



## **START-UP ECOSYSTEM: ANALYSING THE ROLE OF ACADEMIC INSTITUTIONS, UNIVERSITIES BUSINESS INCUBATORS IN SUPPORTING ENTREPRENEURSHIP.**

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### **Abstract**

India is acknowledged as one of the hotbed of entrepreneurship with over 20000 start-ups across various domains and focus areas. India's innovation has been led by policy driven incubation systems. This study is focussed on the role of academic institutions in supporting entrepreneurship among students' community and building a strong startup ecosystem. The paper identifies the critical factors that facilitate the growth of start-ups taking birth in academic incubators. Considering both stakeholders- incubator and incubatee, the study identified factors like financial support, network and communication, location, management of incubator, quality of incubator and facilities provided as critical for the success of academic incubators. This study also provides significant insight to academic institutions for developing an efficient entrepreneurial ecosystem by analysing the performance of SINE, (Society for Innovation and Entrepreneurship), a technology business incubator launched by IIT Bombay.

**Keywords:** Academic Institutions, Business Incubators, Entrepreneurship, entrepreneurial ecosystem, Indian Start-up ecosystem, Start-up

### **1. Introduction**

Several studies have observed that the start-up ecosystem of a country plays a critical role in its economic growth and development through job creation, discovery of innovative goods and services, and infrastructure development (Mazanai and Fatoki, 2012; Ghani et al., 2013; Krishna and Subrahmanya, 2015; OECD, 2016; Okrah et al., 2018). A start-up can be defined as an early stage newly established company or venture that is in the phase of development and needs market. It can also be described as an intellectual property-based technology product/platform/e-commerce that meets customers' requirements through a digital platform (NASSCOM, 2016).

India is acknowledged as one of the hotbeds of entrepreneurship with over 20000 start-ups across various domains and focus areas. The rate of growth in the Indian ecosystem is inspiring. A recent

study also ranked India third, after USA and China, on the number of incubators (Sharma and Vohra, 2020). The two major factors that have contributed towards the growth of the Indian start-up ecosystem are: the mammoth size of the domestic market along with a huge base of internet users, and low cost of doing business because of proximity between customers and vendors.

India's innovation has been led by policy driven incubation systems. The Government of India's initiatives such as 'Startup India', 'Digital India', and 'Make in India' have given an impetus to India's start-up ecosystem launching it in a sustained growth path. Various state governments' start-up initiatives are further supporting this growth phase of start-ups in India. Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry (MOCI), Government of India (GoI) specifically emphasised focus on start-ups in its Industrial policies. As per DPIIT sources, as on December 15, 2020, there were more than 1,17,000 entrepreneurs registered on the Startup India portal, out of which over 40,000 are recognised start-ups as per DPIIT's definition of start-ups. Additionally, the government has announced various compliance related relaxations for start-ups: exemptions under income tax, labor and environmental laws, faster exit (within 90 days) and relaxed norms for bidding for government tenders (Adhana and Kumar, 2020). Currently, there are more than 14,600 recognized start-ups, 270 incubation and business acceleration programs, 200 global and domestic venture capitalist firms supporting home-grown start-ups, and a fast-growing community of 231 angel investors and 8 angel networks (Ministry of Commerce and Industry, 2018). The government-academia partnership has been among the most significant contributor to growth of incubation in India.

The present study is focussed on the role of institutions of higher education as business incubators and facilitators of the Indian start-up ecosystem. Until the early 2000s closed innovation was the form adopted by companies, in which research and development were conducted only in their own laboratories using their own funds. But, in the last decade, open innovation emerged as a new model, in which companies take advantage of the creativity of customers, suppliers, universities, research institutes or independent inventors, through partnership, thereby obtaining more innovation, faster and with less spending.(Chesbrough, 2006).

In the early 1980s, a concept was introduced that universities / academic institutions must be entrepreneurial entities, could be involved in economic growth.

