CHAPTER 3
LITERATURE REVIEW

Business incubation is widely acknowledged as an economic development engine to foster innovation, entrepreneurship, technology development and diffusion. Governments and international development agencies look at the incubation program as a tool to address unemployment, catalyse economic development, and support disadvantaged sections in order to solve societal issues and challenges. These initiatives require periodic research efforts for monitoring effectiveness and impact assessment and for advancement of the field. Several research studies of the past had more of practitioner centric perspectives. Even the empirical research studies were heavily anchored on incubation industry from developed economies of the West.

Prior research studies pertaining to the area of research were reviewed and presented in this chapter. Literature connected to innovation, open innovation, entrepreneurship, start-up dynamics, business incubation, factors influencing success of a start-up firm in the incubation environment, determinants/ contributing factors of start-up success in the incubation environments were reviewed.

Efforts were made to unlock value from such learning in order to arrive at inferences that might commonly be applied to the Indian incubation scenario. A parallel effort to understand the emerging open innovation approach of corporate firms was also made. The exploratory intent was to
connect this innovative business model to incubation industry and to develop some novel propositions in order to advance both theory and practice. This was essential to scope the study and to set the objectives. As open innovation concept heavily relies on networks, past attempts on networked incubation model were also studied in depth. Using the limited inputs available on incubation process dynamics, efforts were made to develop a logical map of incubation service mix. Section 3.1 contains core issues pertaining to ‘Business incubation’. Section 3.2 touches upon relevant information pertaining to the shift from closed innovation systems to open innovation systems. Section 3.3 presents findings associated with networked business incubation and associated value creation for effectiveness.

3.1 BUSINESS INCUBATION

3.1.1 Success Qualifiers of Incubatee Start-up Firms

There are many risks that start-ups face and these risks affect the successful outcome of the venturing efforts. Common ones among them are:

- Technology Risks
- Team /Management Risks
- Funding Risks
- Market risks

Radical technology-based innovations are often accompanied by unique capabilities that allow new markets to be created. These new markets naturally would introduce high levels of both market and technical risks (Branscomb & Auerswald 2002).
Start-ups need financial assistance, primarily, for three reasons:

- to diversify or spread the start-up risk
- to accumulate start-up capital and
- to finance growth and expansion

Commercial financing and most venture capital financing are not easily available to small early-stage enterprises due to risks and uncertainties involved (technology risks / funding risks / market risks). Obviously, established firms with proven products and market share are more likely to obtain commercial and venture capital funds (O'Neal 2005).

Schilling (2008) identified many factors mentioned in the research studies that explain the success or failure of a radical innovation. New product introduction in a market place is generally characterised as ‘first mover principle’. First movers are companies that initiate the introduction of a new product or service to the market place. As disadvantages of first-movers, Schilling mentions high R & D costs with long payback period (funding risks), a non-existing or under developed distribution channel, unclear customer needs and no agreed standards (market risks), lack or immature ‘enabling’ technologies and supporting products (technology risks). Nascent stage technologies / emerging innovations have to face the risks of neither developed standards accepted by the market nor emerging standards.

For an innovation to be successful it must satisfy the needs of customers, although it is still unclear who exactly the customers will be (market risks). Unfamiliarity causes fear and resistance and the newness of the products encourages focusing on irrational needs. Time and effort must be invested to overcome problems related to interaction with the new product; resistance to acceptance is increased by uncertainty of advantages. The
associated risk of ‘using the new product appeal’ of the product may diminish (market risk) when the product is still in pilot phase (Sandberg 2008).

Management of all the risks warrants skilful talent. Retention of skilled employees and checking attrition is heavily associated with other factors stated above (team /management risks).

In order to measure the successful outcome of an incubation exercise, several qualifiers have been identified by researchers and business incubation experts. The success in the market place (acceptance of products and ability to generate revenue), financial success (ability to raise investments and generate revenues) of the venture and recording consistent growth are some of the factors often visible in such studies. Based on the context, the jobs generated or impact (solving a societal problem), product milestones (if it’s a venture focusing on innovative technology) are the other parameters used to measure the success of incubatee venture.

Once extraneous factors that lead to early stage failure of small businesses (poor management, inability to find early stage financing, high overhead, etc.) are controlled or eliminated, the projected increase in survival rate of new ventures should lead to increased employment and an expanded tax base (Brooks 1986).

