg, 2014). YCombinator of USA, established in 2005, is acknowledged as the first accelerator. In less than a decade since (2005-2013), there are over 213 accelerators across the world supporting about 3,800 new ventures (Clarysse, Wright & Van Hove, 2015).

The evolution in the models and focus areas of incubation can be linked to the needs of startups as well as the availability of resources in the ecosystem. When startups don’t have clarity on exit policies or growth plans, they are likely to access fewer support services like coaching and access to networks (Bruneel et al., 2012). The emergence of accelerators substantiates the critical need for startups to grow ‘faster’ as against other requirements for basic infrastructural resources. The evolution in the definition of incubation further substantiates the importance of incubators remaining closely embedded in the evolving needs of startups and the ecosystem. Our analysis highlights the drivers and sponsors, spectrum of services, and gaps and challenges of incubation, while also delving into the needs of incubated entrepreneurs.

## **Methods**

Data for this study was collected from both primary and secondary sources, at various levels. An extensive online search was undertaken to compile a list of over 280 incubators in India. Four major incubator support policies and schemes were compiled largely from already published sources and websites of the relevant government bodies. Primary data in the form of an online survey was collected from 22 incubators supported by and affiliated to one government scheme. The survey included questions on the activities, priorities, performance, and challenges facing the respective incubators. Finally, 24 startup founders were interviewed to understand their experiences and expectations from an incubator. Our findings landscape incubation in India, outline its evolution, and subsequently move into highlighting extant gaps.

## The Topography of Incubation in India

Incubation, as we know now, found its way into India around 1991. The germination of ‘incubating’ innovation-driven entrepreneurship in India can be linked to setting up of incubators in some of the eminent institutes of higher education in the country. The Society for Innovation and Development (Indian Institute of Science, Bengaluru) was established in 1991 and the Foundation for Innovation and Technology Transfer (IIT Delhi) was established in 1992. Much before the historically known period of starting of incubation, early-stage entrepreneurial activities were supported through several initiatives of the central and state governments; this dates back as early as 1955. Particularly, the Ministry of Micro, Small and Medium Enterprises (MSME) set up the National Small Industries Corporation (NSIC) in 1955 with a charter to promote and support, through integrated support services, micro, small and medium enterprises. Initiatives undertaken prior to 1991 are detailed in the next section.

### Pre 1991: Startup and Small Business Support in India<sup>1</sup>

The Department of Science and Technology (DST), Government of India, MSME and financial institutions like Small Industries Development Bank of India (SIDBI) and National Bank for Agriculture and Rural Development (NABARD) have undertaken various initiatives towards supporting small enterprises. Almost seventy years ago, NSIC (an initiative of MSME) launched a variety of schemes and set up institutions to support small enterprises. These schemes facilitated bank credit, marketing, and assistance with raw material, infrastructure development, and tendering. MSME, through NSIC, set up Software Technology cum Business Parks to provide physical infrastructure to micro, small and medium sized enterprises in technology domains and Technology Incubation Centres (TIC) in public-private partnership mode.

NABARD and SIDBI were set up under Acts of the Indian Parliament in 1981 and 1990, respectively. NABARD focused solely on supporting rural development through various interventions, including support to enterprises and organisations working in agriculture or rural areas. In 2009, NABARD set up a Rural Innovation Fund ‘to support innovative, risk- friendly,

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<sup>1</sup> Information sourced from websites of respective organizations – DST, MEITY, NABARD, SIDBI, etc.



unconventional' experiments in farm, non-farm and microfinance sectors to promote livelihood and employment in rural areas.

SIDBI was set up in 1990 for financing micro, small and medium enterprises in India. In 1990s, SIDBI onboarded management institutes across various states of India to set up centres for training of tiny and small enterprises within the respective state. Future loan disbursement to the small businesses was linked sometimes to the entrepreneur attending the training programs.

DST set up the National Science and Technology Entrepreneurship Development (NSTED) Board in 1982 with its charter - 'to convert "job-seekers" into "job- generators" through Science & Technology interventions'. Table 1 presents the initiatives undertaken by the Board prior to and post 1991.

**Table 1: Initiatives of NSTED Board**

Period	Program	Objective
Pre 1991	Science and Technology Entrepreneurship Development Scheme (STEDs)	Create entrepreneurial opportunities in lesser developed districts of India and Innovation
	Science and Technology based Entrepreneurship Development (iSTED)	Identify local challenges/issues and technological/innovative entrepreneurial interventions.
Post 1991	Entrepreneurship Development Centres	Foster entrepreneurial culture in science and technology institutions
	Science and Technology Entrepreneurship Park (STEP)	Provide physical and soft infrastructure to entrepreneurs.
	Technology Business Incubators (TBIs)	Evangelise and support entrepreneurship in higher education institutions.

### Post 1991: Incubation in India

NSTED Board organised all its innovation and entrepreneurship support initiatives under an umbrella program - National Initiative for Developing and Harnessing Innovations (NIDHI). This initiative encompasses support for incubators (TBI and Centres of Excellence),

scholarships and seed investment, scouting competitions, and accelerators and training programs for entrepreneurs.

