

The Institutional Context of Incubation: The Case of Academic Incubators in India

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ABSTRACT We introduce incubators as an organizational form intended to facilitate entrepreneurship. The theorizing and research on incubators have been primarily anchored in market failure perspective and carry over the assumptions about a free market economy, mostly implicitly into the empirical work. This ignores the influence of the institutional context and obscures processes that may come into play in emerging economies like India. Using Scott's model (2008) of institutional context, we argue how the institutional context provides a complementary perspective that may reveal a richer picture of incubator operation in emerging economies. We illustrate this in the case of academic incubators in India.

KEYWORDS academic incubators in India, emerging economy, incubation, institutional context

INTRODUCTION

Moving innovations from conception to the commercialization stage or entrepreneurship has been recognized as a key engine of economic growth in both developed and emerging economies (Armanios, Eesley, Li, & Eisenhardt, 2017; Chandra & Fealey, 2009; Dutt, Hawn, Vidal, Chatterji, McGahan, & Mitchell, 2016; Mair, Marti, & Ventresca, 2012; Phan, Siegel, & Wright, 2005). This recognition has led governments, educational institutions, and even some private companies to experiment with alternate organizational mechanisms such as incubators to stimulate entrepreneurship. Although these organizational forms include incubators, accelerators and science/technology parks, incubators have arguably been the most important of these new forms. This organizational form originated in the US^[1], but has over the years diffused to other countries, most recently to emerging economies like India. Because of their potential roles in job creation and economic development, incubators have also attracted the attention of policy makers (Aernoudt, 2004; Barbero, Casillas, Ramos, & Guitar, 2012).

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During the last decade, incubators have emerged in India as a mechanism to stimulate entrepreneurship among the youth. Given the paucity of official statistics, the estimates of the number of incubators have varied. As of 2009, there are 120 incubators in India according to peer reviewed articles (Jamil et al., 2016; Tang, Baskaran, Pancholi, & Lu, 2013), but by 2017, newspaper articles have suggested numbers as high as 140. Many publicly funded elite higher education institutions have instituted incubators to anchor their entrepreneurship courses and programs, especially in technology-based institutions to provide a gateway to the market for in-house research (e.g., Bulsara, Gandhi, & Porey, 2009; Thomas, 2014). More recently, some private incubators have been started by industrial houses in India (e.g., Tata), and the US-based venture capitalists of Indian origin (e.g., Khosla Labs). Finally, the 'Startup India' movement, launched by the Prime Minister of India in 2016 to ensure visibility and funding for government efforts 'to ease regulations and reduce the compliance burden for startups' (Kant, 2017), shone a light on incubators as organizations that provide hands on support to entrepreneurs and promote a culture of innovation so that more and more youngsters become entrepreneurs.

We focus on academic incubators in India, incubators that are associated with major educational institutions, for several reasons. First, academic incubators have had the longest history in India and thus have relatively stable operations. Second, unlike the newly emerging private incubators, academic incubators are public entities created to stimulate entrepreneurship in India. Third, because many of these academic institutions are national, and intake students from all over the country, they are less subject to the variations in institutional context, in a diverse country such as India.

There is reason to believe that many of the academic incubators in India have modeled their operations upon the descriptions of working incubators in developed economies, which are available from books and research-based scholarship. Although slow to evolve, the incipient research on Indian incubators (e.g., Dutt et al., 2016) also seems to take its lead from the theorizing and research on incubators conducted in developed economies. This research has conceptualized incubators as a response to *market failure*, to the neglect of the role of institutional context. In line with the argument that the models from developed economies do not travel well into emerging economies (Armanios et al., 2017; Chandra & Fealey, 2009; Dutt et al., 2016; Lalkaka, 2002), we propose that the institutional context of emerging economies (e.g., India) may serve as a boundary condition to the theoretical predictions from the extant literature. Put another way, we argue that the institutional perspective will serve as a *necessary* complement to the market failure perspective currently dominant in research. Our argument echoes earlier, perhaps broader calls to examine how the matrix of social institutions is responsible for key facets of entrepreneurship (e.g., the emergence of new technological designs) (Murmann & Tushman, 2001).

The purpose of this article is to initiate a focus on institutional perspective as a complement to the extant theory and research on incubators, a focus that is needed as emerging economies adopt this organizational form to stimulate entrepreneurship. We will argue that overall the research on incubators has taken for granted the institutional context of ‘free market economies,’ particularly the existence of *regulative, normative, and cultural components* that support entrepreneurship. Because emerging economies depart from these idealized conditions, the operation of incubators will be more complex and will incorporate policies and practices that ameliorate the institutional context. We illustrate this in the case of academic incubators in India.

The article is organized as follows. In the next section, we summarize the research and scholarship on incubators, identifying both a) the dominant themes that have informed research and b) the relative lack of attention given to the institutional context of incubators. Following that, employing Scotts’ three pillars framework (2008) we characterize the institutional context of emerging economies, identifying three sets of *ceteris paribus* conditions that are not present in these economies, and the implications of their absence for the operation of incubators. Next, we summarize the economic and institutional context of India, pointing out the challenges said context presents to the operation of academic incubators in India. We conclude with a set of fruitful research directions.

THE SCHOLARSHIP ON INCUBATORS

Incubators: What Are They?

Incubators belong to the class of ‘property-based organizations with identifiable administrative centers designed to foster entrepreneurship’ (Phan et al., 2005). Even though incubators are classified as property-based organizations and as such have often been considered together with science and technology parks, and accelerators, there are substantial differences. Unlike science and technology parks, incubators offer not only space and technical facilities to startups but also more customized services such as mentoring and financing. Incubators typically differ from accelerators in the life stage of the startups they engage: Accelerators generally admit startups who are in their growth stage, whereas incubators focus on the early stages (Narayanan, 2017).

The scholarly literature has underscored the major characteristics that render this organizational form an exciting domain of inquiry. Incubators are often established by *non-profit* organizations (e.g., government entities or universities), are typically public-private partnerships, have *multiple stakeholders* with enormous influence over the mission and operational procedures, and are *dynamic* entities, whose structure and practices change over time.

Seen from the dominant market failure perspective, incubators are *intermediaries* that function as a means for creating successful startups, often by connecting

budding entrepreneurs with other actors while providing value that may not be possible by direct trading between actors (Dutt et al., 2016). As intermediaries, incubators perform two functions: *buffering* and *bridging* (Amezcuca, Grimes, Bradley, & Wiklund, 2013). In their *buffering* role, incubators a) provide services to nascent entrepreneurs that markets cannot offer at a reasonable price, and b) undertake activities for ‘business capability development’, (Dutt et al., 2016) to enhance a startup’s capacity to deploy resources for desired end results (Amit & Schoemaker, 1993). In their *bridging* role, incubators a) provide networking support to startups, whereby they connect startups to providers of capital and other resource providers essential to their business (Dutt et al., 2016), and b) undertake ‘field building’ activities (Amezcuca et al., 2013), i.e., building commercial institutions that support business activity (Mair & Marti, 2009), including capital markets, banking regulations, legal systems educational systems and labor markets (Dutt et al., 2016). Buffering and networking activities allow incubators to mitigate affiliated startups’ ‘liability of newness’, by provision of resources, legitimacy, and certification. By contrast, field building activities benefit even nonaffiliated firms, and may have broader impacts. For example, Dutt et al. (2016) cites the case of technology-focused incubator in South Africa working with public agencies to shape science education.

The complexity underlying incubators has prompted scholars to discuss their operations from an open system perspective, incorporating inputs (potential incubatees), operations (incubation process), and outputs (incubated firm) (Dutt et al., 2016). For example, Hackett and Dilts (2004b: 57) observed:

A business incubator is 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. The system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure.

The buffering activities roughly correspond to the ‘process’ elements, and bridging activities, much less studied in the literature, to the ‘input’ and ‘output’ elements. However, Hackett and Dilts (2004b: 57) went on to underscore the importance of keeping in mind ‘the totality of the incubator’, emphasizing that ‘the incubator is also a network of individuals and organizations’. Additionally, Hackett and Dilts (2004a) further clarified the incubator concept and elaborated the ‘input – incubation process – outcome’ model, identifying a comprehensive set of antecedents and inputs, and distinguishing among initial, intermediate and long-term outcomes.

