ROLE OF BUSINESS INCUBATION ON THE FINANCIAL AND NON-FINANCIAL PERFORMANCE OF TECHNOLOGY STARTUPS: A MULTIVARIATE MULTIPLE REGRESSION ANALYSIS

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ABSTRACT

Technology start-ups are an important source of innovation, technology commercialization, and economic growth. For start-ups, it is not an easy path to grow as more is the progress, the more are the obstacles. The list of challenges is extensive, from the awareness and viability of businesses to legislation relating to legality and enforceability. It can be difficult to get started on the entrepreneurial path without guidance and assistance, considering these difficulties. This study shows that business incubation services can help overcome these challenges. Using survey data from incubator firms, it is found that business incubation dimensions have a statistically significant positive effect in generating start-up performance. This finding is important for managers of incubated firms and managers of incubators alike as they have matching goals and objectives. The major implication of our study is that managers of incubators should try to improvise and augment the business incubation services according to the need of incubated firms in a customized manner.

Keywords: Start-ups, Business Incubation, Financial Performance, Non-financial Performance.

INTRODUCTION

Business incubators intent on maximizing the chances of success of start-up companies by providing a protective environment (Lose & Tengeh, 2015). Momentous rise of business incubators and considerable difference among the success and performance of incubators and incubator firms (Bergek & Norrman, 2008) has led to increasing research interest. This paper intends to analyze a key performance criterion for incubator firms, namely their hard and soft measures, which indicate the financial and non-financial performance, respectively. Past researchers suggest that business incubators create supplementary outputs in addition to finance and revenue advances (hard measures), which they classify as soft measures (Voisey et al., 2006; Stephens & Onofrei, 2012; Stubberud, 2016). A multifaceted performance measure is essential since the performance of start-ups in a business incubation environment is different from non-incubated start-up's (Iyortsuun, 2016).

Concrete performance measures are hence imperative for incubator firms, incubator managers, and policymaker's alike (Ayatse et al., 2017). Hence, the aim of this paper is to investigate the extent to which business incubation services are related to the financial and non-financial performance of incubated firms. We believe that incubator firm performance can be

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fruitfully studied and understood within the business incubator framework. Although business incubators differ in their advantages, they typically seek to promote new ventures by buffering environmental demands when such ventures become extremely vulnerable to resource constraints exerted by dynamic business environments. The business incubation concept focusses on the resources and assistance towards incubated firms that lead to the development of new and innovative products in established or new markets (Salamzadeh et al., 2018; Lose & Tengeh, 2015). An incubator can be defined as a *"shared office-space facility that seeks to provide its incubated firms with a strategic, value-adding intervention system of monitoring and business assistance"* (Hackett and Dilts, 2004).

Academic literature regarding the business incubation phenomenon has grown as fast as the incubators (Tamasy, 2007; Hackett & Dilts, 2004). However, the research domain is multifaceted and empirical studies are mostly done for specific settings (for e.g., Voisey et al., 2006) and are subjective, suffer from generalizable research designs, inexistent theoretical support and thus lead to mixed empirical findings.

Previous research has focused on incubator incubate performance from the perspective of incubator managers and the perceptions of the sponsors of incubator centers (Mian, 2014) and the opportunities of venture capitalists (Vanderstraeten & Matthyssens, 2012). However, (Voisey et al., 2006) point out that the experience of the incubator firm is rarely accounted for. There have not been many objective studies on incubator firm performance as most of them have been generated by incubator managers in line with the incubator performance only (Phan et al., 2005; Bruneel et al., 2012; Hughes et al., 2007; Hutabarat & Pandin, 2014). It is meaningless to capture the business incubation outcomes without capturing the complexity of the process and the impact of different elements of the network on the incubator firm (Baraldi & Havenvid, 2016; Pena, 2004). The ways in which business incubation services affect the individual, and team development of the incubator firm must be measured (Voisey et al., 2006). Previous research also compares incubator firms with a control group of non-incubator firms (Honig & Karlsson, 2010; Dvoulety et al., 2018). Although it tends to focus on the average performance differences between the two groups, the variation in the performance of incubator firms remains unexplained.

Regardless of the extensively growing literature on technology startups and incubators, only a limited number of empirical studies have been undertaken to assess the incubator contributions from the firm's view (Iyortssun, 2016; Khalid et al., 2012). Most of the incubation literature comprises case studies in an ad hoc scenario. Hackett & Dilts (2008) are the only researchers who developed a generally accepted set of measures for the incubators to ascertain its effectiveness; however, analyzing the usefulness of business incubators from the incubator firm perspective is yet to be developed.