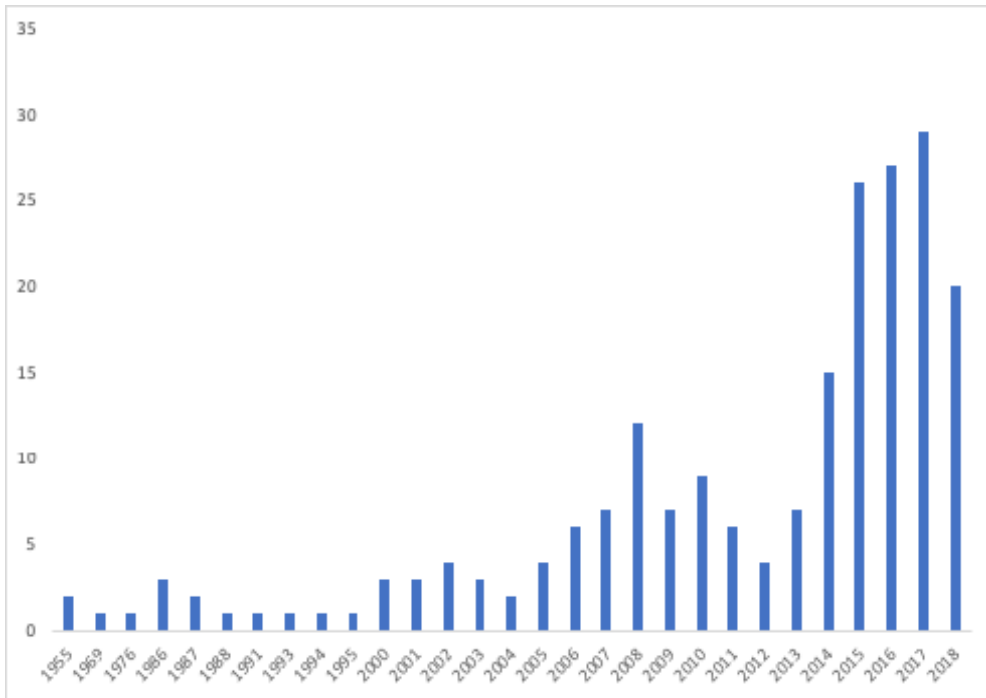
In 2014-15, the Government of India had allocated, through its various schemes, about USD 2 billion towards startup incubation and investment. As of 2019, there were 13 central government ministries and departments that were supporting incubators (Table 2). In total, 284 incubators were identified in India and they included both government supported and private incubators. In the following sections we analyse various characteristics of incubators and key government policies supporting them.

## Landscape of Incubators

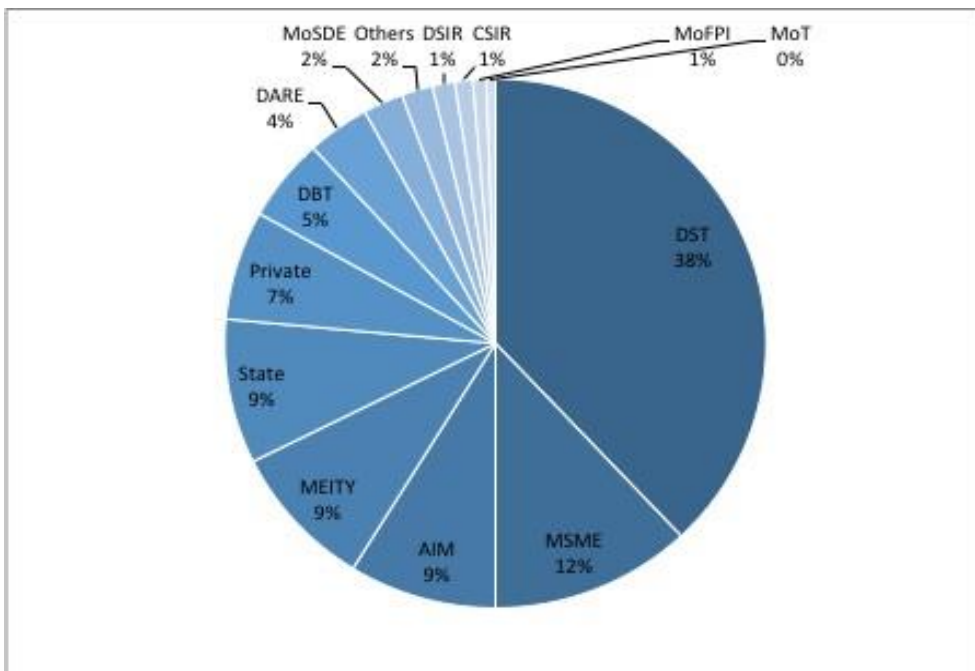
The database of 284 incubators was analysed from various perspectives, including their age, tenure, focus areas, geographical locations to arrive at a landscape of incubation in India.

**Age and tenure.** Of the 284 incubators, over 90% were established post 2000. Of which, about 70% (about 220 in number) are less than 10 years old (set up between 2010-2019; Figure 1). 103 incubators (~35%) were set up post 2015. Most of those founded before 2000 were set up as entrepreneurship support centers under various schemes of DST and MSME (such as those mentioned earlier). This spike in number of incubators in 2015 can be linked to the push by the Government of India towards promoting startups particularly with the institutionalising of the Startup India scheme in early 2016 which included a variety of interventions such IPR facilitation, tax breaks, and funding opportunities in addition to enhancing infrastructure through incubation (Startup India, 2019). With the acceptance and popularity of the incubation model older entrepreneurship support centers were also renamed as incubators under relevant schemes of various ministries.