Academic institutions and universities play an important role in the entrepreneurial ecosystem. By focussing on creating new inventions and knowledge, they serve as an important output of knowledge and innovation. There is a significant link between the level of entrepreneurial activity and desirable effects such as the competitiveness of an economy, job creation, unemployment reduction, innovation, and economic and social mobility (Jansen et al., 2015). Academic entrepreneurship has therefore become a priority for policymakers from inside the universities as well as the local governments (Potter and Storey, 2007). Universities and governments are trying to create highly innovative science parks where young entrepreneurs lead innovation and,

ultimately economic growth. Universities are encouraged to observe and analyse their own entrepreneurial ecosystems: the organizations and climate that support starting students in building a successful enterprise.

In this context, the present study is an analysis of the role of academic institutions in the growth of the Indian start-up ecosystem. It identifies the critical factors that facilitate the growth of start-ups taking birth in academic incubators. It gives significant insight to academic institutions for developing an efficient entrepreneurial ecosystem by analysing the performance of SINE, (Society for Innovation and Entrepreneurship), a technology business incubator launched by IIT Bombay.

The study aims to identify the role of academic business incubators to support entrepreneurial and developing startup companies, with the aim of activating the role of academic institutions business incubators to transfer scientific research to innovation and create startups for students' community. Aim and importance of the study :

## **2. Literature Review**

Baron and Shane (2003) explain that the entrepreneurial process unfolds over time and moves through a number of different phases. These phases are namely: (1) the idea for new product or service and /or opportunity recognition, (2) initial decision to proceed, (3) assembling the required resources (information, finance, and people), (4) actual launch of the new venture, and (5) building a successful business and finally harvesting the rewards. Events are viewed as outcomes during each phase that are affected by individual-level (skills, motives, characteristics of entrepreneurs), group-level (ideas, inputs from others, effectiveness in interactions with venture capitalists, customers, potential employees) and societal-level factors (government policies, economic conditions, technology, etc.). It can be seen from the above explanation, that once the idea is formed / recognized and the entrepreneur decides to proceed with that idea, incubators could play a significant role from the point of assembling the resources to harvesting the rewards.

Incubators act as an active tool to support the structure of new businesses and provide them the assistance and support they need to grow. Rice and Matthews (1995) define an incubator as a business assistance program that provides entrepreneurs with appropriate advice and counsel and serves as a switching centre to other people and resources, as needed. Typically, incubators comprise three components: a person who provides advice/mentoring and access to resource network; shared services (i.e., a company located in the incubator does not have to outlay funds for services like phone, internet or photocopying); and flexible space, rented on a monthly basis, that can be expanded or contracted as needed. Incubators focus on identifying high-potential ventures and supporting them only to the extent needed. The two major types of support that incubators render to entrepreneurs are low-cost shared resources- financial, knowledge, expertise and infrastructure; and networking opportunities-investors, suppliers, employees and customers (Wasdani et al., 2022).

Arlotto et al. (2011) questioned 404 entrepreneurs in 80 incubators in France to study the social utility of business incubators. They found that the incubators allow the incubated companies to be more efficient and perennial than start-ups which don't use their services. The major attraction of business incubation is based on their ability to generate jobs at low public cost that remain in the community and lead to economic development (Al-Mubarak and Busler, 2012). The economic model of business incubators implies that they must constantly find external sources of financing because the incomes resulting from the sale of services to the incubated companies are not enough to ensure their finance equilibrium. Consequently, majority of incubators directly or indirectly use public funds. The key design parameters of incubator success include the selection criteria for the incubatee firms to help incubate the right candidates in the right environment at one end and devise an exit strategy at the other (Bruneel et al., 2012).

Al-Mubarak and Busler (2012) studied incubator models in Europe and the Middle East and found that incubators goals focus on fostering entrepreneurship, jobs creation and technology commercialization. They found that success of incubates to sustainable graduation is based on: clear objectives, incubators location, access to services, employment creation, and economic development strategy. Their findings also suggest that business incubators could be valuable in helping develop local economies, promote technology transfer, create new enterprises, and generate jobs in developing countries.