Despite the increasing number of start-ups and incubation facilities (Salamzadeh, 2015), the area of incubation-incubate research is understudied and indicates fertile ground for future research, which will draw attention to the fundamental aspects of new venture performance (Hackett & Dilts, 2004). Major performance factors of incubator firms remain understudied (Voisey et al., 2006), since the vast amount of literature focuses on, and examine only the financial indicators (Ayatse et al., 2017). A genuine revolution concerning the reorientation from customary to contemporary performance measures has been attempted only in a few studies (Wang et al., 2008). Bennett (2007) measured the assistance provided to small ventures using a range of measures from hard objective impacts to soft personal development impacts. Ramsden & Bennett (2005) established that small ventures valued advice mainly for its soft benefits.

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Voisey et al., (2006), measured outputs in addition to profit and cost improvements (hard measures) as the total benefit of incubation. They also propose that there are subjective measures of incubator firm performance, which are difficult to ascertain and assess, but nonetheless exist which are soft measures. Soft measures are benefits, such as increased business awareness and networking (Stephens & Onofrei, 2012). These studies prove that there is importance in probing incubates to use both hard and soft measures to assess the impact of business incubation. Both subjective and objective measures should be considered in assessing small firm performance, where published data is mostly not accessible, and respondents are largely unwilling to provide facts and figures to outsiders (Simpson et al., 2012; Jarvis et al., 2000). According to Vij & Bedi (2015) *"Business performance can be defined as the overall index of the ability of the firm to satisfy its stakeholders, measured in terms of financial as well as operational indicators, using primary data to measure subjective business performance, and secondary data to measure objective business performance or both."*

This study hence adopts the Hackett & Dilts (2004) paradigm of the business incubation process in order to achieve the research goals, since they are the only authors who developed a generalizable set of measures to explain the effectiveness of business incubation process. They explain three fundamental aspects of business incubation as the selection performance of the incubator (BISP), the monitoring and business assistance intensity (MBAI) provided by the incubator, and the resource munificence (RM) of the incubator. BISP, MBAI, and RM are considered as incubation process dimensions in this study context also, as it best suits the incubation structure in India (Kumar, 2017). Framed within the literature on business incubation and incubator firm performance, this paper examines the relationship between business incubation dimensions with the hard and soft measures of incubator firms. With the insight that business incubation is a well-established antecedent of incubated firm performance, the research question of this study is *"to what extent is business incubation services are related to incubated firm performance?"*. The study, therefore, tries to investigate the importance of the business incubator selection process of startup tenants, the assistance provided by the incubator, and the resource availability in the incubator on the monetary and non-monetary benefits of incubated firms.

The remaining article is systematized in the following four sections. First, we explain the concepts of business incubation and incubated firm performance. Then second, we propose a relationship between them. This is trailed by a third section presenting the research methodology and the empirical findings. Finally, the last section discusses the managerial and theoretical implications.

ROLE OF BUSINESS INCUBATION AND START-UP PERFORMANCE

The facilities offered by an incubator typically includes low-cost, expandable infrastructure support, business-consulting network, technological and management assistance, mentoring, training, access to financing, flexible and low-cost leases, office services, etc. (Schwartz & Hornich, 2010; Stefanović et al., 2008; Grimaldi & Grandi, 2005; MacDonald & Joseph, 2001). The services offered by business incubators are formulated to provide explicit and specific benefits that are primarily intended to enhance the performance of start-ups by providing value to entrepreneurial ventures (Ayatse et al., 2017).

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Fostering innovation, new technology commercialization, and market share generation remain the key objectives for both incubators and incubator firms (Grimaldi & Grandi, 2005), especially in a developing economy (Salamzadeh, & Markovic, 2018) like India. Firstly, an incubator firm's success depends on the incubator's ability to provide value-added resources and assistance in a customized manner (Mc Adam & Mc Adam, 2008), since each incubator firm will have varying demands and needs. Second, the ability of the incubator firms to utilize the resources in an incubator effectively to develop new products and processes and to get these market-ready are also found to be imperative (Hackett & Dilts, 2004)). Quick technology commercialization and innovation are inevitable for a startup company to establish market share (Salamzadeh, 2018; Kazanjian, 1988), especially in a competitive market base like India.