**Figure 1: Founding Years of Incubators 1955 – 2018**



**Figure 2: Incubators Affiliated to Government Schemes and Bodies**

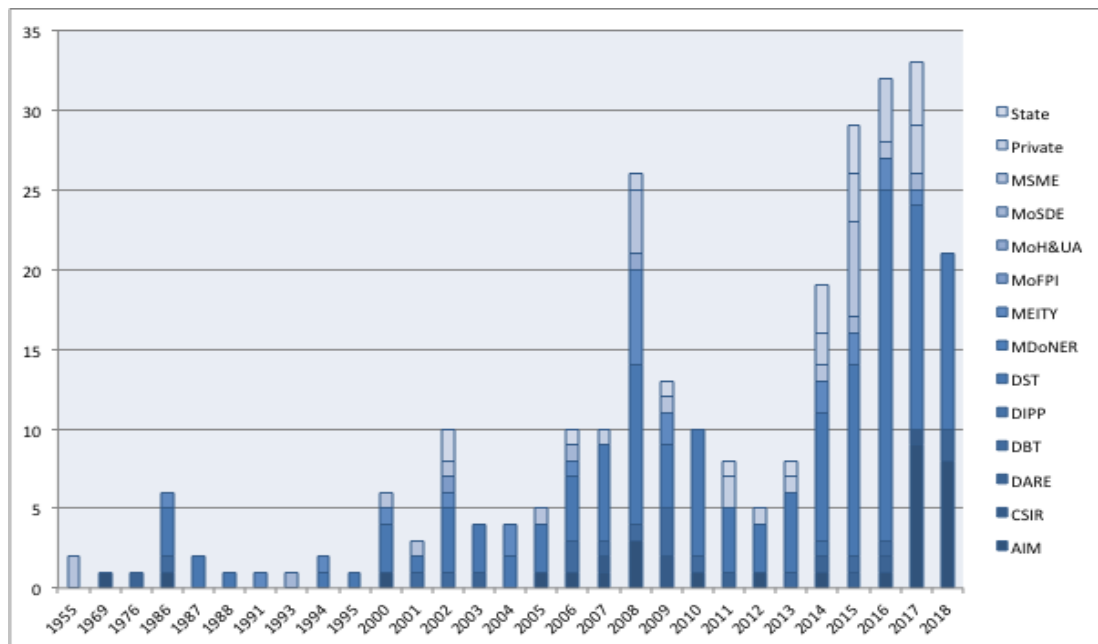


**Table 2: Affiliating Government Bodies**

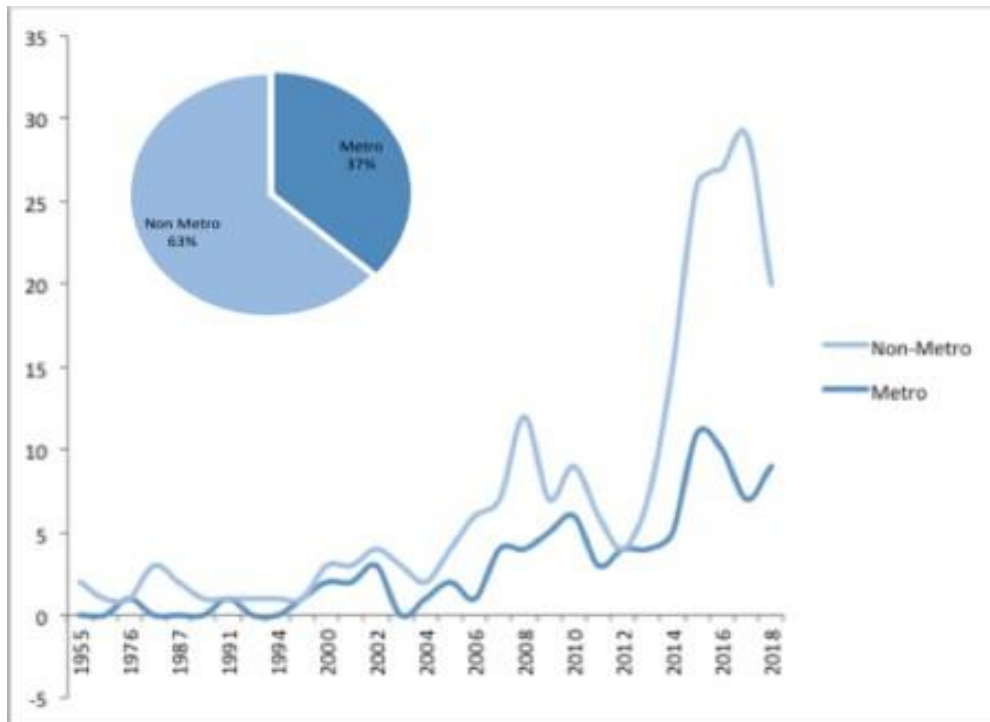
Abbreviation	Full Name
AIM	Atal Innovation Mission, NITI Aayog, Government of India
DARE	Department of Agricultural Research and Education, Ministry of Agriculture and Farmers Welfare, Government of India
DBT	Department of Biotechnology, Ministry of Science and Technology, Government of India
DoS	Department of Space, Government of India
DSIR	Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India
DST	Department of Science & Technology, Ministry of Science and Technology, Government of India
MDoNER	Ministry of Development of North Eastern Region, Government of India
MEITY	Ministry of Electronics and Information Technology, Government of India MoD
MoFPI	Ministry of Food Processing Industries, Government of India
MoSDE	Ministry of Skill Development and Entrepreneurship, Government of India
MoT	Ministry of Tourism, Government of India
MSME	Ministry of Micro, Small and Medium Enterprises, Government of India

If we were to overlay the affiliation of incubators on their growth numbers, it becomes clear DST and AIM have been the biggest drivers of growth in the number of incubators in India (Figure 3). Among the 103 incubators set up between 2015- 2019, 59 are supported by DST, 18 by AIM and 10 are privately funded. While, the number of new incubators affiliated with DST kept rising almost consistently over the last decade, about 20 of the 33 incubators affiliated with (AIM) were founded between 2017 and 2019.

**Location.** Over 60% of the incubators are housed within educational institutions and the other 40% are business led incubators (such as Coir Board, ICICI etc.), housed in foundations set up by industry bodies (such as Wadhvani Foundation, Deshpande Foundation, FICCI etc) and business parks set up by various ministries (such as the BioTech Business Parks).

**Figure 3: Growth in Incubators According to Affiliation**

South India (often referred to as the area covered by the states, Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu) continues to be the most vibrant incubation geography over the last decade (Figure 5). Out of the 130 incubators in this region, 43 are in Tamil Nadu and 32 in Karnataka. The large number of incubators in Tamil Nadu could be attributed to the higher density of higher education institutes (Department of Higher Education, 2017-18). Our data also confirms that 85% of the incubators in Tamil Nadu are housed in universities and educational institutions.

**Figure 4: Location of Incubators – Metros/Non Metros**

Approximately 40% incubators (about 100) are located in large, metro cities, and growth of incubators in non-metros is seen only recently (Figure 4). Over the last three years (2015-2018), most incubators have been set up in the states of Gujarat, Maharashtra (West India) and Karnataka (South India). During this period, there was also an effort to set up incubators in some difficult-to-reach areas, particularly in the North East and historically disturbed regions like Jammu and Kashmir in a push towards facilitating entrepreneurial activity here.

**Sectoral Focus.** Analysis of sectoral and industry focus on incubation shows that 30% incubators (about 85 in number) either have multiple focus areas or are agnostic to the sector of the enterprise they support. Information and Communication Technology (38%) and Agriculture (19%) sector rank the highest (Figure 6).