Jyoti and Singh (2020) examined the relationship of socio-economic characteristics of start-ups with their size in Gujarat, India. They used primary information based on a survey of 120 founders of start-ups and assessed the determinants and factors affecting the annual sales of start-ups in Gujarat. Through their empirical research, they found that the source of funding and support from incubators are crucial determinants of start-up success. The stage of start-up, participation of founders in conferences, educational qualification and new products launched, professional connections of founders were also found to positively impact annual sales of the start-ups.

Surana and Singh (2020) studied the contribution of publicly funded incubators to strengthen of science, technology and innovation-based entrepreneurship in India. They found that effective incubation for supporting STI- based entrepreneurship extended beyond traditional incubation activities, and for such incubators to be successful, policymakers must strengthen the 'incubation system'. This involves promoting coordination between existing incubator programs, developing a performance monitoring system, and extending extensive capacity building at multiple levels including for incubator managers and for broader STI in the country.

McKinnon and Hayhow (1998) define five categories of organizational structure for incubators: (a) economic development organizations, (b) institutions of higher education, (c) for-profit entities, (d) not-for-profit entities, and (e) public private partnerships. 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

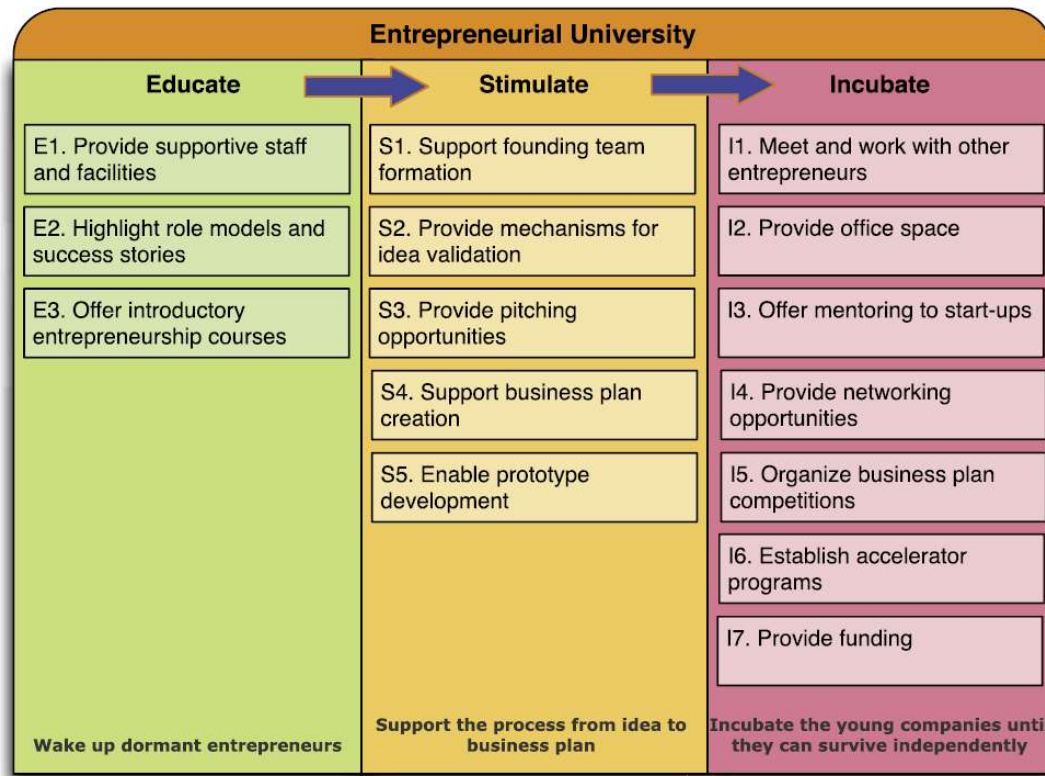
incubators that aim at commercialising technology (c) research incubators (also based in educational institutions) to valorise the research undertaken in-house, and (d) stand-alone incubators that focus on selecting and supporting nascent ventures with high potential.

