

Study of Indian Technology Business Incubators (TBIs) Performance Indicators

Vishal Gandhi¹, Dr. Asif Ali Syed², Prof. Sudhir Kumar Jain³

¹Research Scholar, Department of Business Administration, FMS&R, AMU, Aligarh
Founder & CEO, BIORx Venture Advisors Pvt Ltd

²Associate Professor, Department of Business Administration, FMS&R, AMU, Aligarh

³Adjunct Faculty, Department of Management Studies, IIT- Delhi

Abstract: A business incubator is characterised as a point of contact between the market and the entrepreneurs' proposed business concepts. It includes provision of differential facilities like infrastructure, mentorship, capital and expertise so that there is effective utilization of creativity and ability. This research work assesses the performance of Technological Business Incubators (TBIs) based on no. of patent granted, support services offered by TBIs, services offered in TBIs, selection criteria for incubatee, exit criteria for incubatee, academia linkage, corporate linkage, nature of functioning as a performance indicators. Partial least squares structural equation modelling (PLS-SEM) was employed for testing the significance of hypotheses. Findings show that no. of patent granted, selection criteria for incubatee, corporate linkage, and nature of functioning of TBI have a significant influence on TBI success.

Keywords: *Technology business incubator; business incubator; patent granted, support services, services offered, selection criteria, exit criteria, academia linkage, corporate linkage, nature of functioning.*

1. Introduction

The main aim of Technology Business Incubators (TBIs) is to foster creativity by providing social support with complementary skills and tools. The technology incubator is an institution in which expertise is turned into new products and services (Yee, 2009). Such incubators can deliver good projects thanks to a mix of information sharing and incubator management. Company incubator roles have a positive and significant effect on the economy of country (Cheng and Schaeffer, 2011). However, they discovered several issues with the approved exam standard. Global business trends represent that small businesses make up almost half of a country's overall economy (both developed and developing). Throughout this environment, start-ups, business incubators, and technology business incubators (TBI) all contribute considerably to the country's economy, as does the knowledge and innovation-based economy. Different forms of incubators were studied (Peters et al., 2004). A company's knowledge base is a critical component of its success and ability to compete with other businesses (Gupta and Govindarajan, 2000). Among the most challenging tasks is developing projects that use incubators' products or integrating incubators into new projects. Needed Several sources to ensure the feasibility of new projects (Brush and Greene, 1996). Efficiency, project viability, and experience are all critical considerations.

Technology and creativity are an essential for success (Rooney et al., 2012). The capacity of organizations to innovate is critical to their ability to improve the business economy. The absence of this means they cannot complete and limit their businesses' growth and their potential to increase their income (Taylor et

al., 1993). Innovation can help improve efficiency, competencies and generate revenue (Carlson and Wilmot, 2006).

Incubators have also grown in scale and variety all over the world. It has a long history of contributing to economic promotion and career production. The need to assess the efficiency of these incubators and examine the reasons that enhance organizational performance or failure have increased proportionally over time, as has the desire to recognize the impact that these incubators have had on the companies they host but to be able to reproduce them. Unfortunately, some countries' successful models unfortunately, methodological, theoretical, and analytical limitations also hindered the assessment of incubator results (Yu & Nijkamp, 2009), subsequently, it is exceedingly difficult to draw concrete conclusions from current incubator research. Furthermore, it seems that the incubator's output is measured in a variety of ways. Geographical, industry, and a variety of other aspects all play a role in its success. A consensus about how to measure incubator performance is still to be found, also there is a lack of a consistent description of performance indicators of TBIs. Many performance indicators are witnessed in literature on business incubation but no. of patent granted to incubatee and nature of functioning as a performance indicators is silent in published literature.

Therefore, this research examined the performance of TBIs by considering no. of patent granted, support services offered by TBI, services offered in TBI, selection criteria for incubatee, exit criteria for incubatee, academia linkage, corporate linkage, nature of functioning as a performance indicators.

Hence, the scope of this study can be defined as examining the performance indicators and how they affect the success of TBIs, examining how TBI success affects the Social and Economic perspective to answer the persistent question.

2. Study Background and Conceptual Framework

Lamine and Fayolle (2016) introduces Technology Business Incubation (TBI) as a field of study, development, advancement, and grant research. Science parks, incubators, and agents for quickening are TBI systems that are regarded as essential tools for promoting business growth focused on creation and innovations.

There are many literatures which witness the performance indicators affecting the success of TBI. Some of literatures are discussed as follows: Gozali et al. (2020) analysed the performance TBI by considering performance indicators such as entry criteria, exit criteria, mentoring and networking, funding and support. Results indicate that performance indicators considered in this study significantly impacts on TBI success. Li et al. (2020) studied the role of business incubators as a tool for entrepreneurship development by considering performance indicators as networking services, capital support, training programs, government regulations. Findings indicate that performance indicators are significant for entrepreneurship development. Rakthai et al. (2019) explored innovative capacity and the performance of businesses incubated in university incubator units. The results revealed that the characteristics of leadership orientation,

entrepreneurial orientation, network capacity, innovative capacity, and entrepreneurial performance had relationships in the same direction.