Figure 5: Distribution of Incubators across States

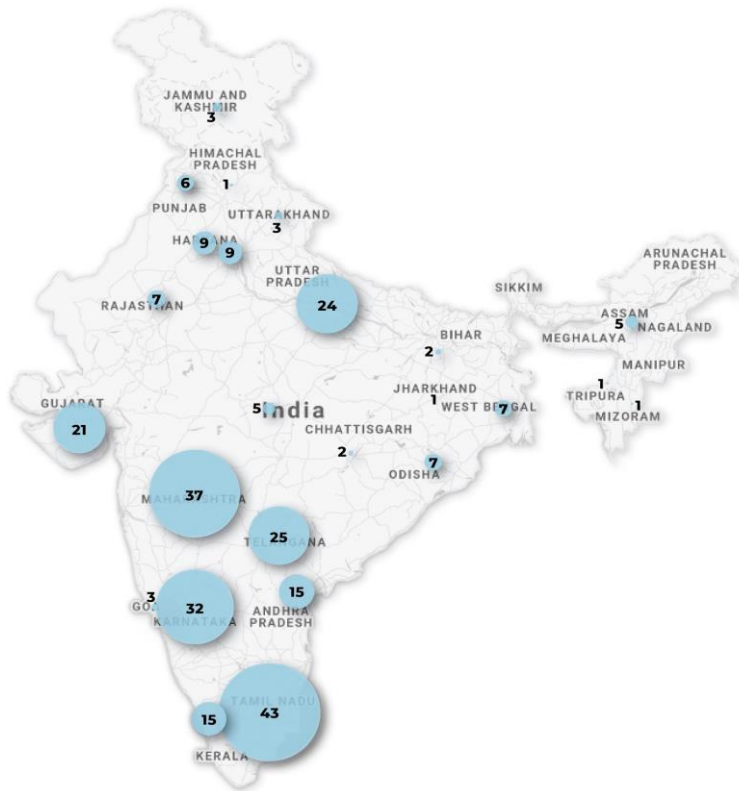
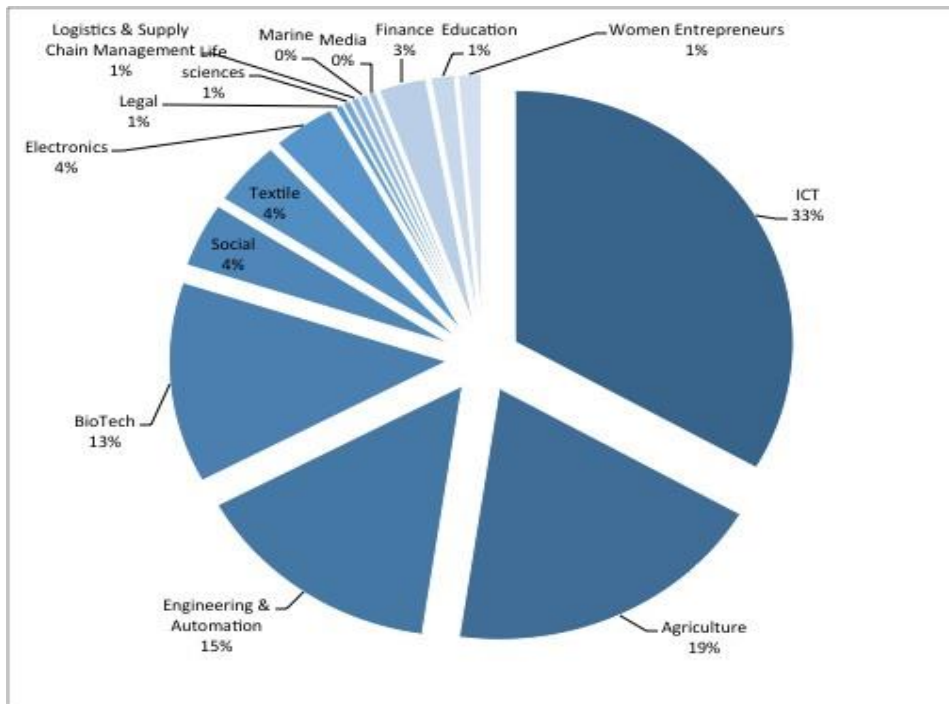


Figure 6: Sectoral Focus of Incubators



**Services offered.** Nearly all incubators mention their physical infrastructure as one of the critical offerings for the startups. Many incubators highlight the availability of specialised labs, equipment and infrastructure. Most incubators also mention providing value added services like mentoring, assistance with various IPR processes, legal, accounting and other business services. About 60% incubators also make a specific mention of providing access to capital.

**Comparing prominent incubation policies.** Given that over 90% of incubators are supported under a government scheme, we analysed the incubation policies of the top four government bodies supporting incubation (Figure 2) – DST, AIM, MEITY, and MSME.

**MSME.** This Ministry established NSIC in 1955 to support and promote skill-based small businesses making it one of the oldest known governmental institutions supporting small businesses. Over its history (~ 60 years), NSIC has undertaken various initiatives largely aimed at enabling small businesses with inputs around tendering, market access and intelligence, promotion, credit and financing support, and training. As of 2018, NSIC had over 80 training-oriented incubators to offer skill-based training and subsequent support to trainees to establish their businesses. In 2008, MSME undertook setting up incubation centers to tap into and support the creativity and spirit of ‘individual innovators’.

In 2015, MSME launched a three-year-long scheme - ASPIRE - with an objective to set up (a) Livelihood Business Incubators (LBI) for rapid incubation involving skill building and setting up of live demo projects and (b) Technology Business Incubators (TBI) supporting existing incubators in academic institutions. By 2018, 74 LBIs and 11 TBIs were set up.

**DST.** The largest supporter of incubation in India, DST, through NSTED Board, runs a scheme called NIDHI TBI. The Board outlines several conditions for running and operating a NIDHI TBI including requirements for the age of the host institutions, incubator’s legal structure, area, and facilities such as ‘Design, Dies & Development (3D)’ rooms, meeting rooms, video conferencing facility, high bandwidth net/WIFI, co-working space, recreational facilities, etc.,’ in addition to having a social media presence and website of the incubator and each incubated company. NSTED Board also lays down guidelines for the incubator to unambiguously design and implement the selection and graduation requirements and timelines for the incubated companies.



