Examining the relation of service assistance facilities, managerial skill competencies and constraints   75
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Examining the relation of service assistance facilities, managerial skill competencies and constraints with agri-business incubators performance in India

S.C. Bose
Pursuing Ph.D in Mangement
Institution: Thapar University
Address: School of Humanities and Social Sciences. Patiala-147004 (Punjab) India.
E-mail: **scbose@thapar.edu**

Ravi Kiran
Ph.D in Industrial Management
Institution: Thapar University
Address: School of Humanities and Social Sciences. Patiala-147004 (Punjab) India.
E- mail: **rkiran@thapar.edu**

Dinesh Goyal
Ph.D in Biotechnology
Institution: Thapar University
Address: Department of Biology. Patiala-147004 (Punjab) India.
E-mail: **dineshgoyal63@gmail.com**

Abstract

This study is an attempt to identify service assistance facilities and managerial skill competencies through grounding of literature to understand how they can contribute in Agri-Business Incubators (ABIs) performance. The study also endeavors to gauge the criticality of constraints and challenges faced by ABIs. A regression analysis is applied to understand the relation among service assistance facilities; managerial skill competencies and constraints with ABI performance. The results highlighted that service assistance facilities and managerial skill competencies influence ABI performance. Insufficient business skill; inadequate funding for operations; Competition from big businesses and difficulties in finding appropriate candidate clients emerged as important challenges. Effort was also made to gauge the perception of managers of large, medium and small ABIs regarding service assistance facilities; managerial skill competencies and for constraints.

Keywords: Agri-Business Incubator. Business performance. Service assistance facilities. Managerial skill. Competencies.

1. Introduction

Agriculture sector is very vital for any developing economics including India, as it is providing livelihood to a large proportion of the population. Yet the present state of

Examining the relation of service assistance facilities, managerial skill competencies and constraints   76
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

agriculture in India is not very bright and it is neither productive nor sustainable. Increasing the productive capacity of agriculture through higher productivity has been an important goal in developing countries (Mathur, Das, Sircar, 2006). It has been suggested that there is a need to increase yields to their technically highest levels through appropriate investment in basic infrastructure, human development and research and extension service (Charas 2006, Zepeda 2006).The share of agriculture sector in the overall domestic product (GDP) has declined. The share of agriculture in GDP was 29.76 percent during 1993-94; it fell to 23.15 percent during the period 2000-01. The yield of different crops in our country is below the world's average except for wheat and sugarcane (Central Statistical Organization, 2004). Therefore, there is enough scope to enhance productivity in our country with the application of the latest technology.The question that arises is how to make agriculture in developing countries more productive and sustainable. The answer lies in developing sustainable agri-business.

Agribusiness is a generic term for the various business involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing and retail sales. Agribusiness covers input supplier, agro-processors, traders, exporters and retailers. Agribusiness provides factors of production to farmers and brings them closer to consumers through the financing, handling processing, storage, transportation, marketing and distribution of agro-industry products (FAO, 1997).Agribusiness is thus a term used to mean farming plus all the industries and services that constitute the supply chain from farm through processing, wholesaling and retailing to the consumer.Agro-industry comprises all the post-harvest activities that are involved in the transformation, presentation and preparation of agriculture production for intermediary or final consumption of food and non-food products (Wilkinson & Rocha 2009).

According to the World Bank, the potential of agricultural growth to reduce poverty is 4 times greater that the potential growth from other sectors. The World Development Report (2008) clearly state how increased investment in agri-business develop multiplier effects through their forward and backward linkages creating demand for agriculture products and related input and creating employment. Mechanism that can transform comparative advantages in commodity markets as in India into competitive advantages in differentiated product market can have a tremendous impact.Effective application of technology through creation of new firms in agribusiness is the most appropriate approach to counter stagnation and initiate economic growth. Peter Drucker in his famous book *Innovation and*

Examining the relation of service assistance facilities, managerial skill competencies and constraints   77
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Entrepreneurship (1985) has explained how US economy outperformed in 1960s, 70s and 80s by effective use of Innovation and Entrepreneurship.

As an economy develops over the time, the share of agriculture in both GDP and employment declines. However, contribution of agriculture will be enhanced substantially, through agro processing and value additions downstream of firms, in the provision of farm input upstream and in improved post-harvest operation, storages, distribution and logistics that are essential elements of agri-business value chains. This offers a route to economic growth and poverty reduction, as well as structural deformation of economic and the improvement of the technical skill and capacity. Wilkinson and Rocha (2009) have shown empirically that the ratio of GDP generated by agribusiness to that generated by farming increased from 0.57 for a nine agriculturally-based countries (all in SSA) to 1.98 for a set of eleven "transforming countries" (mainly Asian) and to 3.32 for twelve "urbanized countries". For the United States, the ratio stands at 13. While in agricultural countries that have not undergone structural transformation; 63 percent of the value added in the agri-food system was created by farming. In the US, farming accounted for on 7 percent input producers, agro-industry, trucking firms, restaurant employees and other created the rest of the value added in the US agri-food system, implying that agribusiness is significantly important for a value addition and economic property (UNIDO 2011).

It is universally accepted that the new and small firms plays significant role in the economic recovery and development. (Birley, 1986) Though the extent of contribution is not very clear yet governments at different levels have designed several polices and strategies for stimulating entrepreneurial activities. For better understanding the creation of new firms, Churchill and Lewis (1983), have built a five stage framework which small firms pass through. The stages are Existence, Survival, Success, take-off, and Resource maturity. The most vital stage is the existence or the start-up stage. Every new firm suffers from certain crisis termed as Liability of newness and liability of smallness. High risk, little credibility and limited resources leads to higher probability of failure and thus discourages new firm formation. Any meaningful and constructive support at this stage increases the survival rate of these new firms like business incubators.