Academic institutions and universities play a crucial role in developing entrepreneurship among students. The growth of the concept of the entrepreneurial university is a positive influence on the development of the innovativeness of universities. The start-up channel provides universities with a direct line to valorize and implement inventions made in the laboratories. Furthermore, as students are at the beginning of their careers after graduation, this may be one of the best times to influence them to continue as entrepreneurs. In no other settings are highly educated people at a turning point in their lives as clustered together as in academia. Universities can thus strongly support nations in their strategies of making their economies more innovative.

Jansen et al. (2015) studied the entrepreneurial encouragement offerings at academic institutions through three case studies: MIT in the United States, IIT in India, and Utrecht university in the Netherlands. They developed the Three Stage Student Entrepreneurship Encouragement Model (SEEM) as depicted in figure 1. They found that incubator services such as common working space, mentoring, networking services and funding, though crucial for entrepreneurial success, seem to change in level of demand and the university culture plays an important part in the success of incubators.

Influenced by the idea of synergistic potential of entrepreneurship patterns with entrepreneurial university concept, Doh et al. (2022) studied the entrepreneurship patterns in selected African universities and examined their potential for institutional entrepreneurial transformation. They identified and established nine patterns of entrepreneurship: two structural patterns at system levels, three at university levels and four cultural patterns at basic units. They designed a framework covering all the nine patterns and suggested that this synergistic approach provides a level playing field for analysing and transforming universities across different developmental contexts.

Colombo and Piva (2008) studied the strengths and weaknesses of academic start-ups and other new technology-based firms using secondary data. They found that the major strengths of academic start-ups reside in the lower initial funding gap and greater investments in technical activities. Conversely, they found that the major weakness of academic start-ups consists of the lack of commercial knowledge and they suffer from greater initial gaps in this field and encounter serious obstacles in implementing effective strategies to close them.



**Figure 1: The Three Stage Student Entrepreneurship Encouragement Model (SEEM) to contribute to becoming an entrepreneurial university (Source: Jansen et al., 2015).**

Finally, Soetanto and Jack (2016) found that university-based incubators overcome their shortcomings of limited financial support by helping incubatees develop strategies that are a combination of technology deployment and market exploitation (than market exploration) using the university’s research and expertise. This approach seems to contribute to better performance in terms of innovation and profitability for the spinoffs (incubatees) and the incubator. This study further contributes to knowledge regarding the factors that are crucial for the success of university-based incubators.