**MEITY.** The Technology Incubation and Development of Entrepreneurs (TIDE) to set up and support Technology Incubation Centres (TIC) in academic institutions was launched by MEITY in 2008. The objectives of this scheme include bridging the gap between R&D and commercialisation, promoting R&D that is more product oriented, and encouraging and accelerating development of indigenous products in electronics and information technology.

The TIDE scheme specifies requirements about the selection, infrastructure, financial support and graduation of the incubated companies. Under TIDE, a significant part of the financial support given to incubators is for investment in startups. The scheme also mandates that incubators provide physical space for a period of two years and support, as needed to the startups.

**AIM.** In 2016, the Government of India launched the ‘StartupIndia’ programme to add thrust on innovation and startups. In this direction, NITI Aayog, a policy think tank headed by the Prime Minister of India, instituted AIM with an initial financial outlay of about INR 1.5 billion. An expert committee on innovation and entrepreneurship was constituted to advise on the mandate, deliverables and scope of AIM (Khanna, 2015).

Designed to function as a platform for promotion of innovation and entrepreneurship, AIM’s vision document had the goal of setting up 35 new incubators in the private sector and supporting an equal number of existing ones mainly housed within universities and academic institutions. The new incubators were to be set up solely by AIM or in collaboration with other government bodies like DST, DBT, MEITY, MSME, Department of Higher Education, and Department of Industrial Policy and Promotion.

As a departure from other policies and schemes, AIM details the parameters to evaluate incubators (Table 3), expects them to use the grant to refurbish the physical incubation facilities, enhance capacity, including team, infrastructure, equipment, services, seed funding support, training programs, outreach and/or other related activities, and building the entrepreneurship ecosystem for incubatee startups.

**Table 3: AIM's Criteria to Evaluate Incubators\***

Quantum Metrics (count of)	Impact Metrics	Financial Metrics
<ul style="list-style-type: none"> <li>• Startups supported till date</li> <li>• Startups graduated/exited till date</li> <li>• Physically incubated startups</li> <li>• Virtually incubated startups</li> <li>• Associated academic institutions</li> <li>• Entrepreneurship development workshops organised annually</li> <li>• Training programs organised</li> <li>• Active mentors</li> <li>• Active industry/corporate partnerships</li> <li>• Personnel at the incubation centre</li> </ul>	<ul style="list-style-type: none"> <li>• Number of jobs created per startup each year</li> <li>• Annual taxes paid by supported startups</li> <li>• Number of technologies patented</li> <li>• Number of awards received by startups</li> <li>• Cumulative sales turnover of graduated startups</li> </ul>	<ul style="list-style-type: none"> <li>• Quantum of seed funding corpus</li> <li>• Non-grant revenue, not including any interest on seed fund</li> <li>• Sustainability (without access to any governmental or non-governmental grants)</li> </ul>

\*the three categories of metrics are a result of the authors' analysis; this is not how it is represented by AIM

These four incubation support policies can be placed chronologically beginning with MSME, followed by DST and MEITY and AIM (Figure 8).

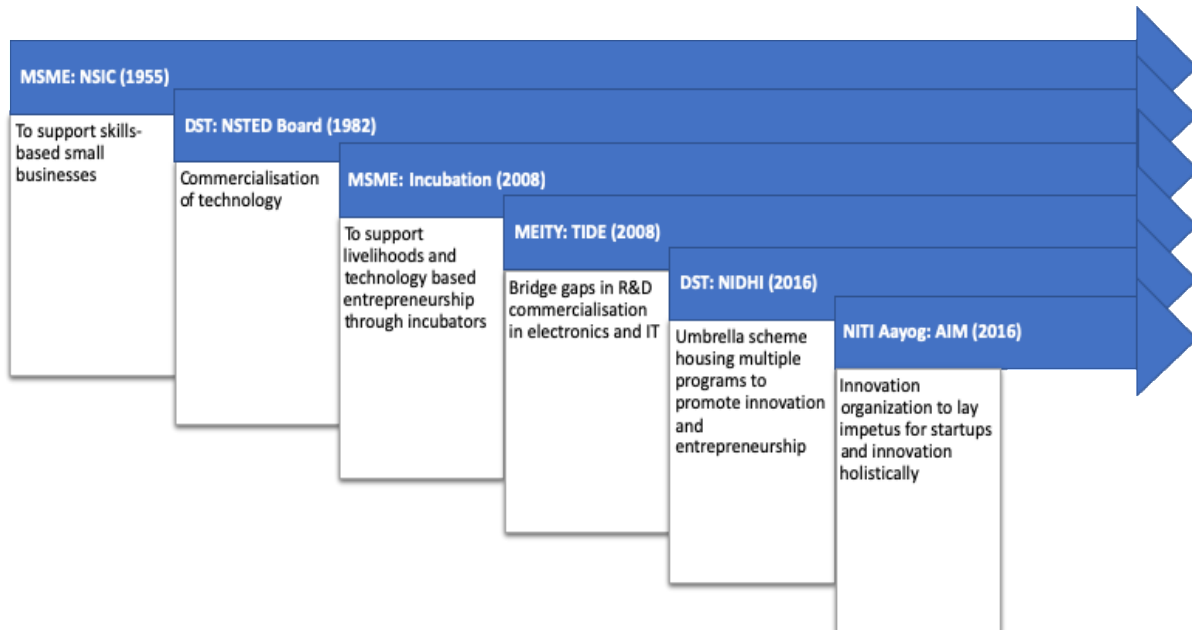
**Figure 8: An Overview of Incubation support from Central Government Institutions**

Table 4 compares the expectations from incubators, as laid down by currently operational schemes of respective government bodies. Juxtaposing these policies, we find an evolution in the understanding of incubation and expectations from incubators. We find some shared objectives between DST's NIDHI-TBIs and MSME's ASPIRE schemes – both focus on aiding commercialisation and providing value-added services; AIM does not mention commercialisation as an objective. The objectives of NIDHI TBIs also extend to promotion of 'technology and knowledge' in startups.

DST supported startups are expected to work in areas of national priorities, as against MSME's focus on agriculture. MEITY operates in the electronics and IT space, while AIM doesn't mention any focus areas. While DST and MSME focus on incubators 'providing' value added services, MEITY's TIDE also mentions 'mobilising' these services. AIM's policy demonstrates sensitivity to the nuances of the incubation processes. This policy mentions how incubators could develop ecosystems by conducting programs, networks, and events. AIM also emphasises on the creation of value-added services by incubators, particularly around the objectives and goals of mentoring and creating networks.