In the current study the review of literature has been broadly based on Incubators, their Role and key success factors focusing on managerial skill competencies and service assistance facilities. Constraints have also been covered. In the last step, their relation with organisational performance has been assessed.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   78
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

The major objectives of the study are:

- To examine the relationship between service assistance facilities and ABI performance.
- To examine the relationship between managerial skill and ABI performance.
- To examine how constraints influence ABI performance.
- To examine whether scale of ABI influences the nature of service assistance facilities, managerial skill competencies and Constraints.

2. Literature Review and Theoretical Framework

Allen and McClusky (1990) have elaborated the new business creators' role of a business incubator. Incubation is the process or practice of developing suitable environment for those businesses which have recently launched their businesses or are planning to do so. Cassim (2001) describes business incubation as a means which can convert a new business plan into reality with reduction in risk factor. In its most generalized term, a business incubator is an infrastructural set-up that houses tenant firms that are in their initial phases (existence stage). However, a business incubator is more than just a building. Their goal is to assist in the development of new entrepreneurial organization while they are in their initial phase (Stephanie, 2006). It states that business incubators are those organizations which supports newly formed business firm in their early phase when the risk of failure is very high and helps them to become "successful".

The American National Business Incubation Association (NBIA) describes business incubation as a dynamic process of new business firm development by accelerating the success rate of start-up business entities. NBIA is a leading association in the field of business incubation with more than sixty years of existence describes business incubation an interactive development process which encourages people to start their own business and provide support to start-up companies in the identification of new customers and development of innovative products.INFODEV- an arm of the World Bank Group (Info. DEV, 2009) defines business incubation aim as to motivate the economic development of the community by guiding the start-up companies and their business development. The "incubator" is commonly used as an overall term for such organizations that offers or creates a supportive

Examining the relation of service assistance facilities, managerial skill competencies and constraints   79
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

environment that is conductive to the "birth" and development of new firms (Chan and Lau, 2005).

According to Aernoudt (2002) the main objective of a business incubator is to produce new and successful firms that will leave the incubator financially viable and sustainable within a reasonable time. Therefore a good incubator should do and provide all those things which will enable newly formed business organization togrow, sustain and prosper outside the nurturing premises. Brooks (1986) mentioned that it will increase the employment and expands tax collection.

For understanding entrepreneurship in the incubation process, Brooks (1986) has broken down new business formation into four distinct phases like Business Idea Stage, Attempt Stage, Development stage and Commercialization stage. He further states that the gap between the idea and attempt stage is vital for the relation between economic development through entrepreneurship and entrepreneur's perception of the probability of success for the new venture. Entrepreneur is less likely to take up a venture where the gap is wider. A system that decreases or removes the gap will increase the chance of entrepreneurship or creation of new venture. Business incubation tries to bridge the gap between these two phases and motivate more entrepreneurs with new ideas to start new venture. Four components of business incubators have received attention in previous researches (Aernoudt, 2004; Allen and McCluskey, 1990; Chan and Lau, 2005; Mian, 1996; Smilor, 1987; Lalkaka and Abetti, 1999). The 'controlled condition' includes four types of support systems.

  i. Shared office space, which is rented under favorable condition to incubators

  ii. Group of shared support service to reduce overhead costs

  iii. Professional business support or advice and

  iv. Network provision, internal and / or external.

According to the National Incubation Association (NBIA) there are five basic classification of business incubation. The NBIA breakdown of incubation program (of these incubators the NBIA has researched) for these 5 types. These are: Mixed use – 47%; Technology – 37%; Manufacturing – 7%; Service – 6%; and Other – 4% (NBIAs l).

The most detail literature survey in the field of business incubation was done by Hackett and Dilts(2004) and it covered most of the areas which have created interest in the mind of the researcher. This work is considered as the most valuable guide for any researcher

Examining the relation of service assistance facilities, managerial skill competencies and constraints 80
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

in the field of business incubation. Hackett and Dilts(2004) have identified five different research orientation and have done so for convenience. Incubators generally provide affordable work space, share facilities, counseling, training, information and access to external network for entrepreneurial groups, thereby helping promote venture creation and economic development.(Allen and Rehman, 1985; Plosila and Allen, 1985; Campbell and Allen, 1987; Smilor and Gill Jr.,1986) This focused assistance to new firm have increased their chance of survive, providing benefits to the entrepreneur, enterprise, community and state (Lalkaka and Shaffer, 1999). So BIs not only helps in establishing new ventures but also assist in survival of these ventures during it early age when they are more vulnerable to failure**.**

Incubator studies are mainly descriptive and mostly dealing with varied concept of business incubator and their function (e.g. Allen, 1985; Allen and Leviru; 1986; Simlor and Gill Jr., 1986). These studies basically deals with the general requirement of a business incubator, such as providing physical space i.e. building to house new small business, shared services including administrative services, business consulting service management assistance etc.(Merrifield, 1987) Capital, technology talent was linked adequately to encourage budding entrepreneurial talent; speed up the growth of new technology based firms(Campbell and Allen, 1987) and enhance the commercialization of technology(Brooks, 1986; Aernoudt, 2004). Researchers since 1990s have begun to complete the concept by describing the role and service of business incubators i.e., incubator hatch new ideas by providing new ventures with physical and intangible resources and speed up new ventures establishment and increase their chance of success (Tang, Baskaran, Pancholi & Muchie, 2011). Zedtwitz and Grimaldi (2006) describe incubators as those which help entrepreneur develop business and marketing plans, built management teams, obtain venture capital and provide access to professional and administrative services. Counseling interaction with incubator management help ventures to gain business assistance whereas networking interaction with incubator management help ventures to gain technical assistance (Seillitoe and Chakrabarti, 2010). Matt and Tang (2010) described the evolution of perceptions and concepts of business incubator from the initial focus on building with basic facilities to value-added services and well defined incubation process.