Binsawad et al. (2019) further evaluated the important indicators that led to the performance factors of TBIs. Alzaghali and Mukhtar (2017) analysed the factors affecting the success of incubators and the moderating role of information and communication technologies. The proposed model adopts many of the success factors that have been used in different case studies worldwide. Moreover, it combines these factors with feedback factors collected from interviews with key persons and managers in incubators in Palestine as a special case. Harper and Lewis (2017) suggested that incubator quality variables have a stronger causal influence on successful incubation outcomes than regional capacity variables.

Based on the understanding from the literature surveyed a few research gaps were identified. There is a pressing need to understand the performance indicators of TBI success. In spite of so many research in the area of TBI success, no researches have focused on number of patent granted to incubatee, academic linkage, corporate linkage and nature of functioning as a performance indicators of TBI success. Technology business incubators support economic growth by developing innovative technologies. However, assessing the performance of technology business incubators in India has not been well recognised. This study thus, attempts to bridge the gap and present a conceptual model that developed based on variables that influence the success of TBI. The proposed research model consists of eight dimensions that lay an impact on the TBI success. The eight constructs are number of patents granted, support services provided by TBIs, services offered in TBIs, selection criteria for incubatee, exit criteria for incubatee, academia linkage, corporate linkage and nature of functioning that influence the TBI success. For this research, three dependent variables were considered viz. TBI success, economic perspective, and social perspective. Therefore, this study assessed the performance indicators affecting the success of TBI and influence of TBI success on social and economic perspective.

The indicators which are considered in this study are as follows: *Number of patent granted to incubatees*: Patents assist TBIs in improving their positioning, creating an innovation environment, incubating knowledge-based start-ups, generating increased income, and tracking research activity. innovators Billions of dollars are raised as a result of certain systems, which benefits everybody involved. The inventor (mostly academics), the educational system, business, and the economy as a whole are the direct beneficiaries. That number of registered patents is a good measure of a country's creativity and technological ability. Therefore, we posed that

H1: No. of patent granted has a significant influence on TBI success

Support services provide by TBIs: TBI's support services are designed to help local companies gain access to information and expertise that they'll never be able to obtain on their own. The number of firms that graduate from such an incubator is positively influenced by the support service (Shrader and Siegel 2007). Access to financial services is amongst the most important considerations for most start-ups' survival and it is considered including some of the incubator effectiveness factors (Gozali et al. 2015). Therefore, we posed that

H2: Support services offered by TBI has a significant influence on TBI success

Services offered in TBIs: Mentors or mentors are older men and women with unique backgrounds and valuable educational skills that really can impact others early through their careers and find a better role than peers or counsellors (Lichtenstein 1992). Therefore, we posed that

H3: Services offered in TBI has a significant influence on TBI success

Selection criteria for incubatee: That even a company incubator chooses the firms it wants to incubatee is amongst the most crucial mechanisms also for incubator's performance, and these may differ depending upon this incubator's purpose and goals. The proposed market incubator model (Campbell, et al. 1985) indicated that one of the four fields whereby incubators / incubators generate value seems to be the collection and regulated application of business resources. Therefore, we posed that

H4: Selection criteria for incubatee has a significant influence on TBI success

Exit Criteria: The better the technological infrastructure, more the likely an incubator climate would promote the formation of technology-based businesses, their early growth, an potential to innovate, including their readiness to graduate. The basic supporting factors what ultimately assess their performance, longevity, and growth after graduation through incubators, as well as the mechanisms of survival or departure from businesses after graduation through incubators. The main objective of TBIs is to assist and support future entrepreneurs (Mas-Verdu et al., 2015). According to recent studies, incubated businesses may not get profit substantially from existing incubator relationships, and may be susceptible to failure after graduation (Lasrado and colleagues, 2016). Therefore, we posed that

H5: Exit criteria for incubatee has a significant influence on TBI success

Nature of functioning: Accelerator and incubator programs often operate in cohorts, typically offering one or two per year, and span anywhere from a few weeks to a few months. Some expenses, like travel, may be covered by the incubator. When considering accelerator and incubator programs, it's a good idea for entrepreneurs to look at past program participants and look for companies at the same stage as their business. Therefore, we posed that

H8: Nature of functioning of TBI has a significant influence on TBI success

Corporate linkage: Corporate linkage is regarded as the most important tools for business incubators in terms of identifying opportunities and improving entrepreneur efficacy, particularly in the face of limited resources. Company incubators and their customers benefit from social media because it shortens the path and saves time when it comes to making decisions and expediting operations. (Fernandez-Perez et al., 2013). Therefore, we posed that