Review of literature signifies that, despite the extensive growth of technology startups and incubators, only a limited number of empirical studies have been undertaken to assess the incubator contributions from the startup's view (Iyortssun, 2016; Khalid et al., 2012). Even though academic literature regarding business incubation phenomenon has grown as fast as the incubators and start-ups (Tamasy, 2007; Hackett & Dilts, 2004), most empirical studies have left aside the essence of incubate outlook (Chen et al.,2009), and is focused on the incubator perspective and are predominantly context-based (for e.g., Voisey et al., 2006) which makes it subjective (Stephens & Onofrei, 2012), thus suffer from generalizable research designs (Ayatse et al., 2017), face inexistent theoretical support (Khalid et al., 2012) and hence lead to inaccurate empirical findings (Stephens & Onofrei, 2012). This gap in literature signifies the need for established generalizable measures on theoretically grounded bases to realize incubator effectiveness as an outcome of incubated firm performance.

At the same time, most of the inclusive evaluation studies to date have been carried out in Europe and the U.S, and not a single relevant study has been published in India yet. Besides, the majority of the studies (Tamasy, 2007; Hackett & Dilts, 2004; Hackett & Dilts, 2008; Voisey et al., 2006; Stephens & Onofrei, 2012; Ayatse et al., 2017) emphasize the incubator support as well as their future contribution. In particular, the effectiveness of incubators in identifying and encouraging potential growth companies, promoting technology transfer, fostering innovation, and extending the range of regional small businesses. Nonetheless, as incubation has only been operating for a moderately short time in India, there is less evidence that they are effective boosters for job and wealth (Bulsara et al., 2009). There is an insufficiency of corroborating the capability of business incubation programs in creating a sustainable path of profit and growth, curtailing losses of probable failures by generating firm performance, leading to the potential success of business incubation altogether (Maital et al., 2008). The perks of joining incubation program in India, and most of all, how the incubator supports startups to survive and sustain, is yet to be perused.

The selection of potential startups for incubation is based on their managerial, market, product and financial characteristics in a technology business incubator in India; the incubator will also provide rigorous customized training, assistance, and monitoring options while providing the required resources on time (Khalid, 2012; Iyortsuun, 2016). According to Hackett & Dilts (2008), the targeted output of successful business incubation can be achieved only by providing tailor-made services to incubator firms. The incubation programs in India targets startups, new ventures, where a venture in any of the four stages, namely conception, gestation, infancy, and adolescence are to be considered as a startup or new venture (Reynolds & White, 1997; Reynolds et al., 2000; Salamzadeh, & Kesim, 2017. All startups in the area under study are

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in any of the four stages; henceforth, it is suitable to appropriately term them startups or new firms/ventures.

Though incubator firm performance has always been marginalized in previous literature (Ayatse et al., 2017), several entrepreneurship literatures streams have focused on new venture performance or small firm performance (Voisey et al., 2006). Although they all use slightly different terminology (e.g., NPD performance, entrepreneurial performance, startup performance), they all focus on the importance of growth and development of small and innovative firms. Though different terms such as financial performance, new venture performance, innovation performance, and hard and soft measures have been used to portray startup performance, it generally represents how quickly a startup firm succeeds, survives, and grows through the new venture process. In the entrepreneurship literature, business incubation has been positively associated with startup performance (Hackett & Dilts, 2004; Hackett & Dilts, 2008; Voisey et al., 2006; Pena, 2004; Vanderstaten, 2010; Iyortsuun, 2016). Many studies in the past few decades pertaining to incubator context have investigated new venture antecedents and outcomes in varying frameworks such as startup innovation (Lalkaka, 2002; Etzokowitz & Zhou, 2017; Cooper & Park, 2008), start-up social capital and networks (Tötterman & Sten, 2005; Tsaplin & Pozdeeva, 2017; Stam & Elfring, 2008; Van Rijnsoever et al., 2017), entrepreneurial orientation (Hughes et al., 2007; Clausen & Korneliussen, 2012; Hughes et al., 2007), market orientation (Li et al., 2010; Hughes et al., 2007) and startup financial performance (Lumpkin & Ireland, 1988; Cooper et al., 1994; George et al., 2002; Chen, 2009; Ayatse et al., 2017;). Also, the past literature comprises mainly of incubator antecedents and outcomes which outlines incubator typology, models, and incubator performance (Hackett and Dilts 2004a; Hackett & Dilts 2004b; Hackett & Dilts 2008; Chrigui, 2012; Vanderstraeten & Matthyssens, 2012; Pena 2002; Clarysse et al., 2005).