Small businesses especially high growth SMEs creates most of the jobs (Stokes and Wilson, 2010) yet most of these small businesses fail within their five years of operation. They are very fragile and vulnerable due to under capitalization and lack of proper

Examining the relation of service assistance facilities, managerial skill competencies and constraints   81
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

management skills. In order to increase survival rate, government and other agencies have designed several incentives and assistance mechanism that provides support to budding entrepreneurs. Business incubators have been designed as a tool to promote new business formation, prevent new venture failure and establish vibrant entrepreneurial sector. (Berget and Norrman, 2008; Allen and Rehman, 1985; Gribaldi and Grandi, 2005; Ratinho et al., 2010) A business incubator provides an environment where public and private resources can combine to meet the needs of small business during their critical stages of development (Shalaby, 2009).

Literature on incubators can be broadly classified into two categories. In the initial stage, those studies on the theory and model of incubators have been covered. These researches have endeavored to understand and analyse the formation of incubators, what are their aims and objectives, how they are planned and managed (Allen and McCluskey, 1990; Aeroudt, 2004; Becker and Gassmann, 2006). The second categories of studies try to evaluate incubators on certain factors that define the success indicators i.e. they try to measure and analyze the performance of the incubators.

The requirement of successful incubation is the matter of research for many scholars, each giving their own set of critical success factors. Adlcomak (2009) identified eight points for successful incubation. Lalkaka (2000) identified ten measures to improve performance of incubator, are those which address the deficiencies. Different studies have stated different critical success factors, but broadly they have a unified approach and there are great similarities.

Kumar and Ravindran (2012) considered four factors to evaluate the performance of the incubators; they are occupancy level, sustainability of the incubator, number of incubators in thousand sq. ft. and survival rate.

The concept of business incubation has been successfully applied in several areas like manufacturing, information technology, services etc. The present study analyses the role of business incubators in enhancing entrepreneurship in agribusiness. The factors which contribute towards success of business incubators were identified, studied, analyzed and reoriented for better explanation of agribusiness based incubators.The present study focuses on: i) Service Assistance Facilities; ii) managerial skill competencies; and iii) constraints. Regression model is used to relate them with Agri-Business Incubator Performance.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   82
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

2.1. Agri-Business Incubators Performance

There is no standard measure of incubator performance and this is a major challenge (Dee et al., 2011). Success has been associated with survival and higher employment growth (Rothaermel and Thursby 2005). Hardly some studies explore post-incubator performance, as 'graduation is easy, but post-graduation survival may not be' (Schwartz, 2010). The aspects covered for measuring performance in this study include: correct evaluation of industrial needs; periodic assessment of tenant companies' satisfaction with incubator services; Reduction in early operation costs; facilitating the development of new firms; and generating a strong bond with University. ABI performance has been measured by five items are listed below:

P1: The incubation centre has a good understanding of industrial needs (Lalkaka 1999).

P2: Makes periodic assessment of tenant companies' satisfaction with incubator services (Hackett & Dilts, 2004).

P3: The incubation centre reduces early stage operation costs by providing vital infrastructure (Campbell et al. 1989).

P4: It accelerates the development of new firms (Adlcomak, 2009).

P5: Bond with a university increases the level of credibility for the business incubator center (Lalkaka, 2002).

Business Incubators try to increase the chance of their tenant firms' survival by developing their level of capabilities (Groen et. al., 2008). The success of tenant firms depends upon the nature of services provided and how they are supplied. The type of services provided are: quality technical assistance, marketing assistance, networking support, human resource support, statutory approval support, product development support, securing capital, dissemination of information, feasibility study, developing business plan, business counseling, learning environment, cost reduction support, accelerating the development of new firms, minimizing failure chances. Quality of the assistance (Hackett and Dilts, 2004) and types of counseling (Rice, 2002) determines the success rate of tenant firms. The objective of the incubator is to participate effectively in the firms systematic problem solving.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   83
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Managers try to solve every problem they face by balancing the cost of solution and the value of the solution's use.

Literature supporting Service Assistance Facilities for Enhancing Agri-Business Incubator Performance has been shown through Table 1.

Table 1: Service Assistance Facilities for Enhancing ABI Performance

S. No.	Services	Author(s)
1.	Quality technical assistance	Hackett & Dilts,2004,McAdam&McAdam 2008;McGrath, Rice 2002
2.	Marketing assistance	Bollingtoft& Ulhoi2005; Carayannis&vonZedtwitz 2005; Becker &Gassmann 2006;McAdam&McAdam 2008;Khalid et al, Abetti 2004
3.	Networking support	Hackett & Dilts,2004,Nohria&Eccles 1992
4.	Human Resources support	Bollingtoft&Ulhoi 2005; Carayannis& vonZedtwitz2005; Becker &Gassmann 2006
5.	Statutory approval support	Bollingtoft& Ulhoi2005;Allen 1988; Allen and Rahman 1985;Smilor 1987;Carayannis&vonZedtwitz 2005; Becker &Gassmann2006;McAdam&McAdam 2008
6.	Product development support	Bollingtoft&Ulhoi 2005; Carayannis&vonZedtwitz 2005; Becker &Gassmann 2006;McAdam&McAdam 2008.
7.	Securing capital	Khalid et al, Lalkaka 2002; Lendner and Dowling 2003; Scaramuzzi 2002
8.	Dissemination of information	Campbell et al 1989; Allen 1988;Smilor and Gill 1986
9.	Feasibility study	Campbell et al 1989; Allen 1988; Smilor and Gill 1986
10.	Developing business plan	Franklin et al.
11.	Business counseling	Phan et al 2005; Mian 1997; Wiggis and Gibson
12.	Learning environment	Campbell et al. 1989; Allen 1988; Smilor and Gill 1986
13.	Cost reduction support	Similor and Gill1986; Allen and Rahman 1985; Allen and McCluskey 1990; Lalkaka 2002;Hannon 2005; Mian, 1997
14.	Accelerating the development of new firms	Allen 1988, Phan et al. 2005;Chan and Lau 2005;
15.	Minimizing failure chances	Campbell et al 1989; Allen 1988; Smilor and Gill 1986

Hypothesis 1:

Examining the relation of service assistance facilities, managerial skill competencies and constraints   84
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

H₁: There is a positive relation among service assistance facilities and business incubation performance.