**Table 4: Comparison of Objectives and Expectations from Incubators**

	MMSME - TBI	DST – NIDHI TBI	MEITY - TIC	Niti Aayog - AIM - AIC
<b>Primary Objective</b>	Promote speedy commercialisation of technology developed in the host institute	Provide a platform for speedy commercialisation of technologies developed by the host institution or by any academic/technical/R&D institution or individual	- no mention -	Assist incubatees in creating sustainable, scalable and profitable business models
		Promote new technology/knowledge/innovation based startups	Transparent selection process-on the basis of detailed techno-commercial proposal	
			A committee to evaluate the proposal on its technical merits and commercial viability	
		The committee would also recommend the level / duration / and terms of support to the entrepreneur(s)		
<b>Sector Focus</b>	Promote ideas and technology in agriculture	Create jobs, wealth and business aligning with national priorities	- no mention -	- no mention -
<b>Building Networks</b>	Network between industry, academia and financial institutions	Build a startup ecosystem, establish a network between academia, financial institutions, industries	- no mention -	Create a strong network of mentors who would provide sector specific knowledge and practical guidance
				Conduct inspirational programs

				Forge partnerships and networks with academia, industry, investors, incubators and others.
<b>“Value-Added Services”</b>	Support development of new enterprises.	Provide cost effective services to startups like mentoring, legal, financial, technical, intellectual property related services.	Mobilise technical/mentoring /managerial/financial /administrative/legal support	Enable access to prototyping facilities, test beds, markets, and pilot implementation
				Provide training and mentorship
<b>Physical Infrastructure</b>	- no mention -	Earmarked funds for infrastructure development	Sufficient operating space – on rent for two years	Physical infrastructure and support services
<b>Incubator’s Teams</b>	- no mention -	- no mention -	- no mention -	Build a team with adequate knowledge and experience to guide startups on business plans, investments, and networks.
<b>Source</b>	Guidelines of ASPIRE, 2018 www.aspire.m sme.gov.in	Guidelines and Proforma for submission of proposal, 2016 www.nstedb.com	Technology Incubation and Development of Entrepreneurs Scheme, 2018 www.meity.gov.in	Guidelines for setting up of Incubators under Atal Innovation Mission, 2017 www.niti.gov.in

### Services and Activities of Incubators

With the aim of getting a deeper understanding of the services, activities, experiences, and challenges of incubators, data was collected using an online survey from 22 incubators affiliated with one of the schemes from the previous section. It was assumed that because all incubators were part of the same scheme and consequently, had similar expectations placed upon them as well as had access to similar resources, any difference in their performance may

be attributed to their characteristics (such as location) or other internal processes. Of the 22 incubators, 16 were affiliated with multiple government bodies and schemes, including DST, MSME, MEITY, and Department of Biotechnology. One incubator was established as early as 1986, three in 2016, and the rest in the interim period (Table 5).

Eight and six incubators are in South and West India, respectively, while others spread across other regions; one incubator is located in the difficult-to-reach North East region. Three incubators are based in universities while the remaining 19 are housed in higher educational institutes such as Indian Institute of Technology (9), Indian Institute of Information Technology (3), Indian Institute of Management (2), and National Institute of Technology (2).

**Table 5: Incubators under the Analysed Government Scheme**

Incubators <sup>a</sup>	Founding Year	Region	Type of City	Affiliation	Support provided to portfolio companies*	Kind of programs and initiatives <sup>#</sup>
A	NA	West	Non-Metro	Single	4,5	6
B	2010	South	Metro	Multiple	3,4	1,2,3,4
C	2016	North	Non-Metro	Single	3,4,7	1,2,4
D	2008	North	Non-Metro	Multiple	3,4,5	1,2,4
E	2013	North	Non-Metro	Single	4	4
F	2004	West	Metro	Multiple	2,3,4,5,7	1,2,3,4,6
G	2009	North East	Non-Metro	Multiple	3,4,5,7	2
H	2006	South	Metro	Multiple	3,4,5,7	1,2,3,4
I	2016	West	Non-Metro	Multiple	1,3,4,5,6,	2,3,5
J	1992	North	Metro	Multiple	3,4,5,7	2,3
K	2009	South	Metro	Single	3,4,5,7	1,2,3,4,6
L	2008	South	Metro	Single	3,4,5,7,9	1,2,3,4

M	2000	South	Metro	Multiple	3	2
N	2012	South	Non-Metro	Single	1,3,4,5,7	2,3,4,6
O	2004	West	Non-Metro	Multiple	3,4,5	1,2,3,4
P	1991	South	Metro	Single	3,4,7	6
Q	2011	West	Non-Metro	Single	3,4,7	2,4,6
R	2008	Central	Non-Metro	Single	3,4,5,7	1,2,3,4
S	2016	South	Non-Metro	Multiple	3,4,7	2
T	1986	East	Non-Metro	Multiple	3,4,5,7,8	1,2
U	2009	East	Non-Metro	Multiple	3,4,5,7,9	1,2,3,4,5,6
V	2008	West	Non-Metro	Multiple	3,4,5,7,10	1,2,3,4

<sup>a</sup> Names anonymised

\* (1) Access to R&D facilities; (2) Branding; (3) Business advise; (4) Connects to mentors, domain expert, customers; (5) Fund-raising; (6) Human resources and interns; (7) Legal and financial assistance; (8) Marketing; (9) Networking; (10) Physical infra support

# (1) Accelerators and skill development programs; (2) Business plan and idea competitions; (3) Demo days; (4) Hackathons; (5) Mentoring clinics; (6) Seminars, workshops and summits