Yet the empirical evidence for incubator as a stratagem for startup existence is vague and ambiguous. Some studies find that start-ups in incubators are more likely to survive (Pena, 2002; Cooper, 1985). Many other studies find that incubators have a constructive effect on the start-up's growth and survival (Voisey et al., 2006; Pena, 2004; Aaboen, 2009; Aernoudt, 2004; Colombo et al., 2012). However, mixed findings have emerged regarding the overall effectiveness of business incubation (Tötterman & Sten, 2005; Hackett & Dilts, 2004; Dee et al., 2019; Lakaka, 2001; Mian et al., 2016), since few authors find the incubator's impact on the hard measures such as growth, profit, sales, or employment to be unreal (Rijnsoever et al., 2017; McMullan et al., 2001; Pena 2004) or even negative when it comes to performance (Amezcua, 2010; Schwartz & Hornych, 2012; Dvoulety et al. 2018).

Against this background, the bottom line in this study is to prove how well the incubator firms are functioning, by leaving aside the traditional performance measures and adopting a comprehensive set of whole measures. Since the performance measures of large firms cannot be used for small firms, especially in an Indian incubation environment, a more inclusive set of measures is essential to determine the actual performance. Unlike the Hackett and Dilts (2008) model, which defines performance as a categorical variable, this study defines performance as a continuous variable determined by hard and soft measures of incubator firm performance. The outcome variable indicating the new venture performance comprising of both hard and soft measures in our study is termed as start-up performance. The term new venture and start-up at the firm level are frequently used interchangeably in the past literature. Consistent with the measurement scale used to measure hard and soft measures (Voisey et al., 2006), we use the term incubator startup performance.

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The following research questions are thus posed: to what extent is the business incubation process related to the hard and soft measures of incubator start-ups. To achieve the specified research objective, the study defines the incubation process in three dimensions: Business incubator selection performance (BISP), monitoring and business assistance intensity (MBAI), resource munificence (RM) with startup performance defined separately as the hard and soft measures. Based on the above argumentation, we hypothesize the following:

H1: There is a positive relationship between the business incubation mechanisms and hard measures of incubator start-ups.

H1a: There is a positive relationship between business incubator selection performance and hard measures of incubator start-ups.

H1b: There is a positive relationship between incubator monitoring and business assistance intensity and hard measures of incubator start-ups.

H1c: There is a positive relationship between business incubator resource munificence and hard measures of incubator start-ups.

H2: There is a positive relationship between the business incubation mechanisms and soft measures of incubator start-ups.

H2a: There is a positive relationship between business incubator selection performance and soft measures of incubator start-ups.

H1b: There is a positive relationship between incubator monitoring and business assistance intensity and soft measures of incubator start-ups.

H1c: There is a positive relationship between business incubator resource munificence and soft measures of incubator start-ups.

METHODOLOGY

Research Context

Survey data was collected in the context of technology business incubators in India, which operates under Kerala Startup Mission (KSUM), the nodal agency of the Government of Kerala. This central agency supports 32 incubation centers, which comprises of College, University, Public and Private Incubators. Only startups and new ventures with novel product ideas are admitted to the incubators under KSUM (recognized as the top business accelerator in the world by UBI-Global). This framework was considered appropriate to test the relationship between BISP, MBAI, RM, and incubator startup performance. All the respondents were the CEO's of incubator startup firms, and are therefore expected to be able to make an accurate verdict about to what extent business incubation has influenced them. Qualitative and open-ended interviews with CEO's of incubated firms verify that most of them have had extensive industry experience and that they came to opportune a business idea they sought to pursue in a start-up firm.

Data Collection

This research is based on survey data collected from various incubator firms within 32 government-supported technology business incubators in India. These firms provide an appropriate sample for examining the relationship between business incubation phenomenon and startup performance as all the firms are currently receiving incubation facilities and have

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completed a minimum of three months inside the incubator. In order to answer the research question, to what extent is BISP, MBAI, and RM is related to startup performance, data were obtained from the incubator firm CEO's, through a descriptive research design using survey method. In order to collect data about the business incubation services, survey questionnaires were personally administered to the CEO's of various incubator start-ups and emailed to those who were out of the station. After multiple reminders and visits, we ended up with 344 responses out of 540 incubated firms. This constitutes a response rate of 63%. The response rate obtained in this study is much higher than in most other survey-based research aimed at small start-ups and new ventures.

Measuring Business Incubation and Start-up Performance

Independent Variable: The items to measure business incubation were adopted from Khalid et al., 2012, which is originally based on the seminal work by Hackett & Dilts (2008). The items were measured from the incubator firm perspective, taking into account the Indian startup and business incubation environment, which resulted in a set of measures reflecting three independent variables, as used by Hackett & Dilts, (2008). It encompasses business incubator selection performance (13 items), monitoring and business assistance intensity (9 items), and resource munificence (9 items). The items were measured by a five-point Likert-type scale ranging from 1=strongly disagree to 5=strongly agree, with greater values representing higher amounts.

