

An Analysis of factors affecting the effectiveness for Indian Business Incubation Centers with respect to Technology Startups

Hima Trivedi¹, Dr. Rajesh Asrani²

¹Research Scholar, School of Doctoral Research and Innovation, GLS University,
Ellisbridge, Ahmedabad, India
hima.trivedi@glsuniversity.ac.in

²Dean, School of Doctoral Research and Innovation, GLS University
Ellisbridge, Ahmedabad, India
rajesh@glsuniversity.ac.in

Abstract: Best Incubation practices are essential to implement at Business Incubation Centers. Indian economic scenario is experiencing paradigm shifts by putting a lot of emphasis on the Technological startups. Looking at the policies of different departments of Indian Government, Technological startups at the graduation level is highly being motivated to cultivating their ideas into the effective business solution. The study used the qualitative and quantitative data collection. Different frameworks of Business Incubation centers have been examined for the factors and data has been collected from 146 Technological startups of India. The result revealed predictors of the predictable factors for Incubation Success Measurements. The research concluded with the facilities are services that were preferred by the technology-based start-ups. The study established the factors of incubation centres used to the strategic development purpose

Keywords: Business Incubation Centers, Best Incubation Practices,

1. Introduction

With an aim to achieve economic growth, self-sustainability and a newer economy developed on the basis of knowledge and innovation, developed and developing countries are putting into practice a range of mechanisms to sustain their entrepreneurial environment and have to keep doing so in this 21st century. Several thousands of entrepreneurs, who are full of hope and feel bright, confident and motivated, start new businesses every year but small business statistics reveal that more than 50% of them will vanish by the end of at most four years. As per the NASSCOM report published in 2019, there is 15% growth since 2011. In last 5-6 years, the number of start-ups has increased rapidly. In India, the Government's Department for Science and Technology (DST) first invested in Science and Technology Entrepreneurs Parks (STEPs) in the 1980s, and then from the early 2000s, in Technology Business Incubators (TBIs) (ISBA, 2009). DST has so far funded over 60 TBIs (ISBA, 2019).

Most are based within academic institutions, but some are public-private partnerships with other types of 'host' organizations, such as the Indian Angel Network.

NBIA, the National Business Incubation Association, describes business incubators as a catalyst tool or medium meant for economic development of region or nation as a whole (NBIA, 2006). The enterprises gaining global attention currently are the tech-based enterprises leading to generation of tech start-ups (Bala Subrahmanya, 2015).

Looking at previous research work, here it is unclear about the stage of the startup. However, most researchers seem to agree that incubation is related to the early phase of a venture's life (Aernoudt, 2004; Bhabra-Remedios and Cornelius, 2003; Grimaldi and Grandi, 2005; Hackett and Dilts, 2004a; Lindelöf and Löfsten, 2004). Klofsten (2005) states that most of the ventures who are immature prefer to be with incubators not the fully developed business ideas and help develop them into viable companies.

2. Research Questions

Research Question: What facilities and services are predictors of Incubation Success Measurement among Technology Based Start-ups in India?

3. Methodology

This study adopted the descriptive survey research design involving both quantitative and qualitative data collection. Creswell (2007) suggests that descriptive studies were advantageous when not much has been written about the topic or the population being studied. It was preferred over other designs because of its rapid data collection and ability to help understand populations from a part of it (Kothari, 2009a).

The study has been carried out the exploratory analysis also by analysing the different factors from existing business incubation frameworks as well as the recent white papers & reports. The study examines the technological based startups across India who are associated with Business Incubation Centres. A cross sectional questioner is been used for collecting the data from 146 startups. 200 startups were approached for the same but only 146 start-ups responded with their views.

The collected data was sorted and coded to highlight to perform the suitable method with respect to problem of the study. The study triangulated qualitative and quantitative responses and the data

findings for to improved reliability, validity and convergence in the reporting or interpretation (Creswell and Piano - Clark, 2007).

To find the nature of the relationship between the factors, the variables has been coded in Statistical Package for Social Science (SPSS) software.

The results were used in establishing the validity and reliability of the research tool. A content validity test was conducted to check if there were enough relevant questions covering all aspects being studied and those irrelevant questions were removed. According to Polit & Beck (2010), a panel of experts is recommended to evaluate research instruments for their validity. The researcher carried out a stability test using the test-retest method on a small population during a pilot study (Kothari,2009b). Reliability was determined by correlating the two administrations using Pearson's product-moment correlation coefficient (r). The value of r - Cronbach's Alpha is 0.795 for start-ups' questionnaire. These were above the recommended threshold of 0.7 hence the instruments were considered ideal, reliable and suitable for collection of data (Osborne and Waters, 2000). Data analysis entailed Multiple Regression and mean square analysis from which interpretations and recommendations were made. In addition, the quantitative analyses were supplemented by qualitative descriptions to provide a fuller picture of the findings.