H7: Corporate linkage has a significant influence on TBI success

Academia linkage: A university based incubator (UBI) TBIs come in a variety of forms. In either regard, various topologies have also been given. Public incubators, proprietary incubators, but university incubators are the three types of incubators. That current study reflects on Barbero et al. (2012). A UBI is characterized as university-based institutions providing tangible and intangible resources to young business start-ups. Therefore, we posed that

H6: Academia linkage has a significant influence on TBI success

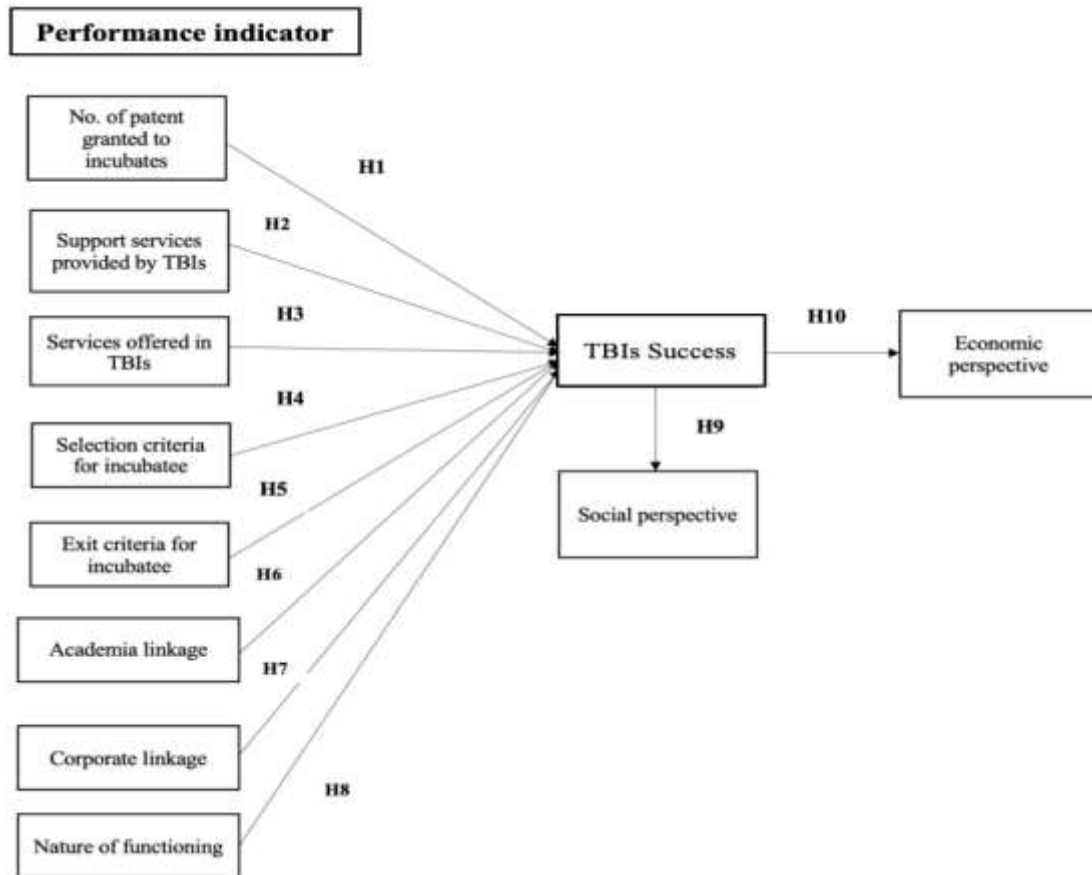


Figure 1: Proposed Research Model

Conceptual framework consists of performance indicators namely no. of patent granted, support services offered by TBI, services offered in TBI, selection criteria for incubatee, exit criteria for incubatee, academia linkage, corporate linkage, nature of functioning as a-performance indicators. Figure 1 shows the research model.

3. Methodology

Instrument development

Quantitative research technique was employed where a structured and close-ended questionnaire was deployed for collecting primary data from the sample. The questionnaire was designed in a manner that lends itself for self-administration to enable ease of data collection from the respondents with the help of

Google forms over the internet. The questionnaire consisted of closed ended questions and consisted of dichotomous questions, multiple choice questions and 5-point Likert scale.

Sampling and data collection

The target population that has been included in the study are TBI's whose data is available in the public domain . It includes more than 250+ incubators that are present in India at the moment, supported directly and Indirectly by GOI. It included TBIs that were incorporated before 2008 and facts were collected from them by using surveys and questionnaires. Final sample size for analysing the data was reduced to 57. In the present study, judgement sampling method is used to collect the data from the sample that has been selected for the study. The judgement sampling method is best suited for the current study as it helps in selecting the TBI's Incubators amongst the 250+ TBIs present in India at the moment. The survey tool was used to gather data for this study.