Dependent Variable: The scales of Voisey et al., (2006) and Stephens & Onofrei, (2012) have been adopted for measuring SP (dependent variable). The scale consisted of a total of 15 items: out of which the first eight items are hard measures from Voisey et al., (2006), and seven items are soft measures from Stephens & Onofrei (2012). The items of startup performance are measured on five-point Likert scale, anchored by the lowest score as 1 and the highest score as 5.

Control Variables

In the regression analysis, several control variables are included. We have used binary variable *"0"* and *"1"*, respectively to measure all the control variables. First, we included startup age and gender of CEOs/founders as controls. Startup age and gender are two significant basic features that may be associated with startup success (Covin & Covin, 1990; Chen, 2009; Clarysse & Bruneel, 2007; Pena, 2004). According to the resource dependency theory, the human capital of startup founders has a significant effect on firm performance (Cooper et al., 1994; Etzkowitz & Zhou, 2017; Fulmer et al., 2009). Especially the founder's formal education and entrepreneurial education are reported to have a significant effect on startup performance (McMullan & Gillin, 1998). In order to take the possibility of both the explanations of education and entrepreneurial education background, we unambiguously controlled for formal education and entrepreneurial education. We also controlled for prior startup experience by measuring whether the founding CEO has previously started a new venture (Arenius & Minitti, 2005; Ensley & Hmieleski, 2005).

According to previous literature, work experience also has a significant impact on small firm performance (Ganotakis, 2012). Family business and entrepreneurial families have a significant influence on startup founders (Edelman et al., 2016), and hence it is controlled in our research context. The effect of family entrepreneurship variables may, however, be less influential in the incubator context, as all the startups will have rather strong influence from the

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incubator network. However, the variables are included because they are found to have a significant effect on new venture performance and are considered as control variables in the entrepreneurship literature. So, it will be meaningless to not consider the effect on our study as well. Descriptive statistics are shown in Table 1.

Chandler & Hanks (1993) argue that self-reports are accurate and true from top management teaming leaders in small firms. However, since our study relies on a single key informant, we tried to reduce a potential common method bias, by following Podsakoff et al. (2003). In line with our research design, we assured participants that their responses would be anonymous, that there would be no correct or incorrect answers, and that they would have to answer questions as fairly as possible. We subjected all the main variables to factor analysis and then assigned the number of factors that account for the variance in the measures. In addition, the reliability of scales was assessed with Cronbach's alpha. As shown in Table 2, all variables have reliability scores above 0.8. To summarize, the proposed model was measured to be valid and reliable, so the subsequent step in the analysis could be performed.

Correlational analyses (Table 3) and general linear model analyses were conducted to determine whether any control variables appeared to vary significantly in association with the dependent variables. None of the control variables described in our study was found to be significant in predicting the outcome variables, and hence they were not considered for the subsequent analyses.

Table 1
DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std.deviation
Hard Measures	344	1.00	5.00	3.13	.90
Soft Measures	344	1.00	5.00	3.73	.90
Startup Age	344	1	2	1.33	.47
Gender	344	1	2	1.08	.27
Formal Education	344	1	2	1.18	.38
Entrepreneurial Education	344	1	2	1.63	.48
Prior Startup Experience	344	1	2	1.21	.42
Prior work experience	344	1	2	1.81	.39
Has Family business	344	1	2	1.80	.40
BISP	344	1.00	5.00	3.44	.66
MBAI	344	1.00	5.00	3.16	.95
RM	344	1.00	5.00	3.35	.86
Valid N (listwise)	344				

Table 2
RESULTS OF RELIABILITY

Variable	No of Items	Total of the accounted variance (%)	Cronbach's Alpha
BISP	13	19.43	.840
MBAI	9	33.10	.940
RM	9	44.21	.904
Hard Measures	8	53.95	.931
Soft Measures	7	58.75	.919