Successive research in this area has shown that most of the incubators provide similar type of conditions to its tenants with varied degree of success rate depending upon the ability of the management team and the type of service assistance being provided. The managerial skill competencies covered in this research are: Selection criteria; Track record with start-ups; Appraisal methods; Financial management efficiency; Good marketing skill; Good interpersonal skill; Possess problem solving skill; Networking capability; Tenant monitoring ability; and Technologically versatile. The details of supporting literature for managerial skill competencies for Enhancing Agri-Business Incubator Performance have been shown through Table 2.

Table 2: Managerial Skill Competencies for Enhancing ABI Performance

S. No.	**Managerial Skills**	Author(s)
1.	Selection criteria	Hackett &Dilts2004;Lalkaka 2002; Fry 1987
2.	Track record with start ups	Kirby, Read & Rowe, Hannon 2003;Studdard 2006;
3.	Appraisal methods	Totterman&Sten 2005;Lalkaka 2002; Duff 1987
4.	Financial management efficiency	Kirby, Read & Rowe, Hannon 2003;Studdard 2006; Khalid et al
5.	Good marketing skill	Kirby, Read & Rowe, Hannon 2003;Studdard 2006; Khalid et al, Abetti 2004.
6.	Good interpersonal skill	Rice 2002;Kirby, Read & Rowe, Hannon 2003;Studdard 2006.
7.	Possess problem solving skill	Groen et. al.2008; Pals 2006;
8.	Networking capability	Bergek&Norrman 2008; Hackett &Dilts 2004; Nohria&Eccles 1992
9.	Tenant monitoring ability	Hackett & Dilts,2004,Abetti 2004; Campbell et al 1989;Abetti 2004
10.	Technologically versatile	Groen et. al. 2008;Fukugawa 2013

As highlighted by (Aernoudt, 2004) a true incubator should offer services such as hand-on management, access to finance (mainly through links with seed capital finds or business angels), legal advice, operational know how and access to new market in addition to office space and common facilities. A business incubator tries to give proper structure and required credibility to new firms by managing controlled conditions to assist in the creation of

Examining the relation of service assistance facilities, managerial skill competencies and constraints   85
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

new ventures (Smilor, 1987). Pals (2006) highlighted Managerial skills as an important feature leading to success of a business incubator. There is management which focuses on having business incubator managers with strong management skills. They want expertise in performance especially in business plan development, marketing and networking linkages, business development trainings (Masutha, 2014).

The related hypothesis is: **Hypothesis 1:**

H_1: There is a positive relation among managerial skill features and business incubator's performance.

2.2. Constraints:

Nature and variety of constrains faced by any incubators influences the stability and sustainability. Constrains, to some extent, test the tenacity and adaptability capacity of the incubator's management team and influences the success rate. The constraint construct designed had 13 items. The Author-Constraint Matrix has been given in Table 3.

Table 3: Author-Constraint Matrix

Author(s)	Pal 2006	Lalkaka 1999	Phan et al. 2005	Abetti 2004	Lalkaka 2002	Brooks 1986	Hackett &Dilts 2004	Lendner &Dowling 2003	Scaramuzzi 2002	Rice and Matthews 1995	Franklin et al.
C1:Appropriate candidate clients	*										
C2:Obtaining funds		*	*	*				*	*		
C3:Complying regulatory and legal work			*								*
C4:Competition				*							
C5: Unwilling	*										

Examining the relation of service assistance facilities, managerial skill competencies and constraints   86
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

to accept advice											
C6: Difficulty in locating appropriate market			*								*
C7: Difficulty in developing business skill for tenant			*								
C8:Inappropriate customer response	*										
C9: Lack of skilled labour			*								
C10: Inappropriate business plan			*							*	
C11:No start-up financing					*			*			
C12:Insufficient business plan						*				*	
C13:Inappropriate technical skill							*				

Brooks (1986) states that if extraneous factors like poor management, financial shortage, high overhead cost etc. responsible for early stage failure of small businesses are controlled or removed, and the survival rate of such businesses increases. The competition for funds often forces many incubators to 'demonstrate success. This often leads to bias in self reporting and the failures are not hidden for want of capital (Dee at al., 2011). Beck,

Examining the relation of service assistance facilities, managerial skill competencies and constraints   87
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Demirgüç-Kunt, and Maksimovic (2005) corroborate this and highlight that financing constraints reduce enterprise growth by six percentage points, on average, for large firms and by 10 percentage points in the case of small firms. Thus, on the basis of constraints mentioned by various researchers, the effort has been made in this research to get perception from managers from 60 respondents from various BIs in India.

Hypothesis 3:

H_3: There is an inverse relation among constrains factors and business performance.

2.3. Scale of ABIs and perception of mangers regarding Service assistance facilities, Managerial skill competencies, and Constraints

In the current study, ABIs have been grouped into three scale categories on the basis of number of graduating firms. ABIs from where the number of graduating firms is between 1-10 have been categorized as small, those where the number is between 11-20 are categorized as medium and in case the graduating firms are in the range of 21-30, are categorized as large ABI. The related hypotheses are:

H_4: There is a difference in the perception of mangers on the basis of scale regarding service assistance facilities.