A Summary of Research on Incubators

Not surprisingly, over the years, incubators have attracted empirical scrutiny. A pioneering literature review identified 26 empirical studies (Hackett & Dilts,

2004b) until 2001, and a special issue of the *Journal of Business Venturing* in 2005 featured five articles that represented the then state of the art in research. There has been a significant volume of research since the original review of Hackett and Dilts (2004b), with an identification of databases and methods appropriate to the study of this organizational form. Mian, Lamine, and Fayolle (2016), provided a catalog of journal articles on incubators published since 1985, identifying 149 empirical papers, during the period until 2014.

We extended the review until 2016 but focused only on papers that were published after Hackett and Dilts (2004b). The methodology for identifying the papers is provided in Appendix I. These papers were organized according to the schemes provided by both Hackett and Dilts (2004a, 2004b) and Phan et al. (2005). As we noted earlier, Hackett and Dilts (2004a, 2004b), using an open systems formulation, organized the literature within an input-process-output framework. Phan et al. (2005) underscored the importance of levels of analysis, identifying four levels: 1) the system and economy, 2) the incubators, 3) the firms located upon incubators, and 4) the entrepreneurs. In Table 1, we have provided a breakdown of the papers based on level and system component.

As shown in Table 1, 78% of the studies examined either process, process-output, or output components of incubation. Studies that explored the output side focused on performance measures such as the differences between on and off incubator firms, in terms of survival, sales/profit, employment growth, and/or innovation/research productivity. Studies investigated the process-output link by examining how incubator strategy, services/activities, and management affected aforementioned performance measures. A subset of studies in the process-output category explored different functions (e.g., University Technology Transfer Office or UTTO), mechanisms (e.g., knowledge flow), or personnel that allowed facilitation of process-output relationship. Papers under the process category covered various topics. For example, the topic of networking appeared frequently in which researchers explored networking behaviors within incubators including networking among entrepreneurs, with the incubator management, or with other stakeholders such as academic/research institutions. Yet, other scholars concentrated on services and activities offered by incubators, such as business support, mentoring, and assistance in raising financial capital, and the benefits resulting from those services. Some process focused researchers investigated differences in incubation model, strategy and best practices.

As shown in Table 1, these studies also invoked different levels of analysis. The incubator level (i.e., Level 2) studies focused on the business services and resources provided by the incubator as well as the life cycle of an incubator in conjunction with certain outcomes. Further, some studies in Level 2 discussed the heterogeneity of incubator types. The firm level (i.e., Level 3) studies exhibited similar concepts as the incubator level studies; however, they were viewed from the tenant firms' perspectives. More specifically, Level 3 studies explored the utilization of incubator services and resources, the knowledge flow, the social networking, and the

Table 1. Papers by level and input-process-output

	<i>Number of Papers</i>	<i>Key Themes</i>	<i>Illustrative Papers</i>	<i>Papers from Emerging Economies</i>
Level 1 (System)	5[†]			
Input	0	Impact of incubator on the region/ economy	Etzkowitz, de Mello, & Almeida (2005)	5
Process	3		Hu (2007)	
Output	2		Sofouli & Vonortas (2007)	
Level 2 (Incubator)	76[†]			
Input	7	Services and resources provided by the incubator; Heterogeneity of incubator types	Bergek & Norrman (2008)	13
Process	46		Bøllingtoft & Ulhøi (2005)	
Output	23		Grimaldi & Grandi (2005)	
Level 3 (Firm)	47[†]			
Input	1	Utilization of incubator services and resources; Knowledge flow and network- ing; Economic outcome of the firms	Link & Scott (2003)	2
Process	21		Rothaermel & Thursby (2005)	
Output	25		Vásquez-Urriago, Barge-Gil, & Rico (2016)	
Level 4 (Entrepreneur)	6[†]			
Input	1	Demographic and dispositional variables of entrepreneurs	Colombo & Delmastro (2002)	2
Process	2		Filatotchev, Liu, Lu, & Wright (2011)	
Output	3		Wright, Liu, Buck, & Filatotchev (2008)	
Grand Total	93[‡]			22

Notes: [†] Papers that belonged to a mixed category were counted twice. For example, an Input-Process paper was counted as Input as well as Process. The same logic applied to a mixed category in terms of the level (e.g., Level 2 and 3). [‡] The grand total reflects the number of papers included in the analysis and is the simple sum of papers without double counting.

economic outcome of the firms. The entrepreneur level (i.e., Level 4) studies examined the demographics or dispositional variables (e.g., personality) of entrepreneurs or owners of the tenant firms.

Table 1 is also informative with respect to the gaps in the literature. First, as our analysis shows, there is a dearth of studies (less than 10%) that explore the input side of incubation. Those that track the input side attempt to focus on a) different policies/regulations imposed by government for incubation, and/or b) individual entrepreneur characteristics. We still lack a clear understanding of how incubators are established for what purpose, why entrepreneurs are motivated to join incubators, and social norms surrounding incubators in the respective culture that shape the process of starting a business.

Second, most studies in our sample fall under either the incubator level or the firm level, and only a few appeared at the system level (Level 1) or the entrepreneur level. This uneven distribution reflects the same implication from the previous analysis based on the Input-Process-Output model: there is lack of studies at the institutional level and a need for future research to incorporate institutional influence such as cultural norms. Finally, although there have been a few studies of incubators in emerging economies, most have focused on the services and resources provided by incubators (see Table 1). These economies included China (7), Brazil (3), Portugal (2), Greece (1), and Taiwan (1).

Underlying Perspectives

Although much of the literature on incubators is still ‘fragmented, and anecdotal with a focus on success stories and outcomes’, and hence best described as ‘a theoretical’ (Mian et al., 2016), serious scholarship has emerged in recent years, which has conceptualized incubators as responses to ‘market failures’ – perceived failures or imperfections in the market place to counter the problems caused by an inefficient allocation of resources.^[2] This literature has characterized incubator operations primarily in *economic* terms. This dominant characterization of incubators in economic terms is partly a reflection of the fact that theories about incubation have originated in developed economies, primarily in the US, where the earliest incubators were developed. Not surprisingly, the institutions and broader societal elements supporting the US free market ethos typically serve as the ‘taken for granted’ assumptions that undergird the theories explaining incubators.

Recently, there has been some recognition in the literature for the need to incorporate the role of the broader environment in the studies of incubators. For example, Phan et al. (2005) highlighted that developing a generalizable theory about incubation process may not be feasible due to idiosyncrasies of incubators in relation to geographic, political, social, and economic systems. A few studies have acknowledged that findings generated from incubators in one country may not be applicable to other countries because of different cultural dimensions of each country (e.g., Abetti, 2004; Aerts, Matthyssens, &

Vandenbempt, 2007). Other studies also recognized the existence of the influence of larger institutions, and the nation, in incubator research (e.g., Baraldi & Havenvid, 2016; Chandra & Fealey, 2009).

This recognition of the broader institutional context may be significant for examining the incubator phenomenon in emerging economies. The epistemic strategy of ‘transporting’ theories from their original habitats to related contexts – what Weick (1989) termed ‘knowledge growth through extension’ – occasionally comes at the price of reduced explanatory power (Narayanan & Fahey, 2006). At least three examples from related fields may serve to illustrate this cautionary note. First, Narayanan and Fahey (2006), using Toulmin analysis, demonstrated the reduced applicability of Porter’s Five Forces Analysis to emerging economies. For another, Ramamurti (2012), in a critical analysis of the internationalization literature, observed that the models of internationalization that have grown up around multinational enterprises in developed economies (DMNE’s) seem ‘particularly in need of refinement and extension to incorporate the case of emerging market multinational enterprises (EMNE’s)’ (46). Finally, Scott (2012) argued that to be successful in global construction projects, managers of foreign companies need to augment their project management knowhow and skill set with the ‘institutional knowledge’ of the host countries in which they are undertaking their projects.

An *institutional perspective* is almost conspicuous by its absence in the theoretical treatment of incubators. Although this perspective is gaining attention in entrepreneurship (Holmes, Zahra, Hoskisson, DeGhetto, & Sutton, 2016), it is a relative new comer. Bjornskov and Foss (2016) have sketched the reasons for the lack of attention to institutional factors in entrepreneurship literature, reasons, which by extension, can be set forth for the current state of affairs in the case of incubator literature as well. Given our reliance on the institutional perspective for developing the role of incubators in India, we summarize this next.

