

Business Incubation Mechanism for Conducive Start-Up Ecosystem

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Abstract

Business Incubators are designed as launching pads for business start-ups. The cycle of any new start-up business needs a number of support services at its different phases to cope up with dynamic environmental and operational challenges. Hence, business incubator mechanism portfolio creation aligned with phases of start-up is an important domain to explore, which is intended in this conceptual study. The article attempts to portray the evolution of business incubator mechanism with a brief typology along with the presence of business incubator facility in modern entrepreneurship development tools employed for supporting startups. Assessing an incubator is a complex task and this article makes an attempt to highlight the significance of such assessments. It presents a set of benchmarking procedure which helps the facility tools to be more impactful and thus maintain sustainable operation. The study contributes to the body of knowledge which can serve researchers and practioners in the planning and execution of incubation facilities as a novel approach to strengthen start-up conducive ecosystem.

Keywords: Business, Incubation, Mechanisms, Start-ups, Typology.

Introduction

Business incubators nurture the development of entrepreneurial companies during their start-up period thus helping them survive and grow during their most vulnerable stages. They provide their client companies with various business support services and resources which are tailored for the young firms to navigate the competitive external situations and environment. Business incubation programmes fulfill some of the most important goals in the society namely creating jobs, enhancing entrepreneurial climate, retaining businesses in a community, developing and accelerating growth in a local industry besides diversifying local economies (NBIA, 2015). Business incubation is an organised venture creation process which

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provides a well composed portfolio of early stage supports to develop and help enterprises to survive. Hence, these service providing institutions/ organisations are known as incubators, which ultimately work as launching pad for start-ups or small businesses. The main purpose of the business incubators is to create successful ventures which graduate from the incubation programme with financially viable and freestanding status. National Business Incubation Association (NIBA), USA is the world's largest association in the field of business incubation. Besides NIBA, there are several other business incubator related professional bodies, agencies and associations which are contributing to the field. Some of them include UK Business Incubation Association, European Business and Innovation Center Network, International Association of Science Parks (IASP), German Association of Innovation Technology and Business Incubation (ADT), France Technopolis Enterprises Innovation (RETIS), etc. India also has its own professional association of business incubators such as 'Indian Science and Technology Entrepreneurs Parks and Business Incubator Association' (ISBA). It is registered as a not-for-profit society under the Societies Registration Act 1860. The main objective of the association lies in promoting business incubation activities in the country, sharing of information and experiences, providing networking assistance among technology business incubators (TBIs), science and technology entrepreneurs parks (STEPs) and other related organisations engaged in the promotion of start-up enterprises (ISBA, 2015). Each associations mentioned above define business incubators in their own way although with some variations and apply different mechanisms.

Brief History and Growth of Business Incubators

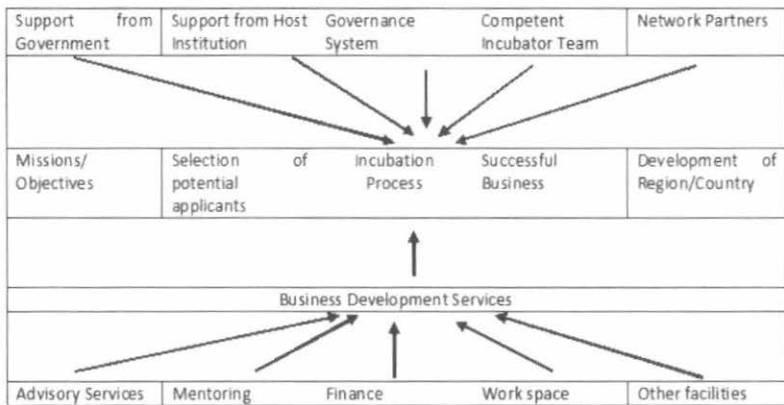
In 1959 the first known business incubator 'Industrial Centre of Batavia' was established at New York, US. It was privately managed and owned multi-tenant facility. By 1980, there were 12-15 business incubator facilities in the US. The 1970s literature on incubator programmes terms it as the first phase which was mainly aimed to address the economic restructuring, job creation, and providing affordable space and shared services. Researchers highlighted the role of start-ups, and entrepreneurially motivated small business in the job creation as highly correlated and this positive relationship fastened the growth of incubation movement (Mian, 2011).