Development and growth of start-up is of paramount importance to define success of a start-up. According to studies (Udell 1990); (Bearse 1998); (Hackett & Dilts 2004), growth measures include examining increases in number of jobs or sales over time, while development measures are reflected in “product innovation, quality of the management team, and strategic alliances consummated” over time. The simplest measure of incubatee success is “graduating” from the incubator upon overcoming resource gaps and developing sustaining business structures (Hackett & Dilts 2004). Sales
turnover, profitability, growth of enterprise and graduation to independent trading are stated as hard measures to define success of business incubation (Voisey et al 2006).

‘Market and product are the most important factors for the survival and development of incubatees’ (Sun et al 2007).

A study (Cusumano 2013) mentions the following as key elements to look for in a start-up while evaluating it:

- Strong management team
- An attractive market
- A compelling new product or service
- Strong evidence of customer interest
- Overcoming the credibility gap
- Demonstrating early growth and profit potential
- Flexibility of strategy and technology
- Potential for a large investor pay off

Firm’s performance should be understood as the multidimensional concept that is attributed to firm sales, turnover, market share, growth of employees, and other measures. These results hold up across different nations, industries, and other contextual variables (Iakovleva 2013).

The studies cited above suggest various characteristics of an incubatee or graduated incubatee firm that could be considered to portray their success. However, there is a need to identify certain dominant qualifiers among them so that the efforts during incubation stage could be focused on
them. Moreover, not much empirical data from Indian business incubation context has been researched and published. This brings out an important gap that needs to be addressed. Additionally, the BI movement is rapidly gaining ground in India and elsewhere and if there is a general agreement on ‘as to what constitutes to success of incubatee firms’, then the BI services could either be designed or modified for effective outcomes.

Start-up ventures need to overcome the risks during the early stage of venturing and if the ecosystem provides them options to mitigate the risks, it would then help them to focus on their core competence. Through their mandate, BIs provide an enabling ecosystem to start-ups

3.1.2 Influencers of Success in BI Environment

BIs provide several value added services in order to help the start-up clients (incubatees) to mitigate the risks faced by them. BIs provide access to infrastructure, access to mentoring, access to funding, access to talent, access to market and access to services such as legal, and protection of IPR & accounting. These services greatly influence the outcomes of incubation success.

Incubation support enhances the chances of success, raises credibility, helps to improve skills, creates synergy among client-firms, and facilitates access to mentors, information and seed capital (Lalkaka 2001).

Smilor’s (1987a) incubation model presents a comprehensive view of the BI program, its stakeholders, its services and the outcomes (success metrics) connected to incubatee firms. Furthermore, Smilor conceptualises the incubator as a system that confers “structure and credibility” on incubatees while controlling a set of assistive resources: “secretarial support,
administrative support, facilities support, and business assistance’” (Smilor 1987 b).

Lalkaka (2001) presents the evolution of the incubator concept after studying and analysing incubators across the globe as:

The ‘first generation’ incubators in the 1980s were essentially offering affordable space and shared facilities to carefully selected entrepreneurial groups. In the 1990s the need was recognised for supplementing the work space with counseling, skills enhancement and networking services to access professional support and seed capital, for tenants within the facilities and affiliates outside. This has led to the ‘second generation’ incubator.

According to him, starting from 1998, a new incubation model has emerged in parallel. This is intended to mobilise start-ups and to provide a convergence of support, towards creating growth oriented technology based ventures. He summarises that BIs provide many value added services to the incubatee firms. The incubation offering include affordable work space as well as shared facilities, counseling, training, information and access to external networks.

Value added services such as access to finance, new markets and legal advice would differentiate a true incubator from others offering only office space with a shared secretary and a common fax machine (Aernoudt 2004).

According to another related study (Abduh M et al 2007), the BI services are classified as:
• Facility related services (affordable and flexible space, amenities to do with physical infrastructure including equipment access, visibility to start ups by virtue of incubator’s reputation)

• Counseling and business assistance related services (mentoring and business development support in the areas of planning, marketing, finance, legal, regulation, product development and employment assistance, facilitation in fund raising) and

• Networking services (access to business resources, information and to businesses outside the incubator).

According to infoDev (2009), following are some of the factors depicted as ‘Critical success factors’ of business incubators:

• Volume of companies co-located is important as it leads to natural clustering & collaboration

• Entrepreneurs will learn more from each other, and other businesses, than ‘consultants’

• Combining start-ups with mature companies in same building encourages collaboration

• Strict entry criteria (focused on innovation & implementation) can ensure high success rates

• Investors/entrepreneurs seeking to make new equity investments can be leveraged as mentors

• Businesses seeking future clients can provide discounted professional services
A strong manager who monitors both mentors and companies is key.

Incubators create a climate of collaboration & networking from the start.