EMERGING ECONOMIES AND THEIR INSTITUTIONAL CONTEXTS: IMPLICATIONS FOR INCUBATORS

Because the research focus on emerging economies is a relatively recent phenomenon, scholars have invoked somewhat different, though related, conceptions of emerging markets. For one group of scholars, an emerging economy is a country that exhibits *both* a rapid pace of economic development, and government policies favoring economic liberalization and the adoption of a free-market system (Arnold & Quelch, 1998; Hoskisson, Eden, Lau, & Wright, 2000). A second group of scholars, interested in global trade as well as knowledge and capital flows, distinguish ‘emerging’ from ‘pre-emerging’ economies, with the former participating to a greater degree than the latter in various global chains from manufacture to entertainment to financial services (Giuliani, Pietrobelli, & Rabellotti, 2005; Hill & Mudambi, 2010). For a third group of scholars, emerging market economies

are typically nations in which the development of capital markets, legal systems, labor markets, and other elements of commercial institutions have reached early to intermediate phases of maturation (Bruno & Tyebjee, 1982; Dutt et al., 2016; Hoskisson et al., 2000). Parallel to these efforts, sources have also generated lists of emerging economies. For example, The International Finance Corporation (IFC) currently identifies 51 rapid-growth developing countries in Asia, Latin America, Africa, and the Middle East as emerging economies. These conceptualizations overlap, and for our purpose, will categorize India as an emerging economy.

The literature on emerging economies have traveled along both nomothetic and idiographic lines. The *nomothetic* streams focus on tracing the variations in institutional contexts to underlying factors, e.g., 1) the maturity stage of institutions in the economy, and 2) the timing of integration into the global economy (Ramamurti, 2012). Peng (2003) develops a stage model of transition from emerging to developed economies, in which because of reduction in transaction costs, relationship-based economies inexorably march toward rule-based ones along with the development of formal enforcement institutions. Ramamurti (2012) traces the difference between the US, an emerging economy during the 19th century, and India, to the time at which these respective economies integrated into a developing global economy. The availability of databases has enabled the relatively rapid progress of these streams of work.

The *idiographic* streams tend to spotlight the unique elements of the institutional context. Although according to institutional theorists following the nomothetic lines of inquiry, emerging economies are characterized by their march to market supporting institutions, the idiographic streams view institutional context itself far more complex. For example, building on Fligstein (2001), Scott (2008) underscores the fact that no organization would have to confront all the complexities of institutional environments,

...our contemporary, modern and modernizing world is made up of many diverse 'local social orders': somewhat circumscribed and specialized arenas bounded by shared understanding and relational interdependence (Fligstein, 2001: 30).

Emerging economies are seen not as homogeneous, but as displaying a rich variety of institutional contexts (Djanko & Murrell, 2002; Hoskisson et al., 2000). By implication, this variety, which cannot be accommodated within a limited set of theoretical factors, restricts the reach of nomothetic lines of inquiry.

Given our interest, we invoke Scott's 'three pillars framework' (2008) to characterize the complex institutional context of emerging economies.

Scott's Three Pillars Framework

Scott's framework is *sociological*, arguably one of the comprehensive and frequently cited theoretical lenses in organization theory literature and has fueled such themes as institutional logics (e.g., Reay & Hinings, 2009), and institutional

entrepreneurship (e.g., Hardy & Maguire, 2008; Peng, 2003). The framework identifies three clusters of elements – regulative, normative and cultural-cognitive – to characterize the institutional contexts.

Regulative elements, primarily emphasized by institutional economists, focus on purposeful, formalized behavior and the instrumental effect of creating a system of rules backed by sanctions to reward conformity and to penalize non-conformity. Governmental legislation and industrial agreements and standards are examples of these regulative components. Regulative elements provide guidelines for new entrepreneurial firms and may lead to firms and individuals complying with laws. Further, the lack of law or regulation in the entrepreneurial space can promote a reaction (Bruton, Ahlstrom, & Li, 2010).

Normative elements stress the importance of internalized controls and the constraining power of a desire to behave appropriately in any given situation (March & Olsen, 1989). In essence, it provides a ‘prescriptive, evaluative, and obligatory dimension into social life’ (Scott, 2008: 54). Some societies have values and norms that promote entrepreneurship while some other societies discourage it by making it difficult, often unknowingly (Baumol, Litan, & Schramm, 2009; Soto, 2000).

Cultural-cognitive elements stress the centrality of shared conceptions that constitute the nature of reality. Cultural-cognitive elements are linked to cognitive schemas and frames – patterns of thinking, feeling, and acting, in Hofstede’s (1991) terms, ‘the software of the mind’. These elements operate more at the individual level in terms of culture and language create a cultural milieu whereby entrepreneurship is encouraged as well as behaviors people engage in almost preconsciously (DiMaggio & Powell, 1991). This aspect of institution shapes how societies accept entrepreneurs and create a cultural milieu whereby entrepreneurship is encouraged (Bosma, Acs, Autio, Coduras, & Levie, 2009; Harrison, 2008; Li, 2011).

Scott’s framework is fueled by an underlying systemic conception of the institutional context. It is noteworthy in three further aspects. First, the framework is agnostic with respect to the linkages among the three elements. Causal mechanisms that link the elements, and pressure toward convergence or divergence, are thus contingent on the specific context being examined. Second, and related to the above, the elements may display autonomous evolution independent of each other. Thus, the elements may evolve differently. Finally, both the above aspects suggest that the institutional contexts are likely to be unique and display idiosyncratic characteristics.

When deployed to illumine the incubator phenomenon in emerging economies, Scott’s framework has three advantages. First, being sociological, it provides the necessary *dialectical tension* to the economic characterization of the institutional context invoked in the incubator scholarship. Second, despite its dialectical utility, Scott’s framework is ‘friendly’, as it does *not* place sociological conception *in opposition* to but as *embracing* the economic conceptions of institutional context. A dominant theoretical lens in institutional economics, North’s (1990: 3) conceptualization of institutions as the ‘humanly devised constraints that structure

human interactions' that may include *formal* and *informal* rules and constraints, is anticipated in Scott's framework, with formal rules visibly captured in the regulative element and informal rules in the normative and cultural-cognitive elements. Similarly, the 'soil and seeds' metaphor advanced by Patti, Mudambi, Navarra, and Baglieri (2016) incorporates a) the formal economic and business environment and b) the 'softer elements', but is necessarily (due to data restrictions) less elaborate about the macro level normative and cultural-cognitive elements of the context. True to his sociological anchors, Scott is much more elaborate in his treatment of informal elements (relative to the economic characterizations), separating them into their normative and cultural-cognitive elements and allowing for the existence of informal regulative mechanisms.

Finally, Scott's framework can accommodate *both* top down and bottom up approaches to the development of institutional contexts. In the emerging entrepreneurship literature in management, the top-down views of formal institutions have dominated, but historical analyses have argued for a complementary bottom-up view of entrepreneurs. In the bottom-up accounts, the institutional conditions necessary and sufficient to launch economic growth do not depend 'ex-ante on effective formal institutions to secure property rights and protect wealth from arbitrary exploitation', and the focus is on the endogenous rise of new institutional arrangements (Nee & Opper, 2012). The bottom-up views celebrate the actions of entrepreneurs, and emphasize social learning and mimicry, learning on the job, development of networks of mutual assistance and cooperation, relationship-based lending, the role of reputation as a screening device, and community sanctions (Nee & Opper, 2012). This social constructionist view of entrepreneurship, a complementary view of the institutional context not captured in the treatment of formal institutions, can be accommodated in the three pillars framework because of the framework's flexibility.

Implications for Incubators

Our literature summary presented earlier a) highlighted market failure as the dominant perspective that has informed the literature on incubators and underscored the relative absence of attention to 'inputs', and of b) consideration of the institutional context that may shape the operation of incubators. Further, although in recent years emerging economies have received some attention, the literature and its conclusions are premised upon the institutional contexts of developed economies, primarily the United States, where the *free market ethos* is most pervasive. Thus, in exploring the linkage between incubators and outcomes – either survival or growth of the startup or economic development – the institutional context is taken for granted, and the differences between developed and emerging economies are typically overlooked.