H_5: There is a difference in the perception of mangers on the basis of scale regarding managerial Skill competencies.

H_6: There is a difference in the perception of mangers on the basis of scale regarding constraints.

3. Research Design and Methods:

For the current study, business incubators based in India have been considered. List of business incubators was obtained from the website of NSTEDB, ISBA etc. Around 120 such incubators listed in renowned business incubators associations were identified and contacted. The respondents are mainly the managers of these incubators. In some cases the person actively involved in the incubator.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   88
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

The questionnaire was prepared in Google docs. First few questions were designed to collected general information about the incubator and the respondent. Rest questions were designed to capture the respondents' perception regarding different factors influencing the performance of the incubator. Five point Likert scale was used to measure the response.

A pilot study was carried out to know the reliability of the questionnaire. Expert opinion was taken to ascertain the validity of the data collection tool. Certain changes were incorporated to increase the efficacy of the tool after which the questionnaire was mailed to the respondents. Where-ever phone number was available; the concerned person was contacted to enhance response level. Sixty responses were shortlisted for the analysis after removing incomplete and vague responses.

Table 4: Reliability of Questionnaire

S No	Description	No of Questions	Cronbach Alpha
1.	General Information	4	-
2.	Service assistance facilities	15	0.870
3.	Managerial Skill Competencies	10	0.905
4.	Constraints	13	0.813
5.	Agri-Business Incubator Performance	5	0.820
6.	Overall	43	0. 876

As shown through table 4 the questionnaire has good reliability score for all the sections as well as an overall score of 0.876. Thus, we proceeded ahead with further analysis.

SPSS-20 was used to perform Stepwise regression for analysing relation of Service assistance facilities and Managerial Skill Competencies with overall performance. The results are shown in next Section.

4. Data Analysis and Interpretation

The study used step-wise regression analysis to achieve the first three objectives, viz. to examine the relationship of service assistance facilities, managerial skill Competencies and constraints with performance of the agri-business incubators. The results have been shown through Table 5.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   89
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Table5: Relationship of service assistance facilities, managerial skill competencies, and constraints with performance of the agri-business incubators.

Model Summary[c]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.693[a]	.480	.471	.27998	
2	.824[b]	.679	.668	.22190	1.97
a. Predictors: (Constant), F7: service assistance facility					
b. Predictors: (Constant), F7: service assistance facility, F8:Managerial Skill Competencies					
c. Dependent Variable: Agri-Business Performance					

ANOVA[a]					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.202	1	4.202	53.608	.000[b]
	Residual	4.547	58	.078		
	Total	8.749	59			
2	Regression	5.942	2	2.971	60.339	.000[c]
	Residual	2.807	57	.049		
	Total	8.749	59			

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.388	.370		3.753	.000
	F7(Service Assistance Facility)	.647	.088	.693	7.322	.000
2	(Constant)	.758	.312		2.434	.018
	F7(Service Assistance Facility)	.493	.075	.528	6.601	.000
	F8(Managerial Skill Competency)	.306	.052	.475	5.944	.000
a. Dependent Variable: Performance						

Stepwise regression was applied on service assistance facilities, managerial skill Competencies and constraints and performance of the agri-business incubators to select the predictors of agri-business performance. The model did not select constrains as the predictor. However, both Service Assistance Facility and managerial skill competencies were selected by the model. The model explained 66.8% of variation. The value of DW   is 1.97 and the

Examining the relation of service assistance facilities, managerial skill competencies and constraints   90
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

value of F is 60.339 and p-value is also less than 0.001. Hence the model is acceptable. B value for F7 (Service Assistance Facility) is 0.493 and for F8 (managerial skill competencies) it is 0.306.

This highlights that Service Assistance Facility has emerged as a better predictor with higher B- value, however, managerial skill competency also is important.. Thus, this model indicates that for enhancing agri-business incubator performance focus needs to be paid to both the factors viz. Service Assistance Facility and managerial skill competencies. Thus, both the hypotheses, **H$_1$**: there is a positive relation among service assistance facilities and ABI performance has been accepted and **H$_2$**: there is a positive relation among Managerial skill competencies and ABI performance have been accepted as both these predictors are positively related with ABI performance.

Initial studies on business incubation have not attempted to come out with model for enhancing performance, however as corroborated by (Tsai, 2009; Thierstein, 2008; & Tötterman 2005) highlighting that incubators provide management guidance, technical assistance and consulting tailored to young growing companies for enhancing sustainability. Moreira et al. (2012) along with Masutha & Rogerson, 2014) emphasize knowledge agglomeration, resource sharing, innovativeness and competitiveness for becoming successful.

However, **H$_3$**: there is a negative relation among constraints and ABI performance has not been accepted as constraints don't emerge as significant predictors in the model. The details of constraints have been presented in next section to understand the criticality of challenges faced by ABIs.