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Table 3 CORRELATIONS												
Startup Age	1	.113*	-.439**	-.035	.160**	.495**	.001	.052	-.028	-.016	.040	.064
Gender	.113*	1	-.030	.016	-.054	-.012	.031	-.022	-.018	-.034	-.055	-.067
Formal Education	-.439**	-.030	1	-.023	-.019	-.393**	.043	-.092	-.065	-.060	-.158**	-.080
Entrepreneurial Education	-.035	.016	-.023	1	.019	-.022	.078	-.057	-.111*	-.020	.018	.024
Prior Startup Experience	.160**	-.054	-.019	.019	1	.123*	-.054	.050	-.025	.101	.072	.064
Prior work experience	.495**	-.012	-.393**	-.022	.123*	1	-.049	.029	.035	.027	.048	.084
Has Family business	.001	.031	.043	.078	-.054	-.049	1	-.055	-.088	-.077	-.100	-.028
BISEL	.052	-.022	-.092	-.057	.050	.029	-.055	1	.297**	.336**	.273**	.332**
BIMON	-.028	-.018	-.065	-.111*	-.025	.035	-.088	.297**	1	.612**	.477**	.547**
BIRES	-.016	-.034	-.060	-.020	.101	.027	-.077	.336**	.612**	1	.476**	.539**
Hard Measures	.040	-.055	-.158**	.018	.072	.048	-.100	.273**	.477**	.476**	1	.716**
Soft Measures	.064	-.067	-.080	.024	.064	.084	-.028	.332**	.547**	.539**	.716**	1

RESULTS

A multivariate regression analysis was done to test the hypothesized relationships among business incubator selection performance (BISP), monitoring and business assistance intensity (MBAI), resource munificence (RM), and the two performance dimensions of incubator start-ups. The multivariate nature of the analysis enables the evaluation of the differential effects of the multiple independent variables on multiple dependent variables, thus minimizing the number of analyzes performed, thus minimizing the probability of obtaining meaningful outcomes due to chance (Lynch & Graham-Bermann, 2004; M'Chirgui, 2012).

Table 4
MULTIVARIATE ANALYSIS OF BUSINESS INCUBATOR SELECTION PERFORMANCE (BISP), INCUBATOR MONITORING AND BUSINESS ASSISTANCE INTENSITY (MBAI), INCUBATOR RESOURCE MUNIFICENCE (RM) AS PREDICTORS OF HARD MEASURES AND SOFT MEASURES OF INCUBATOR START-UP'S (N=344)

Multivariate	Df	F	Wilk's λ	Hotelling's T	Sig	η^2
BISP	2	4.52	0.97	0.02	0.012[a]	0.026
MBAI	2	19.46	0.89	0.11	0.000[a]	0.103
RM	2	15.88	0.91	0.09	0.000[a]	0.086

UNIVARIATE TESTS					
BISP	**Sum of Squares**	**df**	**F**	**Sig**	**η^2**
Hard Measures	2.35	1	4.02	0.046*	0.012
Soft Measures	4.55	1	8.95	0.003**	0.026
MBAI	**Sum of Squares**	**df**	**F**	**Sig**	**η^2**
Hard Measures	13.82	1	23.63	0.000**	0.065
Soft Measures	18.41	1	36.17	0.000**	0.096
RM	**Sum of Squares**	**df**	**F**	**Sig**	**η^2**
Hard Measures	12.25	1	20.94	0.000**	0.058
Soft Measures	14.52	1	28.53	0.000**	0.077

aSignificant at the multivariate level.
***Significance at the univariate level, p < 0.01.*
**Significant at the univariate level, p < 0.05.*

The relationships among business incubator selection performance, monitoring and business assistance intensity of the incubator, and resource munificence of the incubator, and the two dependent variables, hard measures and soft measures of incubator startups, were tested

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simultaneously using multivariate general linear analysis in SPSS (see Table 4). In these analyses, the Partial η^2 term is reported for each predictor variable in Table 1; it is similar to an R2 term from regression analysis and serves as an indicator of effect size (Weinfurt, 2000). The control variables such as firm age, the gender of the founder, education, and work experience of the founding CEO, prior startup experience, and family entrepreneurial experience of the founder were not statistically significant at the multivariate level in this analysis. Business incubator selection performance (Wilks Lambda=0.97, Hotelling's Trace=0.02, F (2)=4.52, $p<0.05$), monitoring and business assistance intensity (Wilks Lambda=0.89, Hotelling's Trace=0.11, F (2)=19.46, $p<0.0001$), resource munificence (Wilks Lambda=0.91, Hotelling's Trace=0.09, F (2)=15.88, $p<0.0001$) were found to be significant at the multivariate level. The slope coefficients 0.133, 0.267, 0.283 represents the average change in BISP, MBAI, and RM associated with a one-unit change in the hard measure of startups when the other antecedents are held constant. Similarly, the slope coefficients associated with soft measures are 0.184, 0.309, 0.309, respectively.