4. Variables

The dependent variable in this study was Incubation Success Measurements and it was measured by multiple variables like Start-ups Incubated, Start-ups Graduated, Associated Mentors, Accelerator Programme Executed, Employment Generated by the Incubated Start-ups, Total amount of Fund disbursed, Types of Funding disbursed and External Funding Raised. The independent variables were several facilities and services provided by the Incubation Centres. These variables that were based on recommendations from previous research were selected for use in this study.

Seven Shared Services variables were combined to be a measure of Administrative Shared Services, Four Physical Infrastructure variables were combined to be a measure of Physical Infrastructure Facilities, Four Mentoring & Networking variables were combined to be a measure of Mentoring and Networking Facilities, Four Host Institution Support variables were combined to be a measure of Host Institute Support, Three Exit Criteria parameters were combined to get the measure of Entry Criteria and same as Four parameters were combine to get the measure of Exit Criteria, Three variables in each parameters were combined to get the measure of Performance Checking and

Funding Availability variables. Information Regarding the Independent variables were measured is provided in Table 2.

Variables	M	SD
Accessibility of shared services	4.098	0.449
Administrative & Secretarial Services		
Specialised Business Services		
Business Assessment services		
Intellectual Property (IP) Management Services		
Commercialising Technology Services		
Product Prototyping And Design Assistance		
International Trade Services		
Physical Infrastructure	4.279	0.445
Geographical Location		
State-of-the-art Infrastructure		
Appropriate Space for Business Needs		
Facilities of Communication Equipment		
Mentoring & Networking Facilities	4.034	0.631
Entrepreneurial Network		
Periodic Calendar of Networking Events		
Entrepreneurial Education		
Accessible Resources		
Host Institute Support	4.212	0.432
Inheritance of Operational Support		
Availability and Accessibility of Established Resources		
Access to Established Network		
Establishment of the Corporate Governance		
Entry Criteria	4.45	0.597
Innovation Quotient		
Strong Team of Founder(s)		
Demonstrate High Potential Growth		
Exit Criteria	4.143	0.499
Incubation Timeline		
Expansion of Team Members		
Achieves the Agreed Business Target and Objectives		
Need Extended Support Beyond Incubation		
Performance Checking	4.288	0.605
Meet Start-ups Regularly		
Progress Presentation Monitoring Committee		
Update Success Stories		
Availability of Funding	4.217	0.579
Different Funds		
Structured Procedures Start-up Selection		
Predefined Regulatory Compliance		

Table 1: Summary of Independent Variables with mean and Standard Deviation

5. Results

The research aims to know to what extent is the Incubation Success is influenced by the eight independent variables.

Table 2 describes the model summary of the variables. R value is the 0.963 which predicts the high correlation between the variables whereas R square value - 92.7% - variability caused to the

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.963 ^a	.927	.922	.12955	1.858

a. Predictors: (Constant), Availability of Funding, Exit Criteria, Administrative Shared Services, Entry Criteria, Physical Infrastructure, Host Institution Support, Mentoring & Networking Facilities, Performance Checking

b. Dependent Variable: Incubation Success Measurement

Table 2: Regression Model Summary

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The survey studied the Durbin-Watson Value which 1.858 which in-between the recommended threshold of 1.5 and 2.5 hence the gathered data eliminated the assumption of self-correlation in independent variables (Frankel, Wallen and Hyun, 2000).

As explained in the Table 3, the values of Variance Inflation Factor (VIF) are also considered to eliminate the possibility of Multicollinearity in the variables. Variance Inflation Factor (VIF) and Tolerance values are below 10 and not nearer to 0 which is recommended for performing the

Independent Variables	Std. Error	Estimate	P - Value	Collinearity Statistics	
				Tolerance	VIF
Administrative Shared Services	.049	.373	.000	.236	4.233
Physical Infrastructure	.045	.245	.000	.293	3.409
Mentoring & Networking Facilities	.039	.528	.000	.190	5.265
Host Institution Support	.050	.056	.229	.247	4.045
Entry Criteria	.030	.414	.000	.353	2.835
Exit Criteria	.035	.039	.299	.377	2.654
Performance Checking	.048	-1.045	.000	.140	7.145
Availability of Funding	.057	.711	.000	.106	9.407

Table 3: Correlation Summary of Regression Analysis

Multiple Regression Analysis.