The second phase of business incubation was between 1980s and 1990s, during which several multi-purpose mixed use models along with specialised business incubation were developed in the US and Europe. According to NIBA (2015) public-private sector activities encouraged incubation in the second phase (1980-90s) that included various activities. For instance, the US

Small Business Administration conducted a series of regional conferences, workshops to bring awareness about incubation during the mid-1980s. Ben Franklin Technology Development Program established by the State of Pennsylvania in 1982 became a pioneer in business incubation. Control Data Corporation (a private technology firm) promoted City Venture Corporation (CVC) which developed several business incubators in the US. During this phase along with the US; Canada, Europe, Asia and South America also appreciated the concept of business incubators.

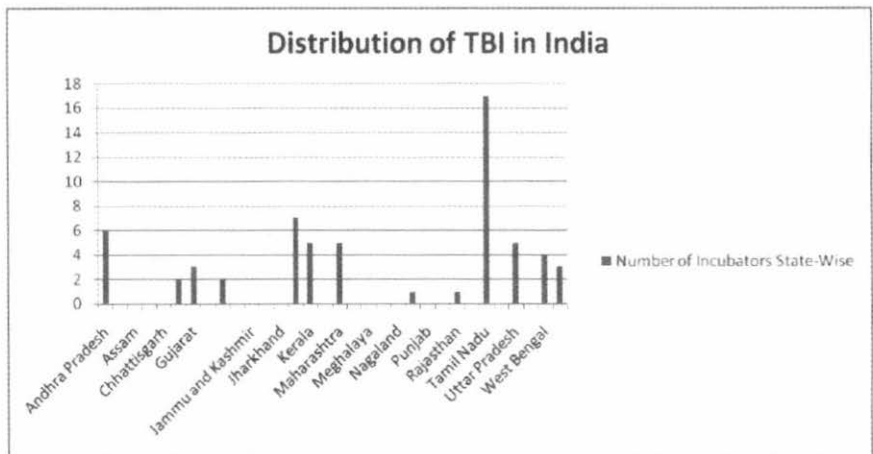
In the third phase (late 1990s, 2000 & beyond) of business incubation history, the world society witnessed the massive introduction of internet-based virtual incubators, technology-based incubators, innovation centres integrated with science parks, etc. which were the prominent signs of modern incubators. Emerging economies such as India, China, Brazil, Taiwan, and Malaysia also joined the incubation movement in the third phase of business incubator movement. Many types of business incubator mechanism were developed as an impact-making economic development tool intended for innovation-based high growth start-up development.

In India, approximately 120 business incubators are functioning, among which 59 TBIs¹ are promoted by National Science & Technology Entrepreneurship Board of DST, Government of India. About 40 are software technology parks promoted by Ministry of Information and Communication and others are promoted by government and non-government bodies (NSTEDB). The broad focus area of Indian incubators operation sponsored by NSTEDB include information and communication technology, biotechnology, new material including nano technology, instrumentation and maintenance, manufacturing and engineering, design and communication, health and pharmacy, agriculture and allied fields, energy and environment. The functioning mechanism of Indian incubators occurs in a synchronised manner, which has helped to create an entrepreneurial ecosystem. See Figure 1 for a framework of Indian incubator functioning model and process.