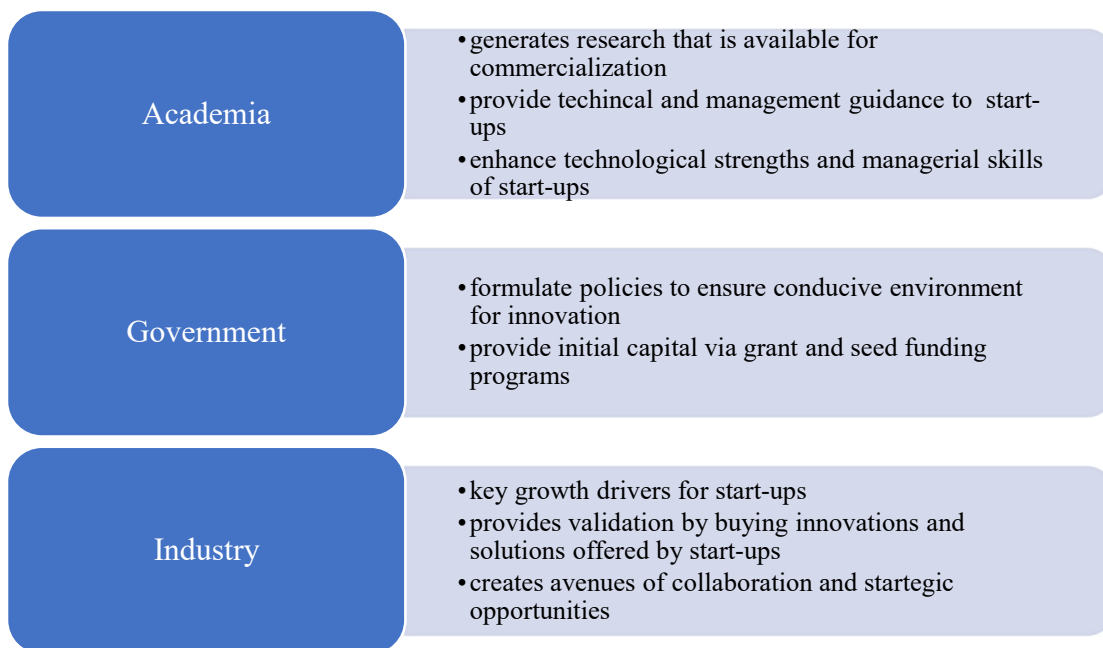
### 3. Methodology

This study is a qualitative study and done with an open-ended approach. The secondary data was extracted from various sources such as official websites, research articles and reports. Furthermore, this study employed a case study approach to identify factors that facilitate the success start-ups from university-based incubators. The case study approach is useful when there is a need to obtain an in-depth appreciation of an issue, event or phenomenon of interest in its natural real-life context (Crow et al., 2011). The case study was done on the business incubator program SINE by IIT Bombay and all the data regarding the same was obtained from its official website (<https://sineiitb.org>).

## 4. Results and Discussion

### 4.1 Critical factors for success of academic incubators

On the basis of the literature review, it is evident that incubators are crucial for start-up success. There are three types of knowledge that the incubators provide to start-ups- technological knowledge, business knowledge, and market knowledge. Figure 2 depicts the role played by each stakeholder involved in the incubator. The incubators facilitate connections of start-ups who otherwise find it difficult to reach put to the stakeholders - academic institutions, government and industry. Measuring the impact and effectiveness of incubators is an area that remains neglected. It is important to identify the factors that contribute to the success of incubators. The determinants of start-up success are determined based on the priority of the interests of the stakeholders. The stakeholders of incubators estimate that the incubators must influence survival of the firms and employment, and also the level of taxes collected. This study has identified the following factors as critical for the success of academic incubators considering both the stakeholders- the incubator and the incubate.



**Figure 2: Access provided by incubators to start-ups in their care**

#### 4.1.1 Financial support

The success of an incubator depends on the funds which it can allocate to assist its incubatees. Access to funding is a major component in creating an ecosystem that is conducive for the growth and development of business. Imperfections in the financial and credit market, lack of capital and credit constraints are major hindrances towards growth. Policymakers should recognize that policy

measures helping incubators in closing their knowledge and funding gaps are more important than policy measures that simply stimulate their creation.

#### **4.1.2 Network and Communication**

Social and business networks are key resources for incubators since they provide opportunities and improve effectiveness for entrepreneurs. Access to mentors, business partners and support during incubation is a critical factor for start-up success. The connections made with potential investors with the help of incubators is a significant factor. Within the incubator management team, comprising a personal relations officer, must encourage academic entrepreneurs to extend their network of social contacts beyond the academic community. Endorsement by the incubator may help to reduce the search and negotiation costs associated with venture capitalist financing and alliance formation

#### **4.1.3 Management of the incubator**

The work quality of the incubator depends on the management team. It is important that the director, business program managers and other staff are competent to assist the starting entrepreneurs and guide them towards success. If the academic entrepreneurs are able to team up with individuals with industry-specific work experience either in commercial or technical functions, with serial entrepreneurs and with ex-managers, they are likely to found start-ups better equipped to grow. On the other hand, if the management team is exclusively made up of academic personnel, the start-ups will suffer due to genetic weakness (lack of commercial and market knowledge in faculty) that will be difficult to overcome. Hence, the success of an incubator is ensured by an efficient and dedicated managing team with requisite experience.