In another way, BI is defined as “an economic development tool designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services” (National Business 2014). According to NBIA, BIs offer several value added services apart from the space provided to the start-ups under incubation (incubatees). Eventually, dynamics of incubation-venturing effort of the incubatee firms are affected by these value added services and hence are deterministic factors impacting the success of incubatees.

The ‘Table 3.1’ provides a summary of findings from literature on various types of value added services received by an incubatee firm in order to mitigate the risks in the venture creation and to build a successful firm.

**Table 3.1 Literature summary on ‘Incubation service offerings’**

<table>
<thead>
<tr>
<th>Incubation Services</th>
<th>Components</th>
<th>Literature References</th>
</tr>
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<tbody>
<tr>
<td>Access to infrastructure</td>
<td>Office space, amenities such as conference &amp; meeting facilities, laboratories for development and testing of products</td>
<td>(Mian 1996); (Voisey et al 2006); (Lalkaka 2006); (Arlotto et al 2011); (Suresh Kumar &amp; Sudharani 2011); (Chandra &amp; Silva 2012); (Suresh Kumar &amp; Sudharani 2012); (Al-Mubarak et al 2013)</td>
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<th>Incubation Services</th>
<th>Components</th>
<th>Literature References</th>
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<tr>
<td>Access to mentoring</td>
<td>Wisdom and expertise of the seasoned experts available in the incubator or its network</td>
<td>(Voisey et al 2006); (Lalkaka 2006); (Arlotto et al 2011); (Suresh Kumar &amp; Sudharani 2011); (Chandra &amp; Silva 2012); (Suresh Kumar &amp; Sudharani 2012); (Al-Mubaraki et al 2013)</td>
</tr>
<tr>
<td>Access to funding</td>
<td>Facilitation to raise money helps the incubatees to raise the required resources (talent/equipment/materials etc...)</td>
<td>(Mian 1996); (Voisey et al 2006); Lalkaka 2006; Bergek et al 2007; (Arlotto et al 2011); (Suresh Kumar &amp; Sudharani 2011) (Suresh Kumar &amp; Sudharani 2012); (Chandra &amp; Silva 2012); (Al-Mubaraki et al 2013)</td>
</tr>
<tr>
<td>Access to talent</td>
<td>Access to talent support from the incubator and/or from its network</td>
<td>(Mian 1996); (Lalkaka 2006); (Arlotto et al 2011); (Suresh Kumar &amp; Sudharani 2011); (Chandra &amp; Silva 2012); (Suresh Kumar &amp; Sudharani 2012);</td>
</tr>
<tr>
<td>Access to market</td>
<td>Validation for its product / service offering</td>
<td>(Mian 1996); (Voisey et al 2006); (Chandra &amp; Silva 2012); (Suresh Kumar &amp; Sudharani 2012); (Al-Mubaraki et al 2013)</td>
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<tr>
<td>Access to legal / IPR support</td>
<td>Protect the IPR and legal needs: Availability of access to legal /IPR support</td>
<td>(Mian 1997), (Voisey et al 2006); (Lalkaka 2006); (Chandra &amp; Silva 2012); (Suresh Kumar &amp; Sudharani 2012);</td>
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It emerges clear that it is difficult to determine the relative importance of the above success influencers in the incubation environment. However, there are enough reasons to have data at least with respect to certain homogeneous incubation environments. This would definitely help stakeholders to work out proper strategies in order to have an optimal service mix based on local needs. Such optimal service mix is very essential for BIs to connect with the local ecosystem comprising of various players such as academia, SMEs, large firms, professional service providers and mentors. For such connections to happen BIs need to be networked and the emerging ‘Open Innovation’ culture provides ample opportunities for BIs to develop their programs in line with the needs of innovation seekers and providers.

3.2 SHIFT FROM CLOSED INNOVATION TO OPEN INNOVATION

The paramount importance of innovation affecting economic development is captured well in the seminal works of various scholars. It is difficult to visualise any issue more vital to society than innovation (Schumpeter 1942); (Van De 1986); (Drucker 2006). According to Gupta et al (2007), innovation is the center piece of any adaptation irrespective of whether it is revolutionary or evolutionary and benefits society as a whole as well as its subsystems comprising countries, industries, organisations, groups of individuals, or even a single individual. More importantly, the adaptation never takes place in vacuum (Gupta A et al 2007).

Technological innovation is key enabler for creating competitive advantage (Quoporsi 2010).
3.2.1 Managerial Decision Making on Disruptive Technological Changes

The number of strategic alliances between large established firms and small firms, in particular new technology based firms had multiplied over the past few years. Theoretically, the combination of small firms’ know-how with large firms’ resources opens opportunities for synergies that can contribute to both firms’ competitive advantage (Segers 1993).