Figure 1: Framework of Indian Incubator Model

Adopted from (NSTEDB) - <http://www.nstedb.com/>

According to NSTEDB, business incubators are located across the nation, but it indicates uneven distribution of the adoption of incubation as a tool of economic development. Andhra Pradesh, Goa, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal and Delhi are the prominent states which have TBI supported by NSTEDB. Unavailability or lack of business incubators directly indicates the backwardness of entrepreneurial ecosystem in select states where no history of business incubation is found in states such as Bihar, States of North-East, Jharkhand, etc. (See Figure 2). There is significant visibility of regional discrepancy with respect to distribution of the incubators throughout India.

Figure 02: Distribution of TBI in India

Source: www.startupindia.gov.in

Since the last half century during which the business incubation concept has been taking its root, first in the US, then Europe, and Worldwide, various incubator mechanisms have been developed and matured. The incubation mechanism was developed as an innovative tool for economic development, enterprise development, job creation, etc. during the 1980s and 1990s. It was the initial phase when the public and private sectors of the US and Europe contributed substantial time to test, experience and adapt, follow hit and trial for success and failure. However, after the boom of the 1980s, the growth in establishing new incubator facilities, science parks, etc. had slowed down during the second half of the 1990s (Mian, 2011), which may be identified as a sign of relative maturity in the US with respect to incubator development. However the university-linked incubation model become an evergreen policy instrument for technology-driven regional economic development worldwide. In India, more than 120 business incubators and accelerators with an annual growth rate of 40% are providing seed stage support to entrepreneurial business firms. New academic institutions are trying to start incubation facilities and are making different efforts with respective capacities. Corporate bodies are nurturing young entrepreneurial ideas under accelerator programme. Institutions such as NASSCOM, NEN, etc. have shown high enthusiasm with start-up culture in India and NASSCOM is partnering with state governments for start-up warehouses. About 45% of incubators are located in Delhi, Mumbai and Bangalore and most of the incubators are successfully providing funding, mentorship, and networking opportunities, in addition to business support.

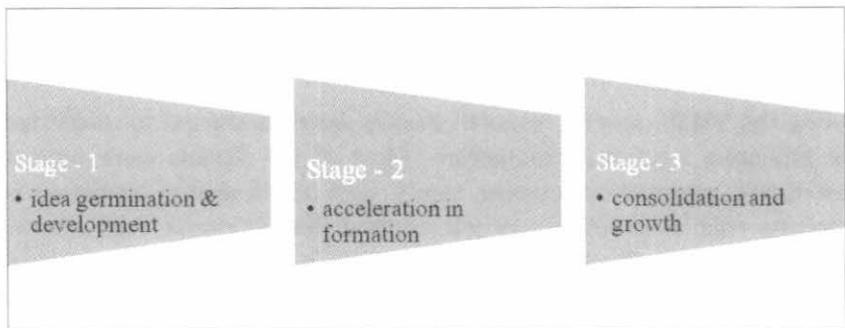
Business Incubation Mechanism

During the 1980s, several research studies were conducted to understand the emerging incubator mechanism. Most of the studies were basically descriptive, generally discussing topics such as incubator configuration, typology, role of incubator in job creation for economic restructuring, etc. (Allen & McCluskey, 1990). However during the 1990s, impact assessment and benchmarking studies in the form of qualitative case studies conducted on university-linked technology incubator programmes were developed (Hackett & Dilts, 2004). The key component of technology business incubator assessment included goals, partnership and operational policies; portfolio of value-added services such as mentoring and coaching; networking and ease of knowledge flow in the incubator ecosystem; benchmarking measures; regional embeddedness; comparison of on and off incubator firm performance; agglomeration effects; firm credibility and marketing references; government subsidies vs. privately owned facilities; and specialised vs. general purpose facilities.

The last five decades of research shows only a handful of studies which were comprehensive enough to assess the performance of any particular mechanism in providing business incubation support. Some of the studies specially focused on the university-linked technology business incubator, generally understood to provide a resource base necessary for the development of new technology-based, innovative, high growth start-up (Allen & Levine, 1986). However, during these years, only a handful of studies focused on theory development to enhance the understanding of business incubators (Hackett & Dilts, 2004). Diverse efforts for theory development includes the market failure argument (Plosila & Allen, 1985), structural contingency theory (Ketchen & Snow, 1993), network theory (Hansen et al., 2000), social capital theory (Bolingtoft & Ulhoi, 2005), the real option view (Hackett & Dilts, 2004) and the resource-based theory perspective (M'Chirgui et al., 2011).