4. Measurement Model Analysis

According to Chin (1998), the reliability level above 0.7 ensures that the scale is reliable which is the case for all constructs in this study (Please see table 1). In this study, reliability was assessed using two ways: Cronbach alpha and Composite or construct reliability. It was found that all the dimensions depicted the Cronbach's alpha value greater than 0.6, thereby confirming that survey instrument is reliable. Apart from Cronbach Alpha, composite reliability (CR) was also measured in this study. After establishing that the scale is unidimensional an assessment of the statistical reliability is imperative before performing any further validation analysis (Anderson and Gerbing, 1991). In this study, C.R. for all the variables considered in the research model was found to be greater than 0.70 as illustrated in table 1. Thus, the research instrument developed for studying the performance indicators for TBI success was reliable. In this study, inter-item correlation values higher than 0.30 was found except for few inter-item correlation values which are satisfactory. Item-total correlation values of the indicators in each construct were above 0.3 as shown in table 1. The findings in table 1 depict that the square root of AVEs was higher than the correlations between constructs/ variables. These results confirmed discriminant validity possessed by scale. In present study the retained 39 items of the questionnaire were proved as a reliable and valid research instrument.

Table 1: Validity and Reliability of construct

	CR	AL	CL	EP	EC	NOF	SC	SO	SP	SS	TBIs	NPG
AL	0.717	1										
CL	0.732	-0.093	1									
EP	0.764	0.145*	-0.166	1								
EC	0.753	0.148	-0.031	0.086	1							
NOF	0.719	0.1	0.335***	0.085	0.013	1						
SC	0.786	0.12	-0.135	0.122*	0.788	-0.228	1					
SO	0.727	0.361	0.093	0.013	0.221	0.045	0.133	1				
SP	0.714	0.005	0.02	0.433	-0.066	0.069	-0.034	-0.014	1			
SS	0.787	0.103	0.242***	0.407***	-0.102	-0.02	0.249***	0.579***	0.038	1		
TBIs	0.743	-0.054	0.369***	0.226***	0.276***	0.392***	0.395***	0.238***	0.234**	0.19	1	
NPG	0.776	0.099	0.387***	0.291***	-0.091	-0.016	0.352***	0.624***	0.356***	0.229***	0.204***	1

Notes:

Significance of Correlations: † $p < 0.100$; * $p < 0.050$, ** $p < 0.010$, *** $p < 0.001$

The numeric values in bold letters indicate the square root of AVE values and imply discriminant validity CR value ≥ 0.7 indicates adequate convergence or internal consistency and strong construct reliability (Hair et al., 2006)

5. Structural Model Testing

Structural Equation Modelling (SEM) is a powerful technique to test and evaluate casual relationships between variables (measured variables and latent constructs) (Hair, 2006). After assessing the reliability and validity of the variables PLS-SEM has been employed for testing the hypothesis. In the present study the proposed research model consists of eleven constructs viz. eight exogenous latent constructs (number of patents granted (NOPG), Support services provided by TBIs (SS), Services offered in TBIs (SO), Selection criteria for incubatee (SC), Exit criteria for incubatee (EC), Academia linkage (AL), Corporate linkage (CL), Nature of functioning (NOF)) and three endogenous latent constructs (Social perspective (SP), Economic perspective (EP) and TBIs. For the purpose of evaluating the research model on the basis of CFA and SEM, it was decided to report the following goodness of fit indices as shown in Table 2.

Table 2: Summary of the Model Fitness

Fit index	Observed levels	Threshold Levels	Model fit
Chi-Square χ^2	981.528	Lower χ^2 relative to df 2:1	Acceptable
Normed χ^2 (χ^2 / df) (CMIN)	1.467	3:1	Acceptable
Goodness of Fit Index (GFI)	0.831	≥ 0.80	Acceptable
Adjusted Goodness of Fit Index (AGFI)	0.827	≥ 0.80	Acceptable
Root Mean Square Error of Approximation (RMSEA)	0.047	< 0.06	Acceptable
Standardised Root Mean Square Residual (SRMR)	0.067	< 0.08	Acceptable
Comparative Fit Index (CFI)	0.901	≥ 0.90	Acceptable
Non-Normed Fit Index (NNFI)	0.845	≥ 0.80	Acceptable
Parsimony Normed Fit Index (PNFI)	0.688	No threshold levels	Acceptable
Standardised Residuals	1.153	< 2.58	Acceptable
PClose	0.214	> 0.05	Acceptable

Thus, the research hypotheses framed in accordance with the proposed structural model were tested. Since the model fit was acceptable in this study, parameter estimates were examined. Following hypotheses were tested in this study:

H1: No. of patent granted has a significant influence on TBI success

H2: Support services offered by TBI has a significant influence on TBI success

H3: Services offered in TBI has a significant influence on TBI success

H4: Selection criteria for incubatee has a significant influence on TBI success

H5: Exit criteria for incubatee has a significant influence on TBI success

H6: Academia linkage has a significant influence on TBI success

H7: Corporate linkage has a significant influence on TBI success

H8: Nature of functioning of TBI has a significant influence on TBI success

H9: TBI success has a significant influence on social perspective

H10: TBI success has a significant influence on economic perspective

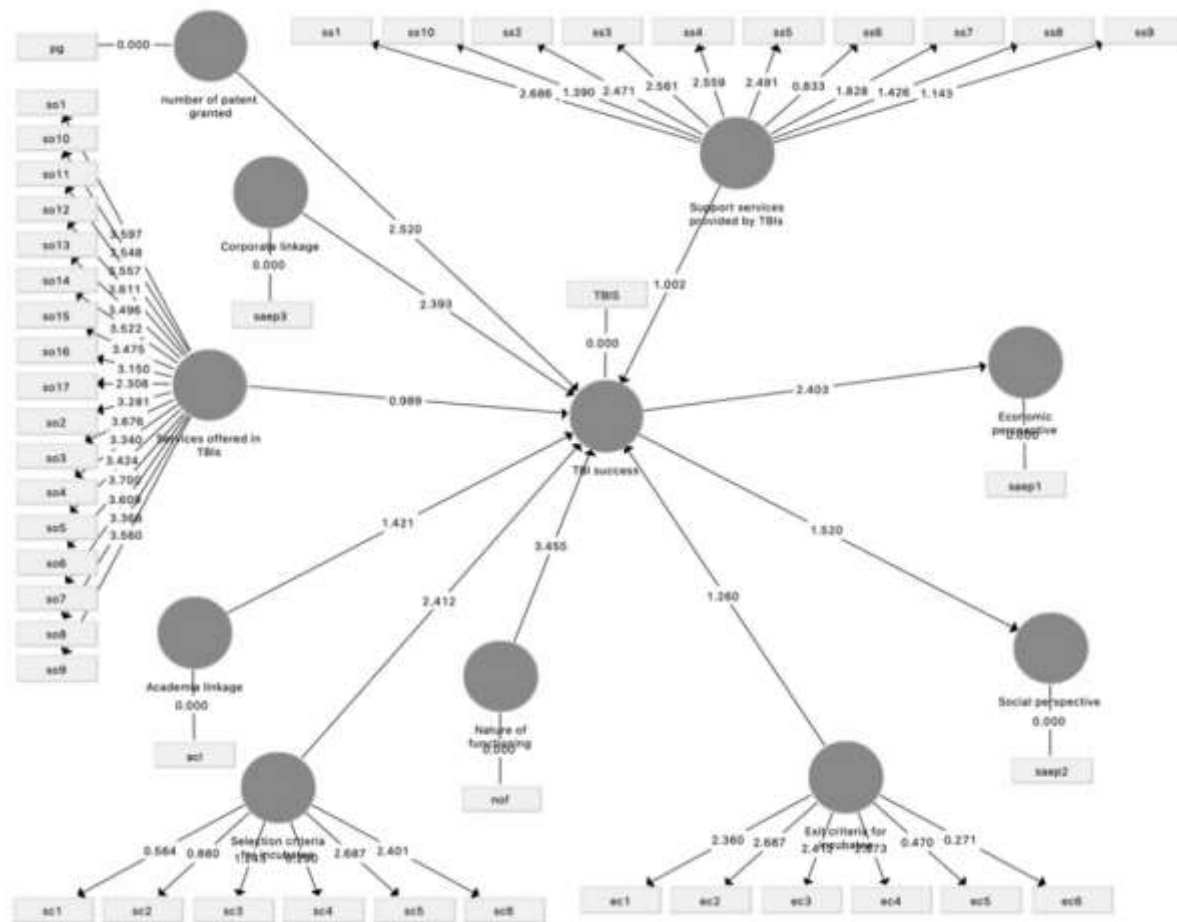


Figure 2: Standardised Path Estimates for the Model

Fig. 2 shows the standardized path estimates for the model. Based on $p < 0.01$ and $p < 0.05$, the standardized path coefficients were found to be insignificant and positive, which indicates that there existed strong evidence in rejection of the hypotheses H2, H3, H5, H6, and H10 except H1, H4, H7, H8 and H9. The significant paths included (NPG → TBI success; $p = 0.016$), (SC → TBI success; $p = 0.029$), (CL → TBI success; $p = 0.003$), (NOF → TBI success; $p = 0.001$) and (TBIs → EP; $p = 0.017$). Critical ratios lied in the range of 0.412 to 3.455. The prescribed limit of CR is 1.96 (Hair et al., 2006). In this study, only a few paths possessed a critical ratio value above the prescribed limit.