Table 6: Criticality of Constraints

Constraints	Mean	Standard Deviation
C1:The incubation centre faces difficulties in finding appropriate candidate clients	3.32	0.14
C2:Difficulty in obtaining adequate funding for incubator operation paperwork	3.44	0.16
C3:Difficulty in complying with regulatory and legal work or paperwork	3.27	0.13
C4:Tough competition from larger firms or big brands	3.41	0.12
C5:Tenant companies are unwilling to accept the incubators advice	2.64	0.08
C6:Difficulty in locating appropriate market for product	2.93	0.09

Examining the relation of service assistance facilities, managerial skill competencies and constraints   91
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

C7:Difficulty in developing business skills for tenant companies	2.62	0.1
C8:Inappropriate customer response	2.83	0.11
C9:Lack of skilled labour in the community	2.94	0.11
C10:Candidate clients have inappropriate business plan	3.08	0.13
C11:Candidate clients have no start up financing	3.03	0.11
C12:Candidate clients have insufficient business skill	3.47	0.12
C13:Candidate clients have inappropriate technical skill	2.86	0.13

The most critical challenge faced by ABI's is: C12: Candidate clients have insufficient business skill with highest mean of 3.47. This was followed by: C2: Difficulty in obtaining adequate funding for incubator operation paperwork having mean score of 3.44; C4: Tough competition from larger firms or big brands with a mean score of 3.41; and C1:The incubation centre faces difficulties in finding appropriate candidate clients with mean score of 3.32. Supporters of incubation assert that the Incubation process can help protect incubatees from competitive forces of the external environment and increase the likelihood of survival.

There are other researchers who opine that this can weaken a firm's ability to compete and survive when graduating out of the incubator (Amezcua, 2010). However, there is a need to focus on these challenges as highlighted by ABI's to tackle these issues. As highlighted by Dalbergh (2011) aggregate economic performance could be improved by increasing the access to capital. In this study also lack of finance emerges an important constraint.

This has also been corroborated by Banerjee and Duflo (2004) where it is indicated that there is a positive effect that financial development on firms' growth. But large injection of capital is not inevitably a panacea for SME growing pains at a start-up, early-stage or even growth phases (Maina et al., 2012). In this study also there is a challenge of insufficient business skills. Phan et al. (2005) emphasize dealing with challenges of entrepreneurial pursuit.

Next step was to find out whether the managers of small, medium or large ABI's share similar perception or are there differences of opinion regarding service assistance facilities; managerial skill Competencies and Constraints. ANOVA was applied to achieve the last two objectives. Scale of ABI's which have been classified as low, medium and large agri-business incubators on the basis of firms graduating as explained in Research design and methods section.

ANOVA results which is given in the table 7 below:

Examining the relation of service assistance facilities, managerial skill competencies and constraints   92
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

Table 7: Scale of ABI's and managers perception regarding service assistance facilities; managerial skill Competencies and Constraints

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
F7:Service Facility Assistance	Between Groups	1.312	2	.656	4.283	.018*
	Within Groups	8.731	57	.153		
	Total	10.043	59			
F8:Managerial Skill Competencies	Between Groups	2.406	2	1.203	3.669	.032*
	Within Groups	18.689	57	.328		
	Total	21.095	59			
Constraints	Between Groups	.392	2	.196	.528	.592
	Within Groups	21.119	57	.371		
	Total	21.510	59			

As results highlight that in case of service facility assistance and managerial skill competencies there was a difference of perception of managers on the basis of scale of ABIs.

Thus hypothesis H_4: *there is a difference in the perception of mangers on the basis of scale regarding service assistance facilities and H_5: there is a difference in the perception of mangers on the basis of scale regarding managerial Skill competencies has been accepted.*

This was not true in case of constraints. In case of constraints p-value was not significant highlighting that there was similarity of perception regarding challenges or constraints. Thus, H_6: *there is a difference in the perception of mangers on the basis of scale regarding constraints has been rejected.*

Next step was to apply post-hoc test to highlight where the difference was evident. The results have been shown through table 8.

Table 8: Post-Hoc Tukey HSD

Tukey HSD					
Dependent Variable	(I) Firms graduated	(J) Firms graduated	Mean Difference (I-J)	Std. Error	Sig.
F7: Service Assistance Facilities	Small	Medium	-.48956[*]	.17193	.017
		Large	-.14414	.11664	.437

Examining the relation of service assistance facilities, managerial skill competencies and constraints   93
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

	Medium	Low	.48956*	.17193	.017
		Large	.34542	.18736	.165
	Large	Low	.14414	.11664	.437
		Medium	-.34542	.18736	.165
F8: Managerial Skill Competencies	Small	Medium	-.55360	.25155	.080
		Large	.18849	.17065	.515
	Medium	Low	.55360	.25155	.080
		Large	.74208*	.27412	.024
	Large	Low	-.18849	.17065	.515
		Medium	-.74208*	.27412	.024
Constraints	Small	Medium	.07711	.26740	.955
		Large	.18586	.18140	.565
	Medium	Low	-.07711	.26740	.955
		Large	.10875	.29139	.926
	Large	Low	-.18586	.18140	.565
		Medium	-.10875	.29139	.926

In case of service assistance facilities, the results given above depict that for managers of small & medium ABIs had a difference in perception. This was not visible from results of managers of low and large category; and also of medium and large category. In these cases the mangers shared similar perception.

As far as managerial skill competencies are concerned, there is a difference in perception between medium and large; while for small and large & for medium and large there is similarity of perception. In case of constrains there is similarity in the perception among all three categories. With respect to service assistance facilities and managerial skill competencies there is a difference in perception, but for constrains all the three categories, viz. managers of small, medium and large ABIs perceive them to be of equal relevance. Thus, scale doesn't influence challenges.

5. Conclusion and Further research

Business incubation has a significant role to play for businesses survival, sustenance and growth of incubatees. Thus, in this paper an attempt has been made to analyse the predictors of ABI performance. A stepwise regression analysis was applied to service

Examining the relation of service assistance facilities, managerial skill competencies and constraints   94
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

assistance facilities; managerial skill competencies and constraints to find their relation with ABI performance.

The results highlighted that service assistance facilities; managerial skill competencies are both important predictor of ABI performance. They have a strong positive and significant relation with ABI performance. Next step was to understand the criticality of Constraints. Insufficient business skill; inadequate funding for operations; Competition from big businesses and difficulties in finding appropriate candidate clients emerged as important challenges.