Chesbrough (2003) coined the term ‘Open Innovation’ and explained its application to managerial problems. According to him, the open innovation model starkly contrasted the closed model, which worked well for many enterprises during the twentieth century (Chesbrough 2003b). However, enterprises had to become receptive to the innovations of others, to external knowledge or to external information workers. This transition was accelerated due to erosion factors such as growing mobility of highly experienced and skilled people, growing presence of private venture capital, increasingly fast time to market for many products and services, growing competition from foreign businesses due to on-going globalisation, and a wider stock of knowledge from various sources ((Chesbrough 2003b); (Van De et al 2009)). SMEs would be relying on both inbound and outbound open innovation simultaneously (Van De et al 2009).

Sheer necessity, compelled enterprises to open their doors; it is widely believed that the era of OI has arrived (Chesbrough 2003b); (Dahlender & Gann 2010). Significant research contributions on the elements of OI and their impact on firms’ innovation performance led to adoption and adaption of ideas emerging from such studies (Chesbrough 2003b); (Chesbrough et al 2006); (Enkel et al 2009); (Dahlender & Gann 2010)). Better innovation performance through OI practices were measured using
metrics such as innovative sales or number of patents (Laursen & Salter 2006); (Rohrbeck et al 2009); (Lee et al 2010); (Huang 2011).

The major difference between the closed innovation paradigm from the open one is basically that companies that implement the latter interact with external entities in terms of their innovation process’s efficiency and effectiveness. Saguy (2011) identifies several issues such as economic crisis, environmental challenges, diminishing resources, and the exponentially accelerating pace of technology and knowledge advancement. He posits that the OI proliferation calls for not only ideation within the enterprises but also requires a deep assessment of collaborators i.e. academicians, researchers, practitioners, and intermediaries with the collaborator and industry relationships.

OI has been a key trend in both innovation practice and research (Fu 2012). Recent developments advocate for OI and development of business eco-systems in this knowledge-based economy and stress the importance of external knowledge sources in stimulating innovation (Young et al 2008); (Rahman & Ramos 2012 b).

According to Iakovleva (2013), smaller firms in particular may face difficulties in scaling up their internal innovation efforts to achieve radical innovations.

One possible cause may be their lack of internal R&D departments that, in large firms, are able to push innovation throughout the organisation. SME firms generally lack awareness of many issues such as IPR, venture capital, joint venture, trademark, copyright, or even patenting. These are popularly applied OI instruments in large or corporate business sectors but hardly been applied to this business sector (Rahman & Ramos 2013). Hence, the SMEs may require services of innovation consultants or intermediaries.
who would help them to bridge the gap while dealing with large/corporate firms on OI projects.

While it’s emerging clearly that both large firms and small firms need to adopt to OI practices sooner or later in order to maintain their competitive advantages, scouting for suitable partners remains a challenge. This necessitates the role of professional service providers who act as innovation intermediaries.

Intermediaries provide all necessary services to launch a successful open innovation program or to find technology from other companies (Hossain 2012). Acquiring IP is usually a complicated task. It demands a clear understanding of both technology and legal aspects. Intermediaries play a pragmatic role to make IP transfer easy for seekers and solvers.

3.3 BUSINESS INCUBATORS AS INNOVATION INTERMEDIARIES IN OPEN INNOVATION SYSTEMS

Existing small businesses can play a critical role in linking entrepreneurial actors to both informal and enterprise support networks (Allen & Rahman 1985). Campbell (1989) reported that many firms used the incubator as an internal market place. In most of the incubator related studies, services are often divided into (i) shared office services and (ii) business assistance and networks (Mian 1996). According to Lynn et.al, (1996), commercialisation usually occurs within an innovation community rather than in a single organisation (Lynn et al 1996).

According to a business incubation report published by ‘Organization for Economic Co-operation and Development (OECD, 1998)’, in USA and elsewhere, the operation of BIs is overseen by an advisory board comprising representatives of local business community. This report recommends that BIs should seek to maximise synergies with local business
environment. Adding further, it states that BIs can also serve as a point of referral for local firms. Marketing and matchmaking services have likewise been offered by some BIs as well as some tenant firms (anchor companies/specialised service provider firms within the incubator), so as to facilitate outsourcing and supplier linkages between incubatee and other local enterprises.

The degree of fit between the business incubation services offered by the incubator and the needs of the local market is another measure of incubator success (Autio & Klofsten 1998).