6. Conclusion

The research model proposed in this research work provides a deep understanding into the relationships between the variables. It also attempts to explain the impact of performance indicators on TBI success and impact of TBI success on social and economic perspective. As discussed earlier in this study, the proposed model was conceptualized on the basis of extant literature. All the factors possessed construct reliability and validity and thus the research instrument was considered appropriate for the study. The proposed research model possessed that the required model fit into the data and thus, the conceptual research model was considered acceptable. All the factors (performance indicators) considered in the study had standardized factor loadings, thereby establishing that the constructs are unidimensional. Patent grants have a significant impact on TBI success therefore, H1 is supported. This result is in agreement with Khan et al. (2019) confirmed that TBIs must increase their intellectual capital in order to. achieve a competitive

advantage. Selection parameters for an incubator significantly influence TBI success therefore, H4 is supported. Wachira and Ngugi (2017) confirm that the election criteria employed by business incubators is crucial to entrepreneurial success. in order to recruit and foster just the most promising TBI candidates. Corporate linkage has a significant influence on TBI success, H3 is supported. This finding is aligned with Binsawad (2018) which shows that sharing knowledge and corporate linking is essential for TBI success. Fernandes et al., (2016) and Gimmon (2014) argued that corporate linkage is essential to develop new technologies and generate knowledge/innovation with the purpose of gaining competitive advantage. Nature of functioning of TBI has a significant influence on TBI success, H8 is supported. Smilor and Gill (1986) are in keeping with the conclusion. This suggests that the accelerator often plays a key role in combining people, technology and funding to accelerate new enterprise growth.

Support services offered by TBI and services offered in TBI, has insignificant influence on TBI success, H2 and H3 unsupported. The reason is that even the major objective of TBIs should be to assist elevate technological enterprises at such an “early stage to something like a level from which they can take advantage of business opportunities and enter the market without additional support (Rothaermel and Thursby 2005; Bollingtoft and Ulhoi 2005; Schwartz 2012). Exit criteria for incubate has insignificant influence on TBI success, H5 is unsupported. It is because they do not know whatever has occurred towards the graduating companies of TBIs from available data sources, but whether the long-term subsistence rate is different (Xio and North, 2017). Academia linkage has insignificant influence on TBI success, H6 is unsupported. This is due to fact that funds made available by the government are not adequately channeled in the way it says on the fiscal policies. The experiences are out there but many entrepreneurs do not have the necessary resources to start up these interventions and the bank is of no help since we cannot provide the necessary guarantees required for the loan to assist them. Robertson and Kitagawa (2011) arguing that incubator universities strive to increase marketing by creating spin-offs that strengthen promotion of research, new ideas, and trade and entrepreneurship activity. The confirmed incubator owners Hofer and Potter (2010) need to engage alongside universities to improve commercialization for the most betterment of the public. TBI success has a significant influence on economic perspective, H9 is supported. This finding is consistent with Ozdemir and Sehitoglu (2013) which shows that TBI success is closely related to the economic development of the country. In conclusion, this study has fulfilled its main aim to examine technology business incubator performance by studying the performance indicators, which is important in the further developmental process of new ventures and TBIs henceforth. Therefore, the study concludes the conceptual framework model proposed as a Benchmark for examining the TBI success towards new venture creation.

7. Recommendations

The framework proposed in this study is of relevance to TBIs success, because it enables them to evaluate their performance based on performance indicators. It is of major importance to understand the performance indicators in order to be a successful incubator. This study will make a sound base and support, regarding the performance indicators associated with an incubator's success. Many studies have found strong relationship between performance indicators and TBI success. The findings of this study present valuable

insights on measures and critical underlying dimensions of performance indicators in the context of TBI success. The proposed theoretical model provides a deeper understanding of the relationships between the factors that influence on TBI success. This research also aims to establish a relationship between the performance indicators and TBI success, social and economic perspective.

Very few studies have laid emphasis on the impact of performance indicators on TBI success in India. Apart from bridging the gap in the existing literature on impact of performance indicators on TBI success. This research study has many implications for technological business incubators. The study helps the TBI in knowing the performance indicators for its success. Therefore, managerial priority should be to identify the most important performance indicators used by TBI. This would help the TBI in examining the TBI success which are affected by performance indicators.

8. Managerial implications

The framework proposed in this study is of relevance to TBIs, because it enables them to evaluate their performance based on performance indicators. It is of major importance to understand the performance indicators in order to be a successful incubators. This study will make a sound base and support, regarding the performance indicators associated with an incubator's success. Many studies have found strong relationship between performance indicators and TBI success.

The literature describes various performance indicators that measure TBI success. As mentioned earlier, number of patents granted, selection criteria, corporate linkage, and nature of functioning were found to directly and strongly influence TBIs success. Managers, practitioners, academicians and incubator managers can utilize the information generated from the findings of this research in order to identify the performance indicators affecting TBI success.

The present study suggests that in order to promote an entrepreneurial culture, governments in India should focus on business incubation and government regulations for entrepreneurship because, without government regulations, business incubators alone are not enough to understand the entire entrepreneurship ecosystem. The study suggests that TBIs should focus upon the performance indicators that influence TBI success. If these performance indicators are successful, the incubator and the entire incubation process will succeed.