A Toulmin critique (Toulmin, 1958) of the dominant perspective would suggest that the institutional context constitutes a fundamental assumption, and

in turn a critical boundary condition of the extant scholarship on incubators. So as not to disrupt the flow of the argument, we summarize the critical elements of this Toulmin analysis in Appendix II. Using Scott's (2008) three pillars framework to characterize the institutional context, we summarize the critique thus: Assumptions about the existence of regulative, normative, and cultural-cognitive elements prevalent in developed economies are carried over into the theoretical predictions about the behavior and outcomes of incubators in emerging economies. These predictions assume, sometimes explicitly but mostly *implicitly*, the existence of regulative elements represented by market supporting institutions such as intellectual property protection and bankruptcy laws, normative elements as reflected in the focus of educational institutions and 'what is right and wrong' in pursuing business indicated by the levels of corruption and ethics, and cultural-cognitive elements captured by attitudes toward entrepreneurship and innovation.

In developed economies, entrepreneurship is supported by regulative, normative, and cultural-cognitive elements of the institutional context. Reversing the gaze (Sin, 2007; Törngren & Ngeh, 2018), the institutional context and its stability enable incubators in developed economies to leverage this institutional heritage to focus on a narrow range of activities to aid business formation. However, emerging economies are not likely to be so fortunate. For example, a) patent laws and bankruptcy laws may be in formation, and even when present, they are enforced sporadically, b) educational institutions may be focused on theory to the neglect of application and c) there may be negative cultural attitudes toward risk taking, innovation, and entrepreneurship. The differences in institutional contexts may impose additional burdens on incubator operations and may detract from incubators' effectiveness. For example, Chandra and Fealy (2009), in a comparative analysis of incubator financing and financial services, concluded that in China and Brazil, the incubators had a more complex set of challenges than in the US, were more dependent on the government, and yet themselves differed from each other in their operations because of fundamental differences in their contexts.

At the general theoretical level (and by extension to the specific context of India), it can be argued that the institutional context may limit the generalizability of findings from the extant literature on incubators. In the following sections, we develop these arguments in the context of *academic* incubators in India. To discuss the challenges faced by Indian academic incubators, we will first place them in India's institutional context.

THE INFLUENCE OF INDIAN INSTITUTIONAL CONTEXT ON ACADEMIC INCUBATORS

India as an Emerging Economy

A predominantly agrarian economy, from independence until the 1980s, India was mostly a centrally planned socialist economy and one of the most closed economies

in the world. The balance of payments crisis in 1991, triggered by the Gulf War of 1991, and the fall of the Soviet Union, one of India's largest trading partners, prompted the government to move away from socialism toward market liberalization and deregulation. To put this in context, China had embarked on a path toward liberalization almost a decade earlier. Although state owned enterprises continue to coexist with private companies, both domestic and foreign, following liberalization, the Indian government has backed away from micromanaging the economy. To illustrate: The government ceded its monopoly over long distance phone service, some tariffs were cut, and bureaucracies trimmed; several industries were opened to private investment, including investment from abroad (Huang & Khanna, 2003).

The uniqueness of the current Indian context may be illustrated along several dimensions: id. First, the British Rule has left a major legacy, democracy and the rule of law, both of which generally prevail in India. According to Huang and Khanna (2003) Indian courts comprise a functioning independent judiciary, although 'notoriously inefficient', although property rights are not fully secure, the protection of private ownership is certainly stronger than in China. Second, the historical legacy has allowed the emergence and evolution of India's capital markets: its banking system and bond and stock markets. Further, government supported developmental financial institutions (DFI) have prompted entrepreneurial activity in the absence of private venture capitalists (George & Prabhu, 2000).

Third, like other emerging economies, business groups – 'a set of firms which though legally independent, are bound together by a constellation of formal and informal ties and are accustomed to taking coordinated action' (Khanna & Rivkin, 2001: 47) – constitute a central feature of the competitive landscape of India. A substantial number of business groups, many of them based on family relatedness, have continued to exist and contribute to Indian economic growth for decades. Singhal and Tagore (2002) observed that various entrepreneurial groups formed out of business families gradually transformed into powerful business groups. Kedia, Mukherjee, and Lahiri (2006) profile the evolution of the top twenty business groups that have existed since 1960s.^[4] In the absence of specialized intermediaries in capital markets, these businesses maintained fairly easy access to business capital by creating parallel *internal* markets (Ghemawat & Khanna, 1998; Khanna & Palepu, 2004) and also served as a training ground for managerial talent.

Fourth, India has enjoyed the presence of multinational corporations, both foreign and domestic. Both European and US multinationals have been present in India for several decades with attendant 'spill over' and 'catchup' processes (Hill & Mudambi, 2010). Spill over in terms of technology (e.g., cars or software development) and management and manufacturing knowhow have potentially benefited the Indian economy. MNEs from developed markets remain the most sought-after employment destinations among educated Indians. The government resistance to foreign direct investment (FDI) has partly contributed to the

emergence of several companies – emerging market multinational enterprises (EMNEs) in Ramamurti's (2012) terms – that now compete internationally in Europe and the US (e.g., Infosys, Wipro, and Ranbaxy).^[5]

A fifth distinctive characteristic is the impact of the Indian diaspora on the Indian context. Indians have been migrating for centuries and the diaspora constitute an 'important and unique force in the world economy'. (See Pandey, Aggarwal, Devane, & Kuznetsov (2004) for a detailed description of the diaspora). During the second half of the 20th century, the major segments of Indian diaspora were engineers, doctors, lawyers, and management professionals. They had a significant role in the development of the Information Technology (IT) sector (e.g., Silicon Valley in the US), and the evolution of the IT sector in India. However, unlike in China, the India diaspora was, at least recently, resented for its success and much less willing to invest back home. Until now, the Indian diaspora accounted for less than 10% of the foreign money flowing to India (Huang & Khanna, 2003). The liberalization of the Indian economy during the 1990s and the success of the IT industry has altered this situation. And it is expected that investment from nonresident Indians is likely to increase.

The liberalization of India, in conjunction with its abundant supply of English speaking high skilled cheap labor, made the country an attractive option for foreign countries to invest. However, India was still lacking 'bandwidth' or 'high speed connectivity' for the software industry and the government of India set up technology parks to accommodate this issue. Even though software technology parks are dispersed all over India, the major industry concentration is in Bangalore, Noida, Pune, Chennai, Hyderabad, and Mumbai (Vaidyanathan, 2008). The software industry is considered as the only globally competitive industry in the organized sector in India (Dayasindhu, 2002). Looking ahead, Forbes has selected technology, along with infrastructure, financial services, technology, and automotive as the top five industry sectors that will drive the country's growth (Bouw, 2017).

Although all the above selected features have influenced both the economic development of India and post-liberalization India's rise as a major emerging economy, they also may have influenced the institutional context. We will acknowledge that patterns of industrial development vary significantly across various regions of India, with some regions having developed startup friendly ecosystems, some with investment friendly climates, and attendant cultural attitudes. For simplicity, we will not account for regional variations.

We will next deploy Scott's framework to piece together a profile of India's institutional context.

The Institutional Context of India

Although attempts to comprehensively portray the institutional context of a country are almost nonexistent, several comparative reports have provided a picture of Indian institutional context – regulative, normative, and cultural-cognitive elements – that

may have relevance to the operation of incubators. In [Table 2](#), we have summarized selected indicators of these elements and their sources.

Regulative elements. As we noted above, India's institutional legacy has generated a respect for the rule of law and private property, a functioning but slow judicial system, and recent economic evolution has been facilitated by a reasonably well functioning banking system and the emergence of stable stock and bond markets, Indian entrepreneurship is hampered by three key elements: 1) intellectual property protection, 2) enforcement of property and contract rights, and 3) laws related to bankruptcy protection, which allow a degree of risk cushion (see also Damaraju, Barney, & Dess, 2017; Narayanan & Fahey, 2006). The World Bank CPIA gave a mixed picture of India, whereas Global Competitiveness Report and Global Innovation Policy Index assessed the property rights and bankruptcy laws as weak in terms of their impact on startups. Further, the costly and excessively time-consuming process of starting a business in India was identified as an impediment to the creation of new firms. Overall, in India, the regulative and administrative framework for entrepreneurship is complex and poorly supportive (e.g., The World Bank: Innovation Policy Platform).