There are various schools of thoughts for business start-up incubation with diverse portfolio of mechanisms. Hence, it is of importance to understand the different steps or phases involved in start-up cycle of a business venture so that appropriate business incubator intervention may be administered for better result. According to the report of Center for Strategy and Evaluation Services (2002), EU report, the incubation continuums have three stages (See Figure 3). Table 1 portrays the stages of incubation continuum.

Figure 3: Stages of Incubation



Source: CSES (2002)

Table 1: Three stages of Incubation Continuum

Stage One	Stage Two	Stage Three
Pre-Incubation: Idea germination & development	Incubation: Acceleration in formation	Post-incubation: Consolidation & growth
<ul style="list-style-type: none"> - Focus on extending hand-holding support to nascent entrepreneurs in terms of: <ul style="list-style-type: none"> • Idea germination, refining. - Generally provided by university or academic institution based incubation agencies with a basic objective of technology commercialisation. - Less focus on market opportunity and public funds. 	<ul style="list-style-type: none"> - Activated when business plan is under process of implementation, with proper team and operative actions. <ul style="list-style-type: none"> • Refining and fine-tuning the plan • Team building mentoring • Resource sourcing • Financial inputs - Companies are under 'acceleration', yet to pay back assistance fee or to be profitable. 	<ul style="list-style-type: none"> - Interaction between R&D agencies and incubator graduates to extend help and support to new technology-driven start-ups under knowledge-laden operating environment. - Subsidised portfolio of supporting programmes for start-ups.
←----->		
	Development Incubator/Mixed Use Incubator	
Innovation Centres/Technology Incubator		
Science Park*/Research Park		
French Research/Academic Incubator	Pepinieres/Hatcheries	Technopolis
Virtual Incubator / Accelerator		

Source: Adapted from (Center for Strategy and Evaluation Services, 2002)

* Although a typical science park can cover all three stages of incubation.

To attain flexibility and be focused in a particular space, most facility centres concentrate in any one or two stages of incubation; hence, there is need to understand the typology of incubators. There are several business incubator models in practice and fashion. The current study identifies models based on the following.

- Sector or industry focus of incubating participants
- Incubator's organisational structure
- Sponsorship type – privately for profit, government supported not for profit.

With a basic understanding of the incubator services portfolio, it is also important to understand the mechanism applicability factors which include (a) Physical Space – PS, (b) Shared Services – SS (c) Business Services – BS, (d) Research & Development cum Technological Facilities – R&D, Tech, (e) University/Academic/Research Institution Connection – UC and (f) Venture Funds – VF. Despite differences in their functional approach, there are many convergence points among them. The popular incubator mechanism models include (a) Development Incubators – DI, (b) Mixed-Use Incubators (MUI), (c) Technology Incubator/Innovation Centre (TIIC), (d) Science/Research Park/Technopolis (SRPP), (e) Pepinieres and Hatcheries (PH), and (f) Virtual Incubator. See Table 2 for a brief description and services availability for these models.

Table No 2: Typology of Business Incubator Mechanism in Practice

Mechanism Type	Services available					
	PS	SS	BS	R&D, Tech	UC	VF
DI	Yes	Yes	Limited	No	No	Limited
MUI	Yes	Yes	Yes	Limited	Possible	Limited
TIIC	Yes	Yes	Yes	Yes	Yes	Yes
SRPP	Yes	Possible	Yes	Yes	Yes	Yes
PH	Yes	Yes	Limited	No	Possible	Possible
VI	No	No	Limited	No	No	Possible

Source: Adapted from Mian (2014)

Monitoring the Incubator Mechanism

Business incubation as a concept evolved through different practices for the development of high growth, technology-driven, scalable start-up/venture creation worldwide. It is important to evaluate the performance of these mechanisms. Despite the increase of the number of business incubators worldwide, there has been no single framework to understand, track and assess the effectiveness of its functioning.