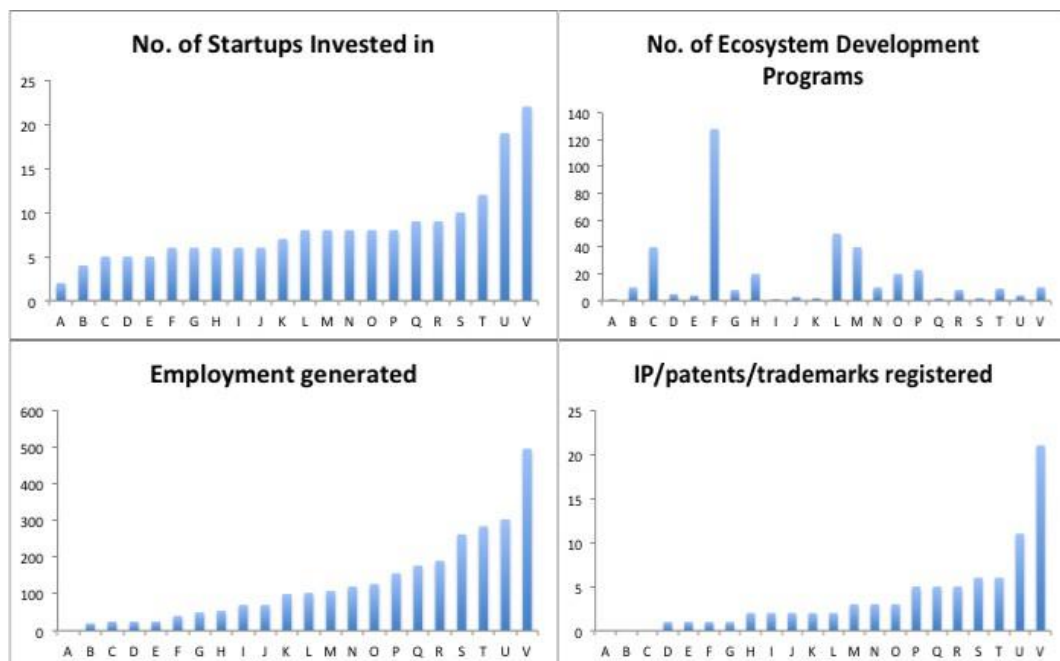
**Incubation activities.** Referring to Table 5 business advice, connection with mentors, domain experts and customers etc., and assistance with fund-raising are the most common services that the studied incubators offer to startups. Assistance with branding (1 incubator) and support with physical infrastructure (2 incubators) are the least common. The latter lack of service may also be a function of the scheme not providing any financial assistance for creation or development of physical infrastructure. Most incubators run accelerators, competitions for business plans, and demo days (where startups pitch to angel investors). Only one incubator holds mentoring clinic programs.

**Performance disparity amongst incubators.** Figure 8 presents the performance of incubators measured in terms of numbers of startups invested in, ecosystem development programs, IP/patents/trademarks registered, and jobs created by startups.

The range of startups invested in ranged from one (Incubator A) to over 20 (Incubator V). Incubator V organised approximately 15 programs, while incubator F, housed within a prestigious technology institution, held more than 120 ecosystem development programs and invested in six startups. Incubator G (the only incubator in the North East region) was found to be performing below average on most parameters (Figure 8).

The primary concern or challenge, mentioned by incubators, was developing ‘appropriate’ infrastructure with specialised equipment that suited the needs of the startups. With regard to investment, incubators were concerned about the inflexibility of the scheme. Some incubators preferred extending debt or grants as against making equity investments. This concern was primarily linked to regulatory complexity of incubators in educational institutions making equity-based investments in companies. No incubator mentioned physical infrastructure or the amount of investment available as a challenge. This may be largely because most incubators are hosted within educational institutions which allot substantial physical space for incubation.

**Figure 8: Disparity amongst Incubators**





We also find that incubators typically struggle with managing the ‘softer’ aspects of incubation such as getting access to subject matter experts and mentors and establishing connects with the industry and government departments to facilitate commercialisation. Some incubators also found it challenging to provide adequate support with the legal processes of investment, filing for IPs, and onboarding talent.

### **The Demand Side Perspective**

In-depth interviews with 24 entrepreneurs (from one of the incubators) were open coded (Charmaz, 2006) to understand their expectation from the incubator. Codes from all transcripts were pooled and then classified into two broad headings – ‘Has’ and ‘Needs’ (Figure 9) – to indicate the services currently offered by incubators and those desired but not necessarily offered by them.

Within ‘Has’, the most prominent services and support include brand building/reputation, financial resources, business resources, confidence building, networks, and personal mentoring and coaching. Participating entrepreneurs often identified the incubator managers as ‘friends who help’. Entrepreneurs also highlighted how incubator managers infused optimism, hope and confidence, which helped them persist on their path. Continued association with the respective manager even after s/he had moved out of the incubator highlighted the value of personal connect of the incubator managers with entrepreneurs. The interviews also revealed that virtual or remote incubation was seen as less effective vis-à-vis the startup being physically located within the physical infrastructure of the incubator.

The three key services that startups ‘Need’ from incubators – (a) connect with specialised mentors, subject matter experts, customers and vendors, (b) help in building their own brands, and (c) processes to remain engaged (especially critical for virtually incubated startups).

**Figure 9: Entrepreneurs' Assessment of and Expectations from Incubators**

### Discussion and Lessons Learned

As we trace the history of incubation in India it becomes evident that until 1991 the focus was on supporting the rural, under-educated youth and livelihood oriented, and small businesses (as found in the policies of MSME, setting up of NABARD, and SIDBI). However, post 1991 the focus has shifted to supporting urban, well-educated youth, creating innovation driven, high value businesses (as evident in the policies of DST and AIM). Abstracting from the data also reveals insights about the incubation ecosystem, landscape, and practices.

### The Salient Role of the Government

The government has had a large role to play in evangelising incubation. The number of ministries supporting incubation as well as improved versions of existing policies being launched by various government bodies stand testament to this.

The government-academia partnership has been among the most significant contributor to growth of incubation in India. Our data substantiates that the government's incubation activities have been carried out mainly in partnership with higher education institutions. Several among the prominent institutions (eg. IISc, IIT Delhi, IIT Mumbai, IIM Ahmedabad) started with theoretical work on innovation led by faculty, moving on to take innovations to market, setting up of technology transfer offices (commonly known as TTOs), and supporting

students who wanted to become entrepreneurs out of their own resources (Narayanan & Shin, 2019). When the policies of the government were favourable, the same institutions became the first beneficiaries of the financial support for incubation. We believe that this government-academia partnership has been a win-win for both sides - the centres for entrepreneurship, innovation and incubation received financial support and gained legitimacy for their activities, while the government found reliable homes to test their policies and take their agenda forward. It is also easier for the government to oversee the utilisation of the financial support disbursed to an academic institution vis-à-vis a private entity. Our findings also show that most successful, well-known and highly regarded incubators, housed within educational institutions in India, crafted their strategy in line with the local ecosystem and strengths of the incubator. Partnering with academia instead of creating its own incubation infrastructure also appears more efficient because it would facilitate a significant part of the resources being used to support startups rather than spend on creating incubation infrastructure.