Managerial Implications for Policy Makers

Our results have implications for BI managers, prospective tenants and policy makers. The results of this study may help the incubator managers to modify their strategy and increase the outcome of their organizations by focusing on the critical performance indicators which is important in the developmental process of new ventures.

To improve on the efficiency and the effectiveness of the business incubation, innovators ought to come up with new techniques that will enable online business training as well as online monitoring. This will enable the information to reach a wide range of people hence enabling the entrepreneurs to achieve their goals in business. Initial point for more methodical approach to the research area of performance measurement of TBI success and to identify the critical success factors which need to be managed by the incubator managers

to achieve the operational excellence and success. In order to be able to provide professional and helpful assistance to incubatees, it is important that business incubators understand main constructs for their success. The current research provided empirical evidence on success factors of business incubators. Namely, research data collected in India and analysed further through qualitative and quantitative methods, showed that major constructs such as no. of patent granted, support services offered by TBI, services offered in TBI, selection criteria for incubatee, exit criteria for incubatee, academia linkage are critical factors to run a business incubator. Thus, it is important to understand these factors well before one start drafting the project to start incubation activities.

Implications for the Society

While doing the survey for this research, the researcher noted the critical comments and feedback provided by the incubator managers. Firstly, the greatest assets of any organization is to be productive and gain continuous growth in human resources. Hence, it is very important for the incubator manager to provide creativity and innovation within the business incubation functions.

Thus, the provision of management direction, technical support and a consulting style to a new developing enterprise is critical to the business incubator. In addition to the above discussion, one can conclude by pointing out that by investing in human capital, business incubation will be able to deliver and reach its target.

Secondly, the inability of business incubators to deliver can be partly attributed to the fact that the managerial control does not come from an entrepreneurial background, and hence, unable to deliver the adequate support required by SMEs. The researcher believes that with the use of entrepreneurial skills, both business incubators and incubated entrepreneurs become well-developed and sustainable.

Thirdly, one of the measures of good management is an incubator's ability to attract sponsors, raise funds and mobilize resources that could be utilized to better the incubator business model in servicing incubatees. This researcher concurs that in developing countries, particularly where business incubators are still evolving in obtaining the public support, and international linkage is essential during the early years of operation.

International linkage in this context means partnering with other incubators and companies internationally. As business incubators increase both in developed and developing countries, the next generation of incubators are expected to be profit driven organizations that specialize in a specific sector environment.

Lastly, it is necessary to analyse the constraints faced by the incubator managers and what steps could be implement to reduce the negative impact of these obstacles.

Future research directions

The increasing number of TBIs and related studies show that TBIs are good catalysers for economic development. Although there is a shortage of common assessment frameworks, management strategies and even definitions, there are a significant number of studies on TBIs.

Business incubator programs have become a central element of support infrastructure for SME and entrepreneurship. These programs exist widespread worldwide as a popular entrepreneurship policy

intended to help new businesses avoid the risks of failure and generate economic growth in worldwide. They receive tremendous subsidies from governments and a great deal of government funds is directed to them both in developing and developed countries. However, the research dealing with whether incubators impact on business performance, economic growth and benefits to society.

Much attention has been devoted to the description of incubator facilities, less attention has been focused on the incubatees, the innovations they seek to diffuse, and the incubation outcomes that have been achieved. As interest in the incubator- incubation phenomenon continues to grow, new research efforts should focus not only on these under-researched units of analysis, but also on the incubation process itself.

Limitations of study

Every study has its share of limitations. This study too has certain limitations. Important ones are listed below

- The lack of time and funds limited further and more extensive research.
- Travel Restrictions due to covid 19 pandemic resulting in online interactions only .
- Data sharing by Incubator Manager due to confidential and competitive nature.
- As the incubator managers did not allow access to their database, the accessibility to more information related to the incubatees was a problem.
- In addition, a larger sample would have yielded results with a higher confidence interval.
- Regardless of the attention and effort, the identified variables in the study may be limited to the knowledge and experience of incubator managers, thus may be considered non-exhaustive.

References

1. Lee, H, Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), 179–228.
2. Cheng, S., Schaeffer, P.V. (2011). Evaluation without bias: A methodological perspective on performance measures for business incubators. *Region Development*, 33, 211–225.
3. Udell, G.G. (1990). Academe and the goose that lays its golden egg. *Business Horizons*, 33(2), 29–37.
4. Smilor, R.W. (1987). Commercializing technology through new business incubators. *Research Management*, 30(5), 36–41.
5. Peters, L, Rice, M., Sundararajan, M. (2004). The role of incubators in the entrepreneurial process. *The Journal of Technology Transfer*, 29(1), 83–91.
6. Gupta, A.K., Govindarajan, V. (2000). Knowledge management's social dimension: Lessons from nucor steel. *MIT Sloan Management Review*, 42(1), 71.
7. Brush, C.G., Greene, P.G. (1996). Resources in the new venture creation process: Strategies for acquisition. *Academy of Management*, Cincinnati, OH.