At the univariate level, also, all the predictors were significantly associated with the dependent variables in this study, as shown in Table 4. Moreover, at the univariate level, none of the control variables were found to be significant. Finally, as was hypothesized, the amount of total variance explained by the predictors for each performance dimension varied. The variables predicting the hard measures explained 28.3% of the variance (Adjusted R^2), whereas the predictor variables accounted for 37.7% of the variance in the soft measures of incubator start-ups. In summary, there were significant and positive main effects of business incubator selection performance, monitoring and business assistance intensity of the incubator, and resource munificence of the incubator as predictors of the hard and soft performance of incubator start-ups.

DISCUSSION

This study raises the research question: to what degree do business incubation services contribute to the incubator startup performance? Although determinants of small firm performance represent a broad field of interest (Voisey et al., 2006; Hackett & Dilts, 2008; Stephens & Onofrei, 2012), little consideration has been given to empirically examining associations among the business incubation mechanisms. The findings are indicated as follows: First, the multidimensional nature of business incubation is explained through incubator selection of startups, monitoring and business assistance, and the resource availability that an incubator adopts when incubating a startup. BISP, MBAI, and RM are positively and directly associated with incubator start-up's hard and soft performance. The significant association between business incubation mechanisms and start-up performance confirms that incubator processes play an important role in small-business growth (Hackett & Dilts, 2008; Vosiey et al., 2006; Iyortsuun, 2016; Ayatse et al., 2017). From a theoretical perspective, our study provides additional empirical evidence that business incubators may lead their firms to high levels of performance and growth in emerging young startups (Salamzadeh, 2018).

Also, most studies agree that the ultimate effect of business incubation is in relation to its financial outcomes which are assessed in terms of the start-up's initial sales, profit generation, customer retention, seed and VC funds, job creation, enterprise growth, and survival (Bergek & Norman, 2008). Whilst, the results of this study ascertain that the business incubation services

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provided to an incubated firm will have an important influence on both financial (hard measures) and non-financial performance (soft measures), which helps attain sustainable development.

The significant association between incubator selection mechanism and start-up performance is an important contribution since very few studies find that the incubator selection of entrepreneurs affects new venture performance (Khalid et al., 2012). Recent empirical studies (Iyortsuun, 2016), including Hackett & Dilts (2008) did not find any significant relationship between BISP and startup performance. The major finding of the study challenges the existing literature. BISP contributes towards start-up performance, more specifically towards soft measures rather than hard measures. Our finding suggests that the incubator's beliefs about the start-up's managerial, market, product, and financial capabilities may contribute to reaching designated performance goals (Hackett & Dilts, 2008) with regards to its hard measures (even though minimal) and soft measures. The perception of these capabilities leads start-ups to set more ambitious goals and to be more dedicated to those goals (Hackett & Dilts, 2008; Iyortsuun, 2016). The results thus imply selecting tenants to be incubated in an incubation program in India is not a determining factor.

The findings show that MBAI is a significant predictor of start-up performance. Moreover, MBAI contributes more to explaining firm performance compared to the other dimensions of the business incubation mechanism in India. This finding is supported by the study conducted by Scillitoe & Chakrabarti (2010), Khalid et al., (2012) and Cumming and Fischer (2012). The methods used to successfully mentor and assist their incubated startup will definitely lead to differences in average performances (Scillitoe & Chakrabarti, 2010). This implies that incubator tenants are most affected by the time-intensity provided by the incubator and the comprehensiveness and quality of services offered inside the incubator. Incubators in India have dedicated incubator managers and mentoring experts who provide their time in assistance, both physical and virtual mentors who assist in business planning, feasibility, production, and operation assistance. Moreover, the incubator manager improves satisfaction inside the house by regularly reviewing the quality of services and offering a flexible network for interacting among tenants, which creates networking opportunities too.

The empirical results also prove that resource munificence plays an important role in predicting both the hard and soft performance of a start-up. Access to marketing experts, capital, funding, technology labs, and consultants provides a way to achieve requisite performance. The incubation programs in India provide excellent financial support to provide direct funding to its tenants, with the help of various financial institutions in the country (Bulsara et al., 2009). The incubator tenants get access to higher-level funding and collaborations through various investor meet up's, venture capital networks, start-up peers and funding agents through the incubator networks and events (Kumar, 2017)

The results indicate that it is important for incubators to lay focus on its selection criteria, the comprehensiveness and quality of business assistance, and resource availability to enhance the business performance of its incubated firms. Also, an important result is that, as per entrepreneurship literature, the human capital dimensions have a significant influence on new venture performance (Cooper et al., 1994; Nielsen, 2015; Nunally, 1978; O'Neal, 2005), but in the present study, it is interesting to note that irrespective of the startup founder characteristics and firm characteristics, business incubation plays a major role in the startup performance.