Effort was also made to gauge the perception of managers of large, medium and small ABIs regarding service assistance facilities; managerial skill competencies and for constraints. Findings suggest that there is a difference in perception of managers of large, medium and small ABIs regarding service assistance facilities and managerial skill competencies. However there was similarity of perception of managers of large, medium and small ABIs regarding constraints. This highlights that scale does influence the type of service assistance facilities that may be needed for enhancing ABI performance. Similarly scale predominated in case of managerial skill competencies as well. The results contribute to the current literature by investigating the role of service assistance facilities and managerial skill competencies on ABI performance.

Larger the scale of ABI, better may be the service assistance facilities and managerial skill competencies offered. However an important point that emerges is that skills for overcoming challenges or constraints need to be analysed in deeper perspective and this could be a future scope for research. Case studies of incubatees could shed more light on this perspective.

This study is not without its limitations. Further analysis should be directed for the break-up of service assistance facility on the basis of scale of ABIs and for analysing the support to be provided by the BI. Also, there is a need to focus on the nature of BIs along with the scale covered in the present study.

6. References:

AERNOUDT, R. Incubators: tool for entrepreneurship? *Small Business Economics*. V. 23, n. 1, p. 127-135. 2004.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   95
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

AERTS, K.; et al. Critical role and screening practices of European business incubators. *Technovation*. v. 27, n. 5, p. 254-267. 2007.

AKCOMAK, İ. Incubators as Tools for Entrepreneurship Promotion in Developing Countries. *UNU-MERIT Research Workshop on Entrepreneurship, Technological Innovation and Development, Maastricht, Netherlands*. 2009.

ALLEN, D. N.; RAHMAN, S. Small Business Incubators: A Positive Environment for Entrepreneurship. *Journal of Small Business Management*. v. 23, n. 3, p. 12–22. 1985.

Al-MUBARAKI, H.; BUSLER, M. The incubators economic indicators: Mixed approaches. *Journal of Case Research and Economics*. v. 1: 1-12. 2010.

BANERJEE, A. V.; DUFLO, E. Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program. *MIT Department of Economics Working Paper No*.: 02-25. 2008.

BECK, T.; DEMIRGUC-KUNT, A. Access to Finance: An Unfinished Agenda. *The World Bank Economic Review*. v. 22, n. 3, p. 282-296. 2008.

BERGET, A.; NORRMAN, C. Incubator best practice: A framework. *Technovation.* v. 28, n. 1-2, p. 20-28. 2008.

BHABRA-REMEDIOS, R. K.; CORNELIUS, B. Cracks in the Egg: improving performance measure in business incubator research. *Small Enterprise Association of Australia and New Zealand 16th annual conference*, Ballarat. 2003.

BIRLEY, S. The role of new firms: Birth, deaths and job generation. *Strategic Management Journal*. v.7, n. 4, p. 361-376. 1986.

BROOKS, O. Jr. Economic development through entrepreneurship: Incubators and the incubation process. *Economic Development Review*. (summer): p. 24-29. 1986.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   96
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

BUYS, A. J.; MBEWANA, P. N. Key success factors for business incubation in South Africa: the Godisa study. *South African Journal of Science*. v. 103, p. 356-358. 2007.

CHAN, K.F.; LAU, T. Assessing technology incubators programs in the Science Park: the good, the bad and the ugly. *Technovation*. v. 25, n. 10, p. 1215-1228. 2005.

CHURCHILL, N. C.; LEWIS, V. L. The five stages of small business growth. *Harvard Business Review*. v. 61, p. 30-50. 1983.

COLLINSON, S.; GREGSON, G. Knowledge networks for new technology-based firms: an international comparison of local entrepreneurial promotion. *R & D Management*. v. 33, n. 2, p. 189-208. 2003.

DALBERG. The Small and Medium Enterprise (SME) Sector —Catalyst for Growth in South Africa. http://dalberg.com/sites/dalberg.com/files/pdf/SME_Catalyst_for_Growth.pdf. 2012.

DEE, N.J. et al. Incubation for Growth. A review of the impact of business incubation on new ventures with high growth potential. *London: NESTA*. 2011.

FUKUGAWA, N. Which factors do affect success of business incubators. *Journal of Advance Management Science*. v. 1, n. 1, p. 71-74. 2003.

GRIMALDI, R.; GRANDI, A. Business incubator and new venture creation: an assessment of incubating models. *Technovation*. v. 25, n. 2, p. 111-121. 2005.

GROEN, A. J.; WAKKEE, I. A. M.; DE WEERD-NEDERHOF, P. C. Managing Tensions in a High-tech Start-up: An Innovation Journey in Social System Perspective. *International Small Business Journal*. v. 26, n. 1, p. 57-81. 2008

HACKETT, S. M.; DILTS, D. M. A real option-driven theory of business incubator.*Journal of Technology Transfer*. V. 29, n. 1, p. 41-54. 2004a.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   97
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

HACKETT, S.M.; DILTS, D.M. A systematic review of business incubation research. *Journal of Technology Transfer*. v. 29, p. :55-82. 2004b.

HACKETT, S.M.; DILTS, D.M. Inside the black box of business incubation: study B-scale assessment, model refinement and incubation outcomes. *Journal of Technology Transfer*. v. 33, n. 1, p. 439-471. 2008.

HANSEN, M. T. et al. 2000. Networked Incubators: Hothouses of the new economy. *Harvard Business Review*. v. 78, n. 5, p. 75-85. 2000.
http://www.nstedb.com

ISABELLE, D. A. Key factors affecting a technology entrepreneur's choice of incubator or accelerator. *Technology Innovation Management Review*. v. 1, p. 16-22. 2013.