Normative elements. Corporate governance practices in India emerging, and some business groups (e.g., Tata's) and EMNE's (partly due to their exposure to global, primarily developed market pressures) are providing models of ethical behavior. In corporate governance, India has made progress, having recently been ranked (6th) higher than China (19th), among 25 emerging economies (Huang & Khanna, 2003). However, the available metrics also provide a mixed picture of formal institutions supporting entrepreneurship. India is characterized by a large informal sector, high corruption, low access to finance, and with mixed ratings on higher education and training. More specifically, the Innovation Policy Index showed that, as of 2012, India was still considering adopting a Bayh-Dole-like policy to promote the commercialization of university research by granting IP ownership rights to the universities.^[3] The ecosystem of transferring knowledge from higher education institutions to entrepreneurs and companies was not effectively supported without such policies in place.

Cultural-cognitive. The success of the Indian diaspora has begun to cast entrepreneurship in a favorable light, but India remains a very tight culture (Gelfand et al., 2011). Just as individuals in tight cultures may be more cautious (concerned with avoiding mistakes), dutiful (focused on behaving properly), and have a higher need for structure (Gelfand et al., 2011), Indians may want to strive to avoid uncertainty by relying on social norms and bureaucratic practices to alleviate the unpredictability of future events and may feel comfortable settling into established routines. These cognitive tendencies may restrict opportunity recognition (Baron, 2006) or channel attention to culturally sanctioned paths, both to the detriment of cultural endowments necessary for entrepreneurship. The persistent

Table 2. Regulative, normative, and cultural-cognitive indicators

<i>Dimension</i>	<i>Source</i>	<i>Assessment</i>
Regulative	Global Competitiveness Report ^[1]	Low property rights (3.9/101 th)
		Medium intellectual property protection (4.5/42 nd)
	Global Innovation Policy Index ^[2]	Medium higher education and training (4.1/81 st)
		Medium affordability of financial services (3.8/38 th)
		Low patent application (1.6 per million pop./64 th)
		High time to start a business (29 days/115 th)
World Bank	Weak property rights	
	Weak bankruptcy protection	
	Slow bankruptcy process	
Normative	Global Competitiveness Report ^[1]	High costs and burdensome requirements to start a business
		Low property rights and rule-based governance (3.5) ^[3]
	World Bank	Low access to finance ^[4]
		Complex tax system and tax cascading ^[5]
		High start-up administrative costs and market exit constraints ⁵
		Medium ethics and corruption (4.4/36 th)
Cultural – Cognitive	Gelfand et al. (2011) ^[6]	High corruption ^[4]
		Large informal sector ^[4,5]
		Very tight culture (3 rd out of 33 nations)

1.The Global Competitiveness Report 2016–2017, World Economic Forum – 138 countries, ratings with 7 being the best
 2.The Global Innovation Policy Index 2012, Information Technology and Innovation Foundation and the Kauffman Foundation
 3.World Bank – Country Policy and Institutional Assessment (CPIA) database: (1 = low to 6 = high)
 4.World Bank – Enterprise Surveys
 5.World Bank – Innovation Policy Platform
 6.Gelfand et al., 2011

cultural influences – family and social system characteristics – may reinforce these tendencies and restrict risk taking behavior.

As can be inferred from Table 2, the institutional context of India remotely resembles the free market economy assumed in the received literature on incubators. The intellectual property protection and bankruptcy laws both of which provide some risk cushion are still in formation, formal institutions that support entrepreneurship are conspicuous by their absence, and the cultural-cognitive milieu does not portray a particular entrepreneurship friendly environment. It should also be acknowledged that being a diverse country, there are likely to be regional variations in India – both in terms of regulative elements and cultural-cognitive milieu. Thus, a few regions of India (e.g., The States of Gujarat and the Punjab) are well known for their entrepreneurial culture, and state level regulations generally are supportive of entrepreneurship. This diversity cautions against

generalizations across regions of India. Therefore, in highlighting the implications of the institutional context, we will restrict ourselves to academic incubators in national institutions, where the local pressures may be muted.

Academic Incubators in India

Academic incubators began to gain attention in India after the liberalization of the economy in the early 1990s (Vaidyanathan, 2008). In the wake of liberalization and the growth of the software sector, some of the elite academic institutions in engineering (e.g., the Indian Institutes of Technology or IIT's) and management (e.g., Indian Institutes of Management or IIM's) began to institute programs in entrepreneurship and to develop academic incubators to encourage entrepreneurship. For the sake of simplicity, we will restrict our discussion to these institutions. These elite higher education institutions draw their 'inputs' on a meritocratic basis from all over India, without regional quotas or allocation; partly therefore, they are less likely to be influenced in their choice of students and faculty members by the location. Also, as we noted earlier, these incubators are stable and have perhaps the longest life span of incubators in India.

In India, although academic incubators were new as an organizational form for developing entrepreneurship, there have been alternate routes to incubation and to entrepreneurship. First, as we have seen earlier, scions of major business families, who had easy access to financing and networks, and could undertake entrepreneurial ventures, could incubate their entrepreneurial skills in their own families augmented, if necessary, by business degrees from the most prestigious business schools in the world. Second, many of the India diaspora, especially technologists groomed primarily in elite Indian academic institutions who emigrated to the US for higher education, became entrepreneurs, later founding or co-founding new enterprises in the US. Third, government agencies, venture capitalists, and corporate entities performed activities similar to that of incubation, the latter two in a for-profit mode (Kumar, 2009).

The academic incubators also differ among themselves, partly reflecting the differences among the institutions in which they were located. For example, incubators in engineering institutions (e.g., IIT's) could rely on the home institutions' technical expertise, and often restrict the startups they admit to insider, i.e., their own students and/ or faculty. Those in management institutions (e.g., IIM's) are typically open to outsiders, but have to acquire technical expertise as and when needed or build linkages to engineering institutions. Quite likely these differences among the incubators partly explain differences in their responses to the influence of the institutional context. We next turn to the implications of India's institutional context.

Implications of India's Institutional Context for Incubator Operations

Being somewhat different from the ideal of free market economy, the institutional context of India, currently in transition, is likely to influence the operation of

academic incubators. These implications can be suggested for the input-, incubation process-, and output- components of academic incubators.

Inputs. Most students enrolling in the above academic institutions typically come from ‘middle-class’ backgrounds. As noted in the report (Pandey et al., 2004: 8)

The students entering IITs do not necessarily have privileged or even commercial background and in fact 80 percent come from the Indian middle class, whose parents are educated but work in low paid and often in the Indian Civil Services sector.

They have conservative attitudes towards risk and they expect their higher education to gain them a passport to the best paying jobs, usually in major, mostly foreign owned, firms. These students constitute the potential ‘input’ (Hackett & Dilts, 2004a) – prospective entrepreneurs – into the incubators.

Although academic incubators in India often mimic screening procedures from their counterparts in developed economies, the academic incubators may also have to undertake activities to enlarge the pool of potential individuals interested in entrepreneurship and starting an enterprise, i.e., to ‘encourage’ students to consider entrepreneurship as a possible career move. A critical issue here is to overcome not merely the students’ *perception of heightened risk* in embarking on a startup, but also the *stigma* attached to potential failure. In India, these individual perceptions are reinforced by cultural forces and family networks through mechanisms such as shaming and ostracism. These influences may be more pressing than the risk calculations in the developed economies, which may have developed social safety nets for failure. Ensuring debt relief to students, and in case of failure of a startup, extending the involved students’ opportunities to compete in the labor market via placement activities are examples of activities that may/or should be undertaken by the academic incubators.

Incubator process. These incubators may also undertake activities to overcome the barriers created by the institutional context. First, they may need to be cognizant of practices to break through the cultural hostility to entrepreneurship. In the words of Amitabh Kant (2017), presently Chief Executive Officer of National Institution for Transforming India (NITI Ayog), a Government of India institution for catalyzing the development process, ‘...the stories of successful startups are aspirational in terms of creating impact, wealth, or solving real problems that society faces at scale’. The incubator activities may include showcasing successful *role models* to students and demonstrating the value of entrepreneurship as a career.