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Theoretical and Practical Implications

The paper adds to the incubator incubate literature in several ways. As suggested by Salamzadeh, 2020, this study tries to examine a previously tested theory in a new context. Firstly, no prior empirical study has examined the influence of the business incubation phenomenon on both hard and soft measures of incubated firms. Secondly, very few objective studies (Voisey et al., 2006) have looked into the incubator firm perspective of business incubation services as a driving force for their performance. Thirdly, few studies have tried to examine the differences in performance of startup firms inside incubators (Scillitoe & Chakrabarti, 2010). This holds in line with the literature that *"research focusing on the incubation process of individual ventures holds the greatest research potential for understanding the incubation process"* (Scillitoe & Chakraborthy, 2010; Siegel et al., 1993).

Prior literature has shown that firms inside an incubator perform well in terms of their entrepreneurial decision making, idea implementation, and market orientation, and have better performance due to the influence of incubator facilities and assistance (Pena, 2002; Pena, 2004; Voisey et al., 2006, Hackett & Dilts, 2004; Hackett & Dilts, 2008; Lalkaka, 2001). Our study findings thus add to the existing literature.

Instead of focusing on only the incubator performance and average difference between incubated and non-incubated startups, we analyze the performance variation among incubated firms with respect to the business incubation phenomenon, and whether and to what extent the dimensions of business incubation can explain this variation among the incubated firm performance. Our argument is rather not to lay focus only on incubated startup performance aspects alone, but we firmly believe and prove that in order to achieve the intended performance of an incubator, it is only made possible by studying the receiving end, the incubator firms. Also, comparing the firm performance across two categories of ventures is purely different from examining the variation within one category of firms.

In addition, previous studies on business incubation and entrepreneurship have shown that most of the variables that are related with start-up performance are mainly related to the human capital, and team characteristics (Pena, 2002; Pena, 2004; Colombo & Grilli, 2005; Clausen & Korneliussen, 2012). Compared to other start-up elements that determine the performance of incubator firms such as the team characteristics, experience, and firm size; this study proves that business incubation services can be customized and tailored to cater to generate sustainable performance of both incubators and incubated firms (Vanderstraeten & Matthyssens, 2012).

Practical implications of the study undoubtedly cater to both incubator startups and incubator managers as they strive to understand the formula for startup performance and growth within a very short time. The reason is indeed clear. For incubator firms with scarce resources, and vague market experience, market-entry, and performance is an essential requisite (Lose & Tengeh, 2015). Incubator firms can achieve this through incubator guidance and services, which may enhance the probability of the firm to succeed, survive, and even grow (Voisey et al., 2006). The major implication of the study is that business incubation should be promoted as a system to help nurture weak but promising firms for the economic development of a nation. The major focus should be given to broadening the network of incubators and strengthening existing incubator strategies to cater to and assist tenants according to their specific requirements, which can complete and broader the strategic incubator- entrepreneurial framework.

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The study will also guide and motivate new ventures to utilize the potential and understand the benefits of being incubated in a business incubator in order to seize opportunities quickly, pro-actively innovate and attain required innovation, technology commercialization, and market entry thereby contributing to the development of the Indian economy.

FUTURE RESEARCH AND LIMITATIONS

This study establishes that business incubation is related to startup performance. In order to improve startup performance, it would be useful to know how to improve business incubation services. Since business incubation consists of selection criteria, monitoring and assistance, and resource munificence, it would be helpful to try to determine which factors should be changed, improved, augmented, and altered by the incubator managers to cater to the specific requirements of incubated firms.

Another vital research question is whether business incubation services and startup performance is related to the economic growth and performance of the incubators. This relationship needs to be examined. In the end, it is the actual monetary results generated by the incubators that are central for the government, policymakers, and incubator managers as well. This would undoubtedly elucidate on the business incubation process as an entrepreneurial development policy for new venture success.

Quite a lot of research implications and, at the same time, quite a few limitations have also emerged from the study. The study is limited to analyzing the effect of the business incubation phenomenon on startup performance among Indian business incubator firms at a single point of time. In a cross-sectional study like this, the issue of causality is unavoidable. Thus, an important extension of this would be to conduct longitudinal studies of the relationship between business incubation phenomenon and startup performance.

This research is performed in a specific setting in one country (India). Therefore, generalizations should mainly be in this context. Comparative studies of business incubation should be carried out in other countries in order to understand whether our study findings hold in other contexts of business incubation.

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