#### **4.1.4 Quality of incubatees**

The selection of incubatees plays a key role in the success of an incubator. Graduates (or individuals with higher education) are more likely to seek help in the first developmental stages of their company. The start-ups in academic incubators must be ground-breaking in their product ideas and devoted towards making the venture successful. The myriad of facilities provided by an academic incubator are of no help if the quality of incubatees is not good enough to ensure success.

#### **4.1.5 Location**

The location of an incubator should be in close proximity of the academic institution so that access to research expertise of the faculty is easily accessible. The site where technology is developed and where it is being converted to a commercial product should not be far from each other.

#### **4.1.6 Facilities**



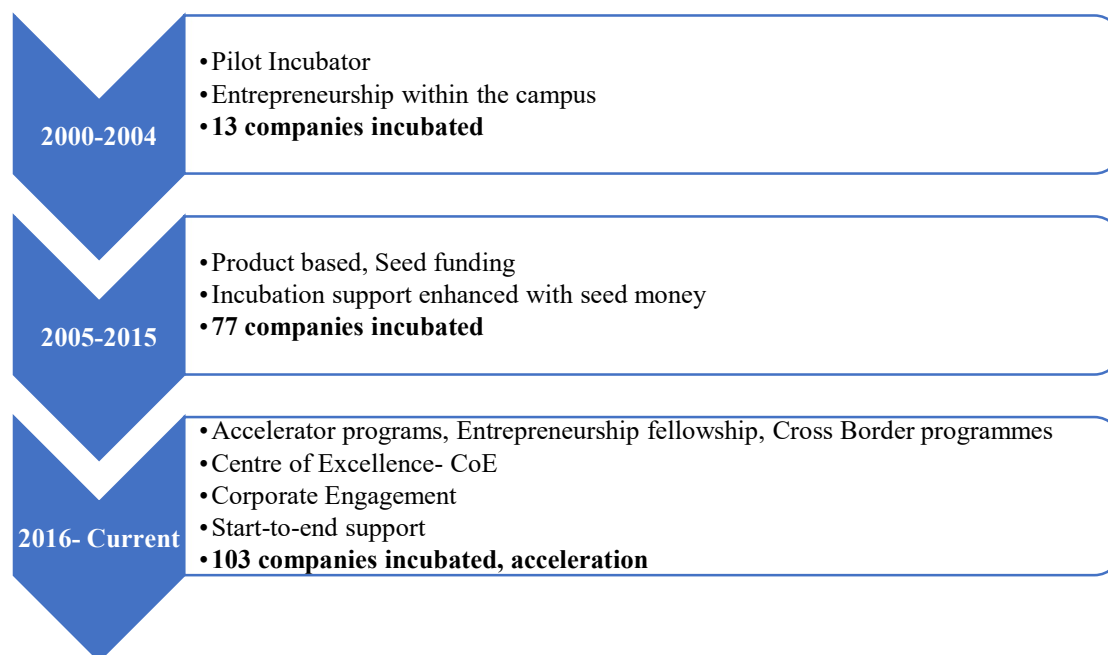
The needs of entrepreneurs are targeted on functional services and infrastructure. All incubators provide basic services which rest on tangible elements like the rent of space at a moderate price (figure 3). In addition to location, an incubator also provides tangible services like high-speed internet connection, telephone, computers, printers, access to relevant journals, technology enabled conference and meeting rooms. The other intangible facilities provided by incubators include help in market research, business plan development, technical support, legal aid, assistance in obtaining angel funding. These facilities, tangible and intangible, are very important factors for start-up success. The entrepreneurs' satisfaction with the incubators depends on both the material resources (tangible facilities) and the services delivered (intangible facilities).



**Figure 3: Support and services provided by incubators**

#### **4.2 Case Study: SINE (IIT Bombay)**

Society for Innovation and Entrepreneurship (SINE) is a technology business incubator hosted by Indian Institute of Technology-Bombay. It is a non-profit entity that was set up in 2004. It holds functional autonomy under its own governing board with members including IITB faculty and industry experts. The main basis for incubation at SINE is the potential to create economic growth, strategic and social value. Intellectual property-based companies with linkage to IITB are given preference at SINE. The progress made at the incubator since its inception is depicted in figure 4.