The research question was answered by obtaining the regression weights and the p-values for these weights. In Table 2, the result of the regression analysis is displayed. In Table, Estimate, Standard Error and p-Value is given for all the predictor are given. Host Institute Support and Exit Criteria were not significant predictor of Business Incubator success measurements with p-Value and β - (0.229, 0.056) and (0.229, 0.039) respectively. However, Administrative Shared Services ($p < 0.000$, $\beta =$

0.373), Physical Infrastructure Facilities ($p < 0.000$, $\beta = 0.245$), Mentoring and Networking Facilities ($p < 0.000$, $\beta = 0.528$), Entry Criteria ($p < 0.000$, $\beta = 0.414$), Performance Checking Mechanism ($p < 0.000$, $\beta = -1.045$), Availability of Funding ($p < 0.000$, $\beta = .711$) are the significant predictors for the Incubation Success.

Further, the research also analysed the nature of the relationship with the independent variables. Performance Checking has the negative relationship with the dependent variable that is very much clear that higher the performance checking mechanism is inversely contributing with the incubation success. All other independent variables have the direct and positive relationship with the dependent variable.

A regression equation resulted from the above presented:

$$y = -1.015 + 0.386x_1 + 0.256x_2 + 0.390x_3 + 0.061x_4 + 0.323x_5 + 0.037x_6 - 0.804x_7 + 0.571x_8$$

Where: x_1 = Administrative Shared Services, x_2 = Physical Infrastructure Facilities, x_3 = Mentoring & Networking Facilities, x_4 = Host Institute Support, x_5 = Entry Criteria, x_6 = Exit Criteria, x_7 = Performance Checking, x_8 = Availability of Funding

6. Discussion

The facilities and services variables considered in this study were Accessibility of shared services, Physical Infrastructure, Mentoring & Networking Facilities, Host Institute Support, Entry Criteria, Exit Criteria, Performance Checking, Availability of Funding. The results of these analyses demonstrate that Availability of Funding was the strongest predictor of Business Incubation Success.

The performance Checking structure was negatively related to the Incubation Success. Higher the performance checking mechanism set-up by Business Incubator tend to create unnecessary pressure on start-ups to give some quantifiable data to prove to be successful. Therefore, there can be specific strategy to check the performance of start-ups which do not affect their work structure.

The study also analysed the parameters start-ups considered while choosing the Incubation centres are sequentially Entry Criteria, Performance Checking Mechanism, Physical Infrastructure, Availability of Funding, Host Institute Support, Exit Criteria, Administrative Shared Services, Mentoring & Networking.

Overall, the contribution of Availability of Funding has the major impact on the success measurement followed by Mentoring & Networking Activities, Entry Criteria, Administrative Shared Services, Physical Infrastructure, Exit Criteria, Performance Checking. Hence, Higher the availability of funding can attract more tech-based start-ups to incubation centres. Therefore, it is very much

important for the incubation centres to get the funds from difference sources for start-ups. While availability of funding also leads to set-up the strong distribution mechanism of the same among the start-ups. However, it is also essential for incubation centres to have the collaborations with Government Agencies, Venture and Angel Communities, Banks for the funds. Here, availability of funding also gives an edge to the incubation centres in their success bucket.

Considering, more and more policies are being placed by Government of India to promote the innovation for strengthening the Indian Economy, it is very much essential for incubation centres to strength their facilities and services to facilitate the start-ups. With sudden increase in number of incubation centres, to implement the best effective operational policies are most important.

While looking at the parameters of the incubation for the measuring the success, start-ups consider mentors associated with relevant field experience, Number of start-ups graduated, Number of accelerator programme executed, Number of start-ups incubated and External Funding Raised.

7. Conclusion and Recommendations

The study centred to influence the Business Incubators' to implement the best incubation practices. Here, the study concluded the parameters and facilities which are essential for the incubators to operate effectively and efficiently. Technology based start-ups across India are expected to have the facilities with their growth so incubation centres can expand their functions accordingly. While implementing the policies also, incubators can decide the structure of the same as flexibility in the policies are as much essentials as the concrete implementation of the policies.

Government can also refer the same to recommend the incubators to set-up the basic facilities for technology-based start-ups.

The finding, discussions and implementation of this study are an important ingredient to the adoption of best policies for the incubators. It is hoped that this study has established the essential facilities and services of business incubator required by the technology-based start-ups. This study established one essential part of the implementation of best incubation polices of Indian Incubators.

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