Second, the stigma associated with failure may be muted in the case of innovations that are framed as useful for the society and the nation (e.g., Roysam, 2017). Attempts to solve societal problems are likely to be greeted with social approval and participating in *social innovations* may be culturally less grating than normal entrepreneurship, often understood as being driven by a self-interested profit motive. Again, in the words of Kant (2017),

India has several challenges. We need, among other things, 30-day flyovers, a zero-blackout economy, universal drinking water, connected farms which can sell to the global market and low-cost green batteries to power electrical vehicles and stabilize the grid. Our startups must take on these challenges and find solutions to India's problems. When they find a viable business model the market will not merely be the one billion plus Indian market but also the next seven billion people of the world.

Incubators may undertake activities that may include an added emphasis on 'social innovation'.

Third, advising activities may include ways to deal with the inertia of complementary institutions, including government agencies that determine licensing, including issuing import and export licenses.

Finally, these incubators may also undertake *influence* attempts at several levels: to attract the engagement of faculty in their respective institution to maintain intra-organizational support, and to 'lobby' both state and federal governments for sustainability.

Outputs. The incubators may also undertake activities on the output side to address the regulative components of the context that may need to be aligned with the requirements of startups. Because the regulative changes ensue only in the long run, the incubators are likely to undertake these activities in *collaboration* with other actors including incubators. The specific activities may include participating in the architecture of ecosystems in nascent industries, advocating policy positions (through white papers or policy papers) on intellectual property and bankruptcy laws, and on organizational architectures needed to move technology from universities and research institutions to the market.

Thus, although Indian academic incubators will perform activities characteristic of their counterparts in developed economies, it is quite likely that to be successful they will have to undertake *additional* activities, both buffering and bridging, that serve as 'substitutes' for the missing elements of institutional context necessary for entrepreneurial success. The 'buffering' activities are likely to emphasize both the congruence of entrepreneurship with emergent cultural trends and the training of startups to deal with intransigent institutional forces. In their bridging activities, incubators may develop networks with numerous actors including other academic institutions, Indian diaspora, Indian business groups and MNE's and local, state, and federal government agencies. The field building activities undertaken in collaboration with these partners may not merely pertain to regulative context and industry- or region-specific ecosystem building, but also enable transitioning the normative and cultural-cognitive components in entrepreneurship friendly directions. Of course, the specific constellation of 'additional' activities an incubator undertakes is likely to be determined by the type and chosen mission of the incubator. This offers a major opportunity for empirical research, and we take this up next.

FUTURE RESEARCH DIRECTIONS

In this article, we have argued that the extant theory and research on incubators, anchored primarily in a 'market failure' perspective, need to be augmented by an 'institutional perspective,' to capture the unique facets of inputs, processes, and outputs of incubators in emerging economies. Using Scott's three pillars framework, we have illustrated that in the case of India, the institutional context remotely resembles that of free market economies, where much of the current scholarship on incubators has originated and developed. Emerging economies offer us a unique opportunity to discover the influence of institutional context on incubators (and entrepreneurship more broadly).

Because the purpose of the article is to direct scholarly attention to the under-explored facets of institutional context that may influence incubator operations, it is conceptual and conjectural and needs to be followed by appropriately designed empirical work. Following Scott (2008), we have argued that the normative and cultural-cognitive components of the institutional context, which need not evolve in step with the regulative component, require empirical researchers to grapple with the unique characteristics of the Indian context. Thus, we argue in favor of an *idiographic* stance in research (as a necessary complement to the more prevalent nomothetic stance). In other words, the trend toward econometric analyses appropriate for exploring the market failure models (e.g., Armanios et al., 2017; Dutt et al., 2016) will need to be augmented by a persistent emphasis on appropriately designed case studies.

In-depth case studies of incubators in India that expose the subtle cultural and normative mechanisms are needed, the data for which is not easily standardized and available for statistical analysis. We propose that multiple case study designs with embedded structure (Yin, 1994) are a fruitful way to explore how incubators in India operate in and deal with the institutional context. A multiple case study design is preferred over single case study design because the result may be more robust for the former (Yin, 1994). Examining multiple incubators of India and collecting data from tenant firms (e.g., entrepreneurs) *embedded* in these incubators would be most beneficial. Within this broad umbrella of case studies, we will highlight two key issues: selection of incubators for the study; and 2) data collection.

The first issue in designing a multiple case study would be to identify criteria by which to select cases, in this case, incubators. Individual incubators could be selected based on factors that contribute to the differences in search, operations, and external engagement, elements that we have identified as being influenced by the institutional context. We offer four such criteria: 1) academic versus non-academic, 2) science and technology focused versus general, 3) national versus local, and 4) based on regional diversity. First, because incubator actions may depend upon the mission of the incubator and are not necessarily related to the institutional context, researchers need to distinguish incubators that are associated with academic institutions from those that are not (e.g., corporate). Second,

academic incubators differ in their operations depending on whether they are science and technology related or whether they are general or management school related. This serves as a screen for the type of projects they support, with the screening in general incubators, mostly affiliated with management institutions, likely not be so constrained as their science and technology counterparts. Third, because there are regional variations in 'business friendliness' in India, a third differentiator would be whether incubators operate in entrepreneurship friendly regions versus in business hostile regions. Finally, some incubators may be locally oriented such that they are heavily influenced by local policies, and their influence is limited to the geographic region, while others are not restricted in such ways. Given the comparative nature of multiple study design, researchers need to be cognizant of these differences and how they may influence study findings.

The second issue would be the approach to collect appropriate data for analysis. As we have discussed above, although case studies were common in the literature, most of them, informed by the market failure perspective, have focused on business practices or regulative elements to the neglect of normative and cultural components. We suggest that the focus of these case studies be enlarged. Data should come from multiple sources including qualitative (e.g., interviews and/or observations) as well as archival (e.g., incubator website, data from incubator management, etc.). Information regarding incubator activities and practices should be gathered over and beyond the archival sources, and in many cases, the interviews and observational data may yield valuable information. Recall a focus of these future studies is on the policies and practices employed by incubators in response to the evolving institutional context in its entirety (to the extent possible), and the start-up ecosystem of India. Also, incubators are dynamic institutions with multiple stakeholders. As such, in collecting data, it is imperative to capture perspectives of investors, incubator administration, academic institutions, as well as entrepreneurs. Once data collection is complete, researchers need to review and codify the qualitative data for analysis.

The case studies will likely provide the necessary material to move onto large sample studies that emphasize generalizability. The multiple case study is suitable to obtain a deeper understanding of how incubators operate in the context of India as the qualitative data collection methods, such as interviews, allow researchers to investigate 'how' and 'why' questions (Yin, 1994). The data collected from the multiple case study can serve as a foundation to build survey items for empirical study. Surveys, once constructed, are relatively less time consuming and cost-efficient compared to the multiple case studies, and they can be applied to a larger number of cases, which in turn, increases the generalizability of the findings.

Emerging economies are in flux, and the incubators must adjust in the face of institutional changes. Therefore, it would be fruitful to examine the changes in incubator activities and practices over time. For example, academic incubators have a relatively longer history of existence in India, but there may be incubators

in other industries that are in nascent stages of development. Depending on the stages of development, incubators may implement different policies and practices to be effective. The use longitudinal study design enables researchers to track those changes and investigate respective implications.

On the *theoretical* side, emerging economies provide a unique opportunity to broaden the current scholarship on incubators to incorporate institutional elements. To illustrate, we will offer three possible avenues for theoretic development. First, what strategic and tactical means do incubators adopt in capability development of startups (Dutt et al., 2016) that are responses to the regulative, normative, and cultural-cognitive components of the context? Do the buffering activities embrace the intrusion of culture and other social elements? Do they undertake bridging activities, and if so of what kind? Strategy as practice (Whittington, 1996) or dynamic capabilities (Teece, Pisano, & Shuen, 1997) lenses may be useful for developing theoretical predictions for empirical verification. Second, although the literature has given us ‘networking’ and ‘field building’ as two types of bridging activities (Amezcuca et al., 2013), the emerging economies may display a wider range of bridging activities not exhaustively captured by the available theory. Bridging activities may be *layered* and may address a much more *complex* set of actors than in developed economies. Thus, incubators may participate in the transition of an economy from emerging to developed or may restrict itself to the development of a new industry, a lower level entity. Activities may not be restricted to economic actors, but may embrace diaspora, other incubators, and a whole host of institutions. Indeed, the behavior of incubators may give valuable insights into the development of ecosystems, in general.