**Figure 4: Timeline of incubation at SINE -IITB**

The following incubation facilities are provided by SINE for a duration of 3 years;

- *Infrastructure*: offices, access to IITB labs
- *Funding*: Seed funds, government grants, angels and venture capitalists
- *Advisory*: Bootcamps, tactical coaching, mentor network, legal aid, intellectual property and finance assistance
- *Networking*: with mentors, industry, manufacturers, etc
- *Visibility*: Events, Media

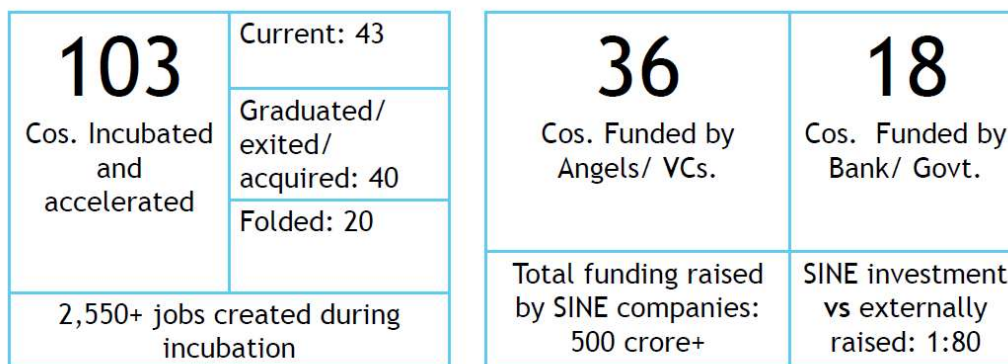
The SINE incubation process comprises of three major steps-application, internal review, and external review. The internal review is carried out by members of the board with strong preference for innovation aiming strategic economic growth and social value. The application passed by the internal review committee is then reviewed by external peers, industry and policy experts to ensure the applications are selected for their merit and are validated by representatives of all the stakeholders. The consideration model is based on three factors- subsidized rent for fully equipped office, equity shares, and revenue share for period of incubation.

As of March 2017, the spectrum of companies incubated and accelerated at SINE includes start-ups in various fields such as software, healthcare, education, fintech, and media (table 1).

**Table 1: Spectrum of companies incubated at SINE**

ICT- Software	31	ICT- Hardware	8
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Healthcare	14	Education	4
CleanTech/Energy	8	FinTech	4
Mechatronics	8	IoT	10
Media	5	Other	11



IITB IP commercialized	28
Faculty involved startups	23
Companies with social innovation	07
Equity liquidation (partial exits in 18 companies)	3 crores+

**Figure 5: Impact of SINE**

Currently, there are 43 companies under incubation at SINE while 40 companies have graduated or exited or have been acquired, and 20 companies have folded. More than 2550 jobs have been created during incubation by the start-ups hosted by SINE. 36 companies are funded by angels or venture capitalists whereas 18 companies are funded by banks or the government. The ratio of funds invested by SINE versus externally raise is 1: 80. More than 500 crore INR have been raised in total funding by SINE companies. Due to the impact and success of SINE, policies and procedures followed by the IITB incubator are being emulated in many other academic institutes across the country.

## 5. Conclusion

Academic institutions are no longer just centres for knowledge dissemination but are turning into hubs for collaboration between academia and industry. The concept of entrepreneurship as an alternative career option is being accepted by many youngsters and universities are now aiming to promote student interaction and the incubation of their innovative ideas. Incubators catalyse economic growth and support fragile enterprises conceived generally 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 start-ups through the incubator is symbiotic. The present study is an analysis of the factors that are most critical for the success of academic incubators- based start-ups. The study found that incubation can be effective and make an impact by onboarding talented and driven incubator personnel and providing intellectual, legal, financial and networking assistance along with basic functional and infrastructural services.

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