The practice of incubation mechanism suggests that business incubation is a process enacted by business incubators and venture capital organisations to facilitate the entrepreneurial process (Hackett & Dilts, 2004). Incubators combine technology, capital and know-how to leverage entrepreneurial talent and accelerate the development of new companies. They assist

entrepreneurs in developing business and marketing plans, obtain venture capital, and provide access to professional services besides helping them in the commercialisation process of the technology. Incubators also provide flexible office space, administrative services, information technologies and specialised equipment. In an ideal situation, start-up ventures become independent and self-sustaining businesses after completing the incubating period with the incubators (Main, 1996). However, in reality, many incubators deviate from the mission statements they had put forward initially and thus fail to provide the essential incubation and support services (Hansen et al., 2000). Hence, they failed to deliver the financial or economic commitments to their investors. Some incubators have a tendency to venture into an industry they are less aware of while few others end up exploiting entrepreneurs only for future financial returns.

Now worldwide, state and funding agencies are quite enthusiastic about establishing incubation facilities such as technology centres, business incubators, science parks, etc. However, in most cases, implementation is done in the absence of profound knowledge of their actual effectiveness. Long-term outcomes of incubation are still considered as 'black box' (Hackett & Dilts, 2008). However, it needs to be noted that there is a major change in awareness by both academics and policy actors in favor of empirical evaluations to demonstrate long term incubation's effectiveness. It is progressively acknowledged that tracking the development and maturity of incubated firms beyond the initial incubation phase is critical for understanding the overall effectiveness of the incubators.

Launching a new business is a challenging task and half of them fail within 5 years. Approximately 25% of new businesses are abandoned within the first year of funding, 55% fail by their fifth year, and only 30% last beyond their tenth year according to US Census data (Shane, 2008). Start-ups and young firms in particular lack reputation or legitimacy in the market resulting in a negative effect on their business interactions with financing institutions, suppliers, customers, etc. Incubator takes the position of an intermediary to help start-ups to establish contacts with external actors and gain access to their resources and knowledge. Through various support mechanisms, incubators try to compensate for early-stage resource deficits of start-ups and ensure entrepreneurial stability, sustainable economic growth and long-term business survival. Literature reveals the challenges associated with survival rates and failure rates as indicators of incubator effectiveness. These challenges are summarised in Figure 4.

Figure 4: Indicators of Incubator Effectiveness

Source: Author

Innovation in the knowledge economy in the information age is important as it leads to value creation, cost reduction, resource optimisation, etc.

Literature and incubation research treats the types of incubator in a homogeneous fashion, although some studies have recognised the different nature of incubators (Allen & McCluskey, 1990). To analyse incubation, a distinction needs to be made between types of incubators, as different incubators achieve different results (Aernoudt, 2004). Although issues such as incubation services, activities and their objectives are important, it is essential to capture the performance of different types of incubator to gain a deeper understanding and for additional value addition. While some studies have focused on the extent of innovation across different types of incubator, there seems to be lack of studies on the relationship between the nature of innovation and the type of incubator. This study attempts to highlight this gap in the research.