Finally, because emerging economies are in transition, incubators may serve as a crucible for testing evolutionary predictions. For example, how do mimetic and innovative forces combine to explain the changes in incubator behavior over time? Will incubators in emerging economies converge in their mode of operation to their counterparts in developed economies? Or will normative and cultural-cognitive forces persist in maintaining their uniqueness? Incubators offer a ready-made site for tracking the influence of normative and cultural strands on evolutionary dynamics.

NOTES

This article was partially supported by funding from the Fulbright Commission, USA and Nehru Foundation, India. We would like to thank Andrea Farro, presenter Ari van Assche, and other participants of *MOR* Special Issue Professional Development Workshop at the Indian Institute of Management Bangalore, January 2018, for their help in revising the article.

- [1] The Stanford Research Park authorized in 1951 was the first research park in the US while Cambridge Science Park established in 1970 was the first science park in the UK (Vaidyanathan, 2008).
- [2] Hackett and Dilts (2004b) identify four approaches – market failure, structural contingency, co-production of value, and network theory – but during the decade following Hackett and Dilts (2004b) structural contingency and co-production of value perspective have been able to attract few adherents, but they were employed in conjunction with market failure and/or

institutional void perspective. Also, we assimilate network theory within the broader institutional void perspective.

- [3] The Bayh-Dole Act of 1980 or Patent and Trademark Law Amendments Act (Pub. L. 96-517, December 12, 1980) is United States legislation dealing with intellectual property arising from federal government-funded research. The Act is named after its sponsors, Birch Bayh of Indiana and Bob Dole of Kansas, who were senators in respective states. The Act arose from the fact that the US Government had licensed only about 5% of its accumulated 30,000 patents. Under the Act, the contracting universities and businesses were permitted to exclusively license the invention to a third party where it determines the invention is not being made available to the public on a reasonable basis (Stoltenberg, 2010). Although several studies of the effect of Bayh-Dole Act have concluded that Bayh-Dole Act had limited impact on university functioning in the US (Jensen & Thursby, 2001; Mowery, Nelson, Sampat, & Ziedonis, 2004), we use the World Bank indicator to suggest the relative lack of regulatory attention to entrepreneurship in India; Indeed, unlike many universities in the US, Indian universities till recently were not focused on technology transfer.
- [4] Kedia et al., (2006) introduced the top twenty Indian Business Groups based on the accumulated assets and the list for the year of 1990 includes the following groups: Tata, Birla, Reliance, J K Singhania, Thapar, Mafatlal, Bajaj, Modi, MA Chidambaram, TVS, Shriram, UB, Bangur, Kirloskar, Walchand, Mahindra, Goenka, Nanda (Escorts), Lalbhai, Ruia (Essar). These groups are distinct from entrepreneurial start-ups mentioned in the following paragraph (e.g., Infosys, Wipro, and Ranbaxy).
- [5] Ranbaxy is founded in India and still has its headquarters located in India but has been acquired by a Japanese company (i.e., it is a subsidiary of the Japanese company).

APPENDIX I

Selection of Papers

We searched the major journals in the management field using the following keywords: ‘Science Park’, ‘Incubator’, ‘Technology Incubator’, ‘Business Incubator’, and ‘Technology District’. This search yielded 130 published papers. We employed several scanning criteria to select the papers for the current study. First, we focused on papers published after Hackett and Dilts (2004b), who provided a comprehensive review of incubation up until 2002 and generated great interest on the topic. Indeed, a number of significant studies came out after the review, and we concentrated on papers published in 2002 and onward to provide an updated perspective on the incubation research.

Second, we excluded policy papers, unpublished conference papers, and review articles. For example, we did not include Cornelius and Bhabra-Remedios (2003) given that it was presented at 16th Annual Conference of Small Enterprise Association of Australia and New Zealand, but not published in an academic journal. Similarly, we excluded Public Policy on Business Incubators: an OECD Perspective by Nolan (2003), which we judged to be a policy paper. There were also review papers (e.g., Hackett & Dilts, 2004b; Mian, Lamine, & Fayolle, 2016; Phan et al., 2005; Siegel, Waldman, & Link, 2003), which provided overview of the research stream and although we refer to these articles, they were not part of our data analysis.

Our final sample became 93 empirical papers from the period of 2002 to 2016. Consistent with the recent literature review by Mian et al. (2016), more than 50% of papers came from either *Technovation* (29 papers) or *Journal of Technology Transfer* (22 papers). *Research Policy* and *Journal of Business Venturing* came next with six papers each.

APPENDIX II

Toulmin Analysis

The epistemological claims of any theory, model or framework to ‘knowledgehood’ (that is, a body of knowledge worth taking seriously) rest on the cognitive enterprise on which the claims are founded. As noted by Rescher (1992), the quality of this cognitive enterprise rests on a rational discourse that

ensures the existence of persistent and pointed challenges to key elements in the reasoning process. This in turn requires an (epistemological) methodology to structure the arguments constituting a frame that ties together analytical constructs, explicit or implied causal connections, relevant evidence, and perhaps most critically the underpinning assumptions (that unfortunately often remain largely implicit). It is for this purpose that we now invoke Toulmin's approach to epistemological analysis.

The Toulmin method (Toulmin, 1958) makes explicit that every theoretical frame must start with three core items: descriptive data (D), outputs or claims (C) in the form of conclusions, implications or prescriptions, and propositions or warrants (W) in the form of principles or rules that enable the theorist to get from D to C. The argument, i.e. the logic or reasoning that enables the strategist to get from D to C is rarely self-evident or transparent. However, such data (D), no matter how comprehensive or detailed, do not explain the claims (C), that is, the inferences, recommendations, or assertions, derived from the Porter strategy frame.

Thus, warrants (W) demand that the theorist explicates the propositions, that is, the statements in the form of relevant rules or principles that serve as the necessary bridges between D and C. The Toulmin method, however, cautions that any advocated warrant (W) be examined for its backing (B): What historical evidence supports the proposition? What other principles or rules support the warrant? The backing (B) typically takes into account descriptive data that are different from the D that buttresses the specific C in question. As B is explicated, our understanding of the argument at the heart of the strategy frame is further refined and enhanced.

Toulmin can be used in a Hegelian sense, to provide a dialectical tension between two theories. Because Toulmin analysis (Toulmin, 1958) demands a close examination of the underlying structure of argumentation, especially the assumptions (Mason & Mitroff, 1981), the analysis also recognizes that the underlying argument may hold with varying degrees of strength across different contexts. Thus, it is necessary to examine the magnitude that the D confers on the C by virtue of one or more W. By identifying qualifiers (Q) to an argument, researchers can refine the domain and range of applicability of the proposed logic. The discovery of qualifiers is enabled by deriving assumptions with the help of *another* theory that then stands in dialectical tension to the original theory being analyzed (see also Narayanan & Fahey, 2006). Q represents the *boundary condition* within which a theoretical scheme can be employed to yield valid inferences. Q forces theorists to consider the circumstances in which the argument does not hold or the conditions of rebuttal (R).

In the case of the dominant perspectives that fuel research on incubators, a Toulmin analysis of the argument structure is presented in Figure 1. As shown in the figure, the link between incubators and desired outcomes hinges on arguments based on market failure taking for granted the institutional context of a free market economy. Assumptions about the existence of *regulative*, *normative*, and *cultural-cognitive* elements – prevalent in developed economies – are carried over into the theoretical predictions about the behavior and outcomes of incubators in emerging economies. In the context of incubators, these predictions assume, sometimes explicitly but mostly implicitly, the existence of regulative elements represented by market supporting institutions such as intellectual property protection and bankruptcy laws, normative elements as reflected in the focus of educational institutions and 'what is right and wrong' in pursuing business indicated by the levels of corruption and ethics, and cultural-cognitive elements captured by attitudes toward entrepreneurship and innovation. These three assumptions serve as *qualifiers* in Toulmin analysis, with the *rebuttal* being that each one of these assumptions is likely to be vitiated in emerging economies to varying degrees. For example, a) patent laws and bankruptcy laws may be in formation, and even when present, they are enforced sporadically, b) educational institutions may be focused on theory to the neglect of application and c) there may be negative cultural attitudes toward risk taking, innovation, and entrepreneurship.