### **Incubation Presence is Geographically Lopsided**

Though there are 284 incubators in India (as presented earlier), we believe that there is still scope for more, especially in certain regions. Figure 5 presents the lopsided density of incubators in India. More incubators are needed in central, eastern and north-eastern India. India's development, in terms of infrastructure, education access, and economic growth is not uniform (Rao, 2017). East India has large minority groups, lower economic growth, and citizens are often seen as low on entrepreneurial inclination (Goel, Vohra, Zhang, & Arora, 2007). Notwithstanding the slow germination of incubation activity, there is sparse awareness and engagement with entrepreneurship in the east and north-east India (Vohra, Mendonca, Kishore, Bhat, & Verma, 2017).

It may be argued that it is unviable to set up incubators in small towns. As part of our study, we observed an interesting experiment by Incubator V of creating regional entities that work with the local youth to stimulate innovative ideas and build enterprises. Three years of focused work towards regional outreach (to an area within 200 kms of the center) has yielded several interesting startups from far-flung areas that have had an almost negligible startup ecosystem. This substantiates that incubation requires continual nurturing ideas and evangelising

entrepreneurship. To remain viable, incubators could choose to be located in urban regions but design innovative ways to reach the semi-urban and rural areas in its region.

Yet, there is merit in incubators localising their services. Incubators could play a role in helping startups to overcome the cultural and societal lethargy in starting up (Spigel, 2017). The government bodies need to make a concerted effort in enabling incubators to energise local ecosystems and build sustainable partnerships. The incubation policy could encourage localisation of offerings by each incubator to enable adequate support to local entrepreneurs and startups. Perhaps, this could help address the current lopsidedness in incubation.

### **Need for Incubators to Evangelise**

Even though it is easy to be overawed by the number of incubators, startups, amount of investment, idea competitions etc., evangelisation and promotion of innovative ideas still needs attention in India. Given the recent focus on providing financial support, it may be easy to overlook that the core of a startup is the entrepreneur's ability to identify either unsolved problems or newer solutions for difficult problems; the seed of enterprise in the innovative idea. At an incubator based in Western India (out of the top ranked business school in the country) where the authors are involved in various roles, experiences of frustration with the 'clonish' nature of the ideas are common. In an idea competition held in 2018, where one of the authors participated, out of the fifteen top ideas chosen among 19000 submitted ones, six were on developing food delivery apps; about ten years ago, five of the top fifteen ideas were to create devices to clean fans! Thus, emphasising the need for incubators to find continuous ways to engage people to think of ideas, have them evaluated and improved.

### **Incubation is more than Physical Infrastructure**

Government regulation, availability of cheap capital, qualified personnel, and access to markets prevent failure of startups. An incubator can help navigate the challenges that startups face owing to their smallness or newness (Mireftekhari, 2017). Starting from access to cheap capital, relevant mentorship, training to fill skill gaps, access to hard-to-reach networks, creation of a mutually supportive community, referrals to expert services at reasonable costs, are few of the services that effective incubators provide (Table 5). Our data shows that most incubators are unable to provide the 'softer' services (particularly concerning relationships and people). While, the evolution in incubation policies is a promising trend (Table 4), most government

policies do not focus on incubators' inputs, particularly in the form of softer skills. There is a need for incubator managers to connect better with startups and provide inputs on softer aspects, in addition to infrastructure, networks etc.

### **Capabilities of the Incubation Personnel Matter**

An incubator's ability to provide highly specialised and critical services to startups is linked to the quality of its talent. Our study also confirms that dedicated managers, who understand the enterprise creation process and are motivated to work for startups, are critical for an incubator's success. However, talent for the incubator is difficult to find and retain (Akcomak, 2009; Somsuk, Wonglimpiyarat, & Laosirihongthong, 2012). We find that the government policies do not pay attention to this issue, nor do they earmark specific support for the incubators to hire and build their talent adequately. It may be said that incubation in India still functions under a landlord model (providing inputs such as physical infrastructure). Practicing incubation at a more sophisticated level, i.e. facilitating the startups' take-off, would require upgrade of skills and human capital of incubator personnel (Akçomak, 2009; Ayatse, Kwahar, & Iyortsuun, 2017; Hackett & Dilts, 2004).

### **Measuring Success of Incubators**

Data on number of startups incubated, applications received, services provided by the incubator, satisfaction with support provided by the incubator, innovations by incubators, extent and effectiveness of curation of human, financial, and other resources was unavailable for a large majority of the incubators included in the study. Measuring the impact and effectiveness of incubators is an area that remains neglected. The aphorism 'what gets measured gets improved' (credited to Peter Drucker) also stands true for incubators. While the incubation policy of AIM mentions performance measures, we do not know the outcomes of it being implemented. Detailed indicators of performance have most often been developed by institutions that support incubation (Torun, Peconick, Sobreiro, Kimura, & Pique, 2018). We believe that given the diversity amongst incubators, relevant performance metrics need to be devised to measure the performance robustly by incubators, policy designers, and researchers of incubators. For instance, new incubators may be assessed on the startups that they are able to attract, while more mature ones may be evaluated on the success of supported startups as well as the ability to generate resources and become sustainable.

**Conclusion**

To conclude, incubators catalyse economic growth and support fragile enterprises spawned and conceived largely by first generation entrepreneurs. They make it possible for innovative technologies and research originating in universities and research labs to be converted into businesses, therefore unlocking economic and social value. The partnership of government and academic institutions for nurturing of startups through the incubator is symbiotic. Most importantly, for incubation to remain effective and make a stronger impact, onboarding talented and driven incubator personnel and developing relevant performance measurement metrics are imperative.

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