KUMAR, K. Suresh.; RAVINDRAN, D.S.R. A study on element of key success factors determining the performance of incubators. *European Journal of Social Sciences*. v. 28, n. 1, p. 13-23. 2012.

LALKAKA, R.; ABETTI, P. A. Business incubation and Enterprise support system in restructuring countries. *Creativity and Innovation Management*. v. 8, n. 3, p. 197-209. 1999.

LALKAKA, R.; BISHOP, J. Business Incubators in Economic Development: an initial assessment in industrializing countries, United Nation Development Programme, New York, Washington D. C., United Nation Industrial Development Organisation, Vienna. 1996.

LALKAKA, R.; Shaffer, D. Nurturing Entrepreneurs, Creating Enterprises: Technology Business Incubation in Brazil, UNDP, New York. 1999.

LALKAKA, R. Technology business incubators to help build an innovation-based economy. *Journal of Change Management*. v. 3, n. 2, p. 167-176. 2002.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   98
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

MAINA, K.; BUTOYI, S.; MICHIRA, N. SME Solutions Center-Kenya: Developing Alternative Financing Solutions for Small and Medium Enterprises. Washington, DC: World Bank. 2010.

MASUTHA, M.; ROGER, C. M. Small enterprise development in South Africa: role of Business Incubators. *Bulletin of Geography, social – economic series No. 26, Turin: Nicholas Copernicus University*. v. 26, n. 2, p. 141-155. 2014.

McADAM, M.; McADAM, R. High tech start-ups in University Science Park incubator: the relationship between the start-up lifecycle progression and use of the incubator's resources. *Technovation.* v. 28, n. 5, p. 277-290. 2008.

MIAN, S. A. U.S. University-sponsored technology incubators: An overview of Management Policies and Performance. *Technovation*. v. 14, n. 9, p. 515-528. 1994.

MIAN, S. A. Assessing value-added contributions of university technology business incubators to tenant firms. *Research policy.* v. 25. n. 3, p. 325-335. 1996.

MIAN, S. A. Assessing and Managing the University Technology Business Incubators : An Integrated Framework. *Journal of Business Venturing.* v. 12, p. 251-285. 1997.

MOREIRA, A. C.; MARTA, F. S.; CARVALHO, M. F. S. (2012). Incubation of new ideas: extending   incubation models to less-favored regions. In T. Burger-Helmchen (Ed.), *Entrepreneurship, Creativity and Innovative Business Models*. 2012.

NOHRIA, N.; ECCLES, R. G. Networks and organization, Boston, MA: *Harvard Business School Press*. 1992.

PALS, S. Factors determining success/failure in business incubators: A literature review of 17 countries.2006. Retrieved on www.wpi.edu/pubs/e-project/available/e-project-121806-084440.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   99
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

PHAN, P. H. et al. Science parks and incubators: Observations, synthesis and future research. *Journal of Business Venturing*. v. 20, p. 65-182. 2005.

PHILLIPS R.G.Technology business incubators: how effective as technology transfer mechanism? *Technology in society*. V. 24, n. 3, p. 299-316. 2002.

ROTHAERMEL, F. T.; THURSBY, M.   University- Incubator firm knowledge flows: assessing their impact on incubator firm performance. *Research Policy.* v. 34, n. 3, p. 305-320. 2005.

ROTHAERMEL, F. T.; THURSBY, M. Incubator firm failure or graduation? The role of university linkages. *Research policy*.34: 1076-1090. 2005.

SCHWARTZ, M. Beyond incubation: an analysis of firm survival and exit dynamics in the post-graduation period. *Journal of Technology Transfer.* v. 34, p. 403-421. 2010.

SMILOR, R. W. Managing the incubator system: Critical success factors to accelerate new company development. *IEEE Transactions on Engineering Management*. EM v. 34, n. 3, p. 146-155. 1987.

SUCHMAN, M. C. Managing Legitimacy: Strategic and Institutional Approaches. *Academy of Management Review*. 20(3): 571-610. 1995.

TAMASY, C. Rethinking Technology-Oriented Business Incubators: Developing a robust policey instrument for entrepreneurship, innovation and regional development. *Growth and Change*. v. 38, n. 3, p. 460-473. 2007.

THIERSTEIN, A.; Willhelm, B. Incubator, technology, and innovation centres in Switzerland: features and policy implications. *Entrepreneurship & Regional Development*. v. 13, n. 4, p. 315–331. 2001.

TOTTERMAN, H.; STEN, J. Start-ups. Business Incubation and Social Capital. *International Small Business Journal*. v. 23, n. 5, p. 91–94. 2005.

Examining the relation of service assistance facilities, managerial skill competencies and constraints   100
with agri-business incubators performance in India
Bose, S.C.; Kiran, R.; Goyal, D.

TOTTERMAN, H.; STEN, J. Start-Ups: Business incubation and social capital, *International Small Business Journal*. v. 23, n. 5, p. 487-511. 2005.

TSAI, F.; HSIEH, S.; FANG, C.; LIN, J. The co-evolution of business incubation and national innovation systems in Taiwan. *Technological Forecasting and Social Change*. v. 76, n. 5, p. 629–643. 2009.

UNDP-UNIDO-OAS, New York.
https://books.google.co.in/books?id=60vhUOS6at4C&pg=PA131&lpg=PA131&dq=UNDP-UNIDO

VAIDYANATHAN, G. Technology parks in a developing country: the case of India. *Journal of Technology Transfer*. v. 33, p. 285-299. 2008.

VON ZEDTWITZ, M. Classification and Management of Incubators: Aligning Strategic Objectives and Competitive Scope for new Business Facilitation. *International Journal of Entrepreneurship and Innovation Management*. v. 3, n. 1, p. 176-196. 2003.