8. Rooney, D., Hearn, G., Kastle, T. (2012). Knowledge is people doing things, knowledge economies are people doing things with better outcomes for more people, In Handbook on the Knowledge Economy, Vol. 2 (Edward Elgar, Cheltenham and Northampton), pp. 1–14.
9. Taylor, M.S., Grossman, G.M., Helpman, E. (1993). Innovation and growth in the global economy. *Economica*, 60(239), 373.
10. Carlson, C.R., Wilmot, W.W. (2006). Innovation: The Five Disciplines for Creating What Customers Want. *Crown Business*.
11. Ascigil, S.F., Magner, N.R. (2009). Business incubators: Leveraging skill utilization through social capital. *Journal of Small Business Strategy*, 20(1), 19
12. Gozali, L., Masrom, M., Haron, T.Y.M.Z (2015). Critical Success Factors of Successful E-Business Incubators Framework in Indonesian Public Universities.
13. Lichtenstein, G.A. (1992). The significance of relationships in entrepreneurship: A case study of the ecology of enterprise in two business incubators.
14. Campbell, C., Kendrick, R., Samuelson, D. (1985). Stalking the Latent Entrepreneur. *Economic Development Review*, Volume3(2), pp.43–48.
15. Lasrado, V., Sivo, S., Ford, C., O'Neal, T., Garibay, I. (2016). Do graduated university incubator firms benefit from their relationship with university incubators? *The Journal of Technology Transfer*, 41(2), 205-219.
16. Mas-Verdú, F., Ribeiro-Soriano, D., Roig-Tierno, N. (2015). Firm survival: The role of incubators and business characteristics. *Journal of Business Research*, 68(4), 793-796.
17. Fernandes, C.C., Miranda Oliveira J.M, Sbragia, R., Borini, M., (2016). Strategic assets in technology-based incubators in Brazil. *European Journal of Innovation*, 20(1), 153-170.
18. Sekaran, U. (2003) Research Methods for Business: A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York.
19. Chin, Wynne, Marcoulides, G. (1998). The Partial Least Squares Approach to Structural Equation Modeling. *Modern Methods for Business Research*. 8.
20. Hair, Jr., J. F., Black., W. C., Babin., B. J., Anderson., R. E., L. Tatham., R. (2006). Multivariate Data Analysis. New Jersey: Pearson International Edition.
21. Ozdemir, O. C., Sehitoglu, Y. (2013). Assessing the impacts of technology business incubators: a framework for technology development centers in Turkey. *Procedia-Social and Behavioral Sciences*, 75, 282-291.
22. Xiao, L., North, D. (2018). The role of Technological Business Incubators in supporting business innovation in China: a case of regional adaptability?. *Entrepreneurship & Regional Development*, 30(1-2), 29-57.
23. Smilor, R.W. (1987). Managing the Incubator System: Critical Success Factors to Accelerate New Company Development. *IEEE Transactions on Engineering Management*, Volume 3, pp. 146–155.
24. Binsawad, M., Sohaib, O., Hawryszkiewicz, I., Aleidi, A. (2018). Individual Creativity Towards Technology Business Incubator Performance.

25. Kuryan, N., Khan, M. S., Gustafsson, V. (2018). Born globals and business incubators: a case analysis. *International Journal of Organizational Analysis*.
26. Hofer, R.A. and Potter, J. (2010), University Entrepreneurship Support: Policy Issues, Good Practices and Recommendations, Committee of the Local Economic and Employment Development Program of the OECD (LEED).
27. Kitagawa, F., & Robertson, S. (2012). High-Tech Entrepreneurial Firms in a University-Based Business Incubator. *The International Journal of Entrepreneurship and Innovation*, 13(4), 249–259.
28. Xiao, Li & Ramsden, Mark. (2014). Technology Business Incubators and the Innovativeness of New Ventures in China's Core and Periphery.
29. Rothaermel, Frank, Thursby, Marie. (2005). Incubator Firm Failure or Graduation? The Role of University Linkages. *Research Policy*. 34. 1076-1090.
30. Bøllingtoft, Anne, Ulhøi, John. (2005). The Networked Business Incubator - Leveraging Entrepreneurial Agency?. *Journal of Business Venturing*. 20. 265-290.
31. Schwartz, M. (2013). A control group study of incubators' impact to promote firm survival. *J Technol Transf* 38, 302–331.
32. Gimmon, E. (2014). Mentoring as a practical training in higher education of entrepreneurship. *Education and Training*, 56(8/9), 814-825.
33. Wachira, K., Ngugi, P., Otieno, R. (2017). Role of Social Networks in University Based Business Incubators in Promoting Entrepreneurship Growth in Kenya. *International Journal of Academic Research in Economics and Management Sciences*. 6. 10.6007.