The absence of these regulative, normative and cultural-cognitive factors may have significant implications for the operations and effectiveness of an incubator. Key implications are sketched in Figure 2. First, incubators may have to institute policies and actions to ensure inputs, a pool of viable incubation candidates, to overcome the normative pressures and cultural hostility to entrepreneurship. Thus, for example, academic incubators may have to incur the costs involved in reducing the risk exposure of students interested in pursuing incubation in these academic institutions.

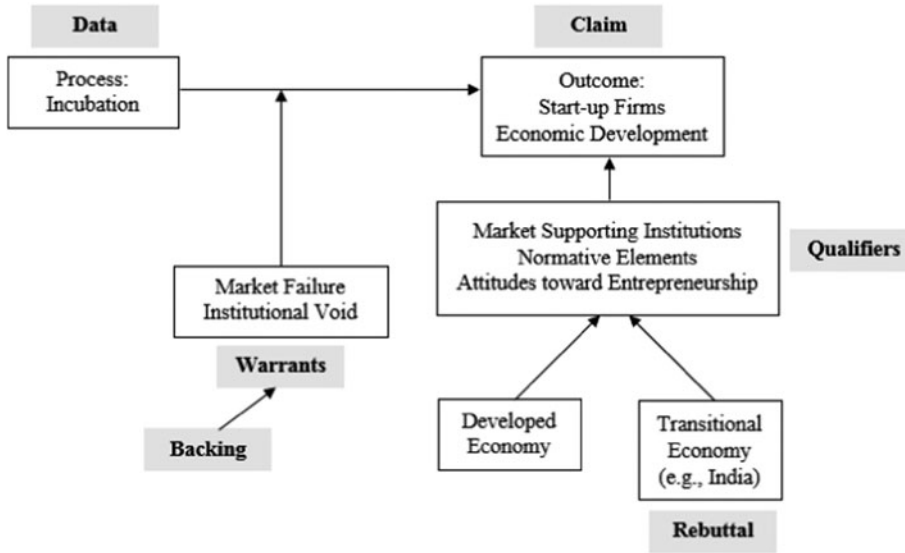


Figure 1. Toulmin analysis of the argument structure

Similarly, incubation process may have to incorporate showcasing entrepreneurial role models to instill the value and potential of pursuing an entrepreneurial career, not merely the mentoring for entrepreneurial success. Second, in the absence of relevant regulative elements, a startups’ pathway to success may be somewhat different from the one in developed economies. Thus, incubators may have to demonstrate methods of dealing with government agencies (e.g., licensing), assuring intellectual property protection, and avoiding both the actuality and the ‘stigma’ of bankruptcy. In the absence of these regulative elements, the link between incubation and outcomes may be somewhat different from that observed in developed economies. Third, incubators may themselves participate, in collaboration with other actors, in the transition of the economy toward the model espoused by the developed economies. Put another way, all the while they are operating within a cultural milieu, incubators also become agents of cultural change. We use academic incubators in India as an illustration of these implications.

APPENDIX III

Types of Academic Incubators

It has been documented that in India several different types of incubators have recently come into existence. Based on the promoters of incubators, Kumar (2009) has reported the existence of incubators in academic institutions, government agency (‘local economic development incubator’), Venture Capital Firms, and corporate organizations. Given our focus on academic incubators, we focus on two types of academic incubators, based on whether the incubator is situated in 1) a science/ technology based or 2) a management institution.

Science/Technology incubators have been started in major national science and engineering institutions. They include Indian Institute of Science, several Indian Institutes of Technology, Birla Institute of Technology and Science (BITS), and are supported by the Government of India. They typically encourage technology-based incubation and restrict or give preference to startup applicants from their own institutions, including student, staff and faculty. Academic incubators in major national management institutions include CIIE in IIM Ahmedabad, and NS Raghavan Center for Entrepreneurial Learning (NSRCE), and are also supported by public funds both from the Government of India and State governments. They do not restrict themselves to technology-

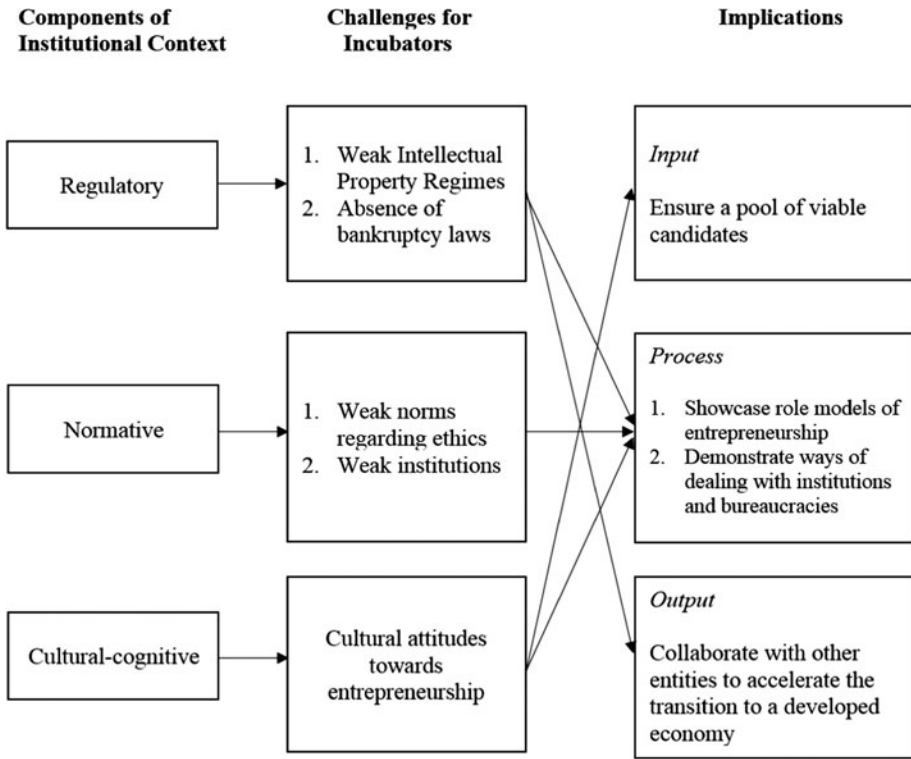


Figure 2. Key implications from analysis of incubators in emerging economies

based incubation and are open to startup applicants from all over the country. Given their respective charters, these two types differ in terms of their selection and screening, bridging activities, resource bases and the type and stage of incubation:

1. Science/Technology typically screen from their own students, faculty and staff, and hence do not have to expend effort to gain incubatees unlike management incubation centers, who must solicit, screen and select from startup applicants from outside their academic institutions.
2. Being national institutions, both can transcend their locations through bridging activities. For example, unlike Bangalore one of the centers IT in India where NSCRE is located, CIIE is located in Ahmedabad away from Mumbai (a major city) but has been able to build relationships with state governments in Rajasthan and local governments in Pune (near Mumbai). Similarly, BITS located in a remote region has managed to create a significant number of entrepreneurs, overcoming its locational shortcomings.
3. Both have different resource bases, especially the networks in which they are embedded. Technology incubators have more plentiful supply of alumni who have technology expertise, whereas management incubators have access to sources with capital (such as Venture capitalists).
4. Predictably, then, technology incubators are likely to have earlier stage start-ups whereas management incubators are likely to admit relatively more mature startup. Management incubators may also nurture relatively more social entrepreneurship.

The influence of the institutional context may be experienced differently by the two types of institutions. For example, because their intake is primarily students, that is individuals from risk averse middle class, technology incubators may have to address cultural-cognitive forces more intensely in their processes. Given the paucity of research, we advance this as a hypothesis, to be examined in the future research.

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Manuscript received: September 14, 2017

Final version accepted: August 31, 2018 (number of revisions – 2)

Accepted by: Guest Editors Suresh Bhagavatula and Ram Mudambi,
and Deputy Editor Johann Peter Murmann