Enhanced legitimacy resulting from the education, research, and community outreach initiatives helps firms residing in university-based incubators to connect and align with the demands of local resource environments. This aids the start-ups to improve their odds of survival. Improvement in the

performance of the start-up or the young firm after joining the incubator is noted by some of them. There is a vast body of literature that uses sales, number of employees and access to funding as performance measures for a firm. The number of employees can be used to measure the rate of growth of the firm. The sales data provides insight on economic output of a firm in a particular year. The access to funds (Angel Investment, Venture Capital Investment) before or after one year from the date of incubate graduation reveal the potential to attract investors by being associated with a particular incubator. The acquisition and effective use of scarce resources are a major challenge for entrepreneurs. As start-ups, entrepreneurs generally control a very limited resource base. There is a shortage of human, financial and intellectual resources besides limited organisational assets, and capabilities (Bhide, 2000). Due to information asymmetry between entrepreneurs and external stakeholders, acquisition of resources is challenging. Financial capital is critical for the acquisition and configuration of resources as they enable the new firm to acquire other resources and thus serve as an important intermediary medium in the resource configuration process (Alsos et al., 2006). New ventures also tend to face both liability of newness and liability of smallness. Hence, this study highlights the need to investigate the role and effectiveness of incubators with respect to their potential of graduating incubatees in attracting funding.

Literature suggests that business incubation success can be measured at multiple levels; at the incubator and firm levels to measure related impacts. There are a variety of measures of incubation performance or outcomes such as occupancy rate, added value of incubator service, the number or proportion of firms graduated, growth of the tenant firms, jobs and wealth created (Hackett & Dilts, 2008; Chan & Lau, 2005) and number of patent applications per firm (Colombo & Delmastro, 2002). However, from a general viewpoint, the primary function of business incubators is to help new firms to survive and assist them in their development (Allen & Rahman, 1985).

The survival rates of incubator firms are communicated to the public by the incubator management or local authorities not only to demonstrate the effectiveness of those publicity funded policy initiatives, but also to justify the financial support granted by sponsoring agencies. However, there is a tendency to ignore the problems associated with survival and failure rates as variables of business incubator. Also, when referred only to tenant-survival rates, there is an implicit assumption that firm failures after graduation are independent of 'prior incubation', i.e., firm survival is not an objective of business incubator support. This view partially overlooks the fact that successful graduation is no guarantee of long-term survival (Allen &

McCluskey, 1990). Research overtly focusing on the post-graduation period has been ignored and there is also limited empirical evidence to justify the pattern emerging during this period.

Building high-quality relationships with their incubators improves both the quality and quantity of interaction for the tenants. It also affects the willingness and capability of incubators to transfer knowledge from direct or indirect sources. Well-maintained relationships increase the opportunities for mutual interaction (Adler & Kwon, 2002). Hence, collective mutual participation of both the incubators and tenants is essential to improve the incubation effectiveness and tenant performance. Besides, high relationship quality such as high level of trust and familiarity encourages incubators to provide fine-grained help and enables sharing of knowledge with a focal tenant though it cannot go beyond common contractual obligations (Dyer, 1996).

Conclusions and Scope for Future Research

This conceptual article intends to understand the role of business incubation and incubation mechanism as a modern entrepreneurship development tool which supports the creation and growth of start-ups worldwide. The research shows that over the last half century, 'business incubation' as a concept has evolved and contributed to different aspects of economy in different nations while the incubation mechanism matured only at the advent of the twenty-first century. A closer look at last four decade of business incubation literature shows that that focus of research were mostly related to (a) Incubation concept, facility design, and models and (b) Incubator performance assessment and benchmarking of best practices. Assessment of incubators evolved as a controversial and complex task, and this conceptual study was an attempt to identify a few gaps and research questions for the evaluation of business incubators for further research. Does association with incubation centres make post-graduating start-ups attractive to investors? What kind of innovation evolves during incubation process which helps enterprises to survive post-incubation? Is there a pattern for exit dynamics that can be identified after graduation? Are there different survival rates and exit dynamics of graduates observable between different incubator organisations? The current study is intended to conceptualise and raise a few ideas for further study. Future studies may focus on the following: to investigate the investment attractiveness among graduating business incubation tenants; to track the rate of survival and growth of business incubation supported enterprises; and to investigate the innovation adoption pattern with reference to the types of host incubators.

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END NOTES

- 1 <http://www.nstedb.com/>