Hansen et al (2010) position network theory (Nohria & Eccles R 1992) in order to claim that primary value-added feature of networked incubators is the set of entrenched processes that carefully structure and transfer knowledge throughout the incubator network. This is for creating conditions that facilitate the development of incubatees and to commercialise their innovations. They find that degree of entrepreneurial intensity, economies of scale and scope, and network design are important factors for incubation success. The importance of networked incubators is emphasised as follows:

“Most business incubators provide office space, funding, and basic services. The better ones also offer an extensive network of powerful business connections, enabling fledgling start-ups to beat their competitors to market” (Hansen et al 2010).

Financial support is not crucial to entrepreneurial actors developing a viable business (Totterman & Sten 2005). Favourable rents for space and equipment are important, but incubators should focus more on the development of business networks that would help companies survive in the long run.
Lalkaka (2002) depicts success of an incubatee venture as affected by the following characteristics of BIs apart from policy and knowledge base:

- Private sector partnerships for mentoring and marketing
- Professional networking, national and global community involvement (including businesses in the region) to promote entrepreneurship.

Hackett & Dilts (2004) underscore the importance of network relationships and institutionalised knowledge transfers in order to enhance the likelihood of incubation success.

While ‘shared office services’ that are easy to imitate are used almost on a daily basis, the ‘business assistance services’ are unique in nature and sought as and when the need arises. However, this does not undermine the merits of the latter. Care should be exercised in identifying relevant and appropriate services (Bollingtoft & Ulhøi 2005).

Incubators can also be viewed as brokers resonating with the idea that a huge part of the value of the incubator is its role as an intermediary to a much larger set of networks. Effective handling of conflicts / dilemmas would be factored in determining success of incubation process. Also, the types of ties and networks will be important (Peters et al 2004).

Bøllingtoft & Ulhøi (2005) envisage BIs as attempts to address market failures and the problem of a three-dimensional liability of newness:

- one dimension relates to administrative support
- the second dimension relates to age and related lack of visibility on the market [this is a problem which an incubator—if it has
become well known and accepted—might, to some extent, compensate for (via the brand, networks, etc., of the incubator)]

- The, third relates to being on your own versus being in a ‘community’ of peers.

Their findings suggest that incubators address these market failures and liabilities of newness in varying degrees.

‘Industry attractiveness of BI’ is evident when effectiveness is demonstrated. Sometimes industry supports BIs as social responsibility (for instance, South African breweries), for ‘intrapreneuring’ (acting entrepreneurially in a corporate environment), or for profits (as in venture capital affiliated), or to acquire innovations (as in the case of the new corporate and internet incubators) (Abduh M et al 2007).

Buys & Mbewana (2007) stress on the importance of partner networks and its contribution to incubator successes through sharing of the wisdom reaped from both achievement and failure. They reiterate that networking too is important in expanding market opportunities for entrepreneurs and graduates.

Marketing and sales assistance are pivotal for growth. The incubation programs can improve the level of services in these areas by appointing more efficient and experienced marketing and sales consultants. BI provides the transformation of ideas into start up business or viable business ventures. In addition, the start-ups receive support and guidance to market their business concepts, work effectively to reduce the failures and garner the ability of free standing in the market after graduation from the incubation program (Abduh M et al 2007).

According to an ‘infoDev (2009)’ report, the incubation program provides networking service linking incubates to other businesses and
resources within the building and community. The program cannot manage that relationship, but it can use its influence and reputation, and links with the private sector and government to identify possible linkages, and to network foreign investors and companies with local companies and resources. Linkages with other incubators and programs would be part of this networking facility.

The consistent advocacy of researchers from mid-nineties till recently emphasises the importance of BIs’ role as a networked entity to provide access to market support to their incubatee firms. However, one can see the shift from the envisaged role of a network partner to that of an innovation intermediary over the years. This shift has to be viewed in the context of emergence of ‘Open Innovation’ from early part of last decade (2000-2005). This holistic view would portray a clear requirement on the part of BIs to embrace to these changing circumstances and adapt to the developments.

BIs can no longer operate in silos. This is more relevant for the majority of Indian BIs who operate out of ‘academic institutions’. While there have been very few ‘open innovation’ intermediary experiments carried out involving BIs, in the recent past, in India, there are no serious research findings around these experiments and data on the outcomes. Even the postulations mentioned in this section from studies carried out by researchers abroad during the last decade carry more of intent rather than concrete empirical outputs of the outcomes. Hence, there is a clear need to investigate the possibility of BIs playing the role of innovation intermediaries and associated issues and challenges.