

Towards Effective and Sustainable Business and Technology Incubation Models: Case of Tanzania

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Abstract—Business and Technology Incubation is one amongst the initiatives geared to promote innovation and entrepreneurship for socio-economic development across the world. Developing countries particularly from Sub-Saharan Africa have adopted the incubation concept from developed countries; however their effectiveness and sustainability have not been very successful. This study aimed at exploring the fitness of developed countries' incubation models to developing countries' context by conducting an in-depth situational analysis of Tanzanian incubation models. The data were collected through interviews with incubator managers and directors, focus group discussion with incubatees, onsite and documentary analysis. The study revealed that appropriate adaptation of the incubation concept to suit the local conditions contribute to the effectiveness and sustainability of the incubation. It further revealed a difference in the adaptation approaches among incubators located within the same local environment. Therefore, innovative adaptation approaches are called for to improve success of incubation in developing countries during establishment and implementation phases, respectively.

Keywords—Business and Technology Incubation; Adaptation; Sustainable; Effectiveness

I. INTRODUCTION

Around the world, local, regional and national social-economic development strategies are increasingly framed in terms of development of innovative Business and Technology Incubators (BTI) [1]. Since the origin of the "incubator-incubation" concept in the late 1950's in the United States of America, it has been employed in developing countries as well. Estimates suggest the existence of around 9,000 incubators worldwide with a 10-20% annual increase in developing countries [2].

Incubation concept entails the process of nurturing start-up companies (incubatees) by supporting them with resources, value-added services and networks at the vulnerable early-stages of development. The incubatees acquire shared support services under "one roof" for a given period of time (mostly 3years),

after which they are expected to exit from the incubator as financially viable and freestanding businesses. After exit from the incubator, the survival rate of incubated businesses range approximately from 80-85% against 30-35% for non-incubated businesses [3].

Furthermore, the creation, survival and growth of start-ups as a result of the incubation initiative lead into economic development, creation of new jobs, commercialization of technologies, strengthened linkages between universities, industry and business community, and promotion of innovation and entrepreneurship [4,5].

There is vast literature on BTI; however, it is mostly dominated by the experiences of best practices from developed countries as compared to developing countries [6, 7]. In addition, incubation researches on developing countries context have been focusing more on emerging economies such as Brazil, Russia, India, and China (BRIC) than Sub Saharan African (SSA) countries. This generalization does not take into account the diversity that exists between these countries in terms of scale of economies, political stability, local culture, and institutional framework [8, 9]. Furthermore, reports show that incubators from SSA are facing problems of, weak management structures, lack of objectivity in tenant admission, inadequate support services to tenant firms, inconsistent government policy and poor funding, failure to set challenging but attainable goals, inactiveness related to entrepreneurial enthusiasm, as well as poor academic – industry linkages [9,10,11].

These studies, however, do not narrate the pros and cons of the developing countries adapting incubation concept developed in the North. In order to achieve the set objectives (effectiveness) and be able to operate in a self-sufficient manner (sustainability), incubation ought to be well adapted to suit the needs of the local environment. References [12, 13], support this argument and particularly in [9], their study of incubation that took an Adaptation-wise perspective to explain the success of incubation programmes. Although they emphasised the importance of adaptation when incubation concept and models are transferred to the South, they neither elaborated what adaptations ought to be followed nor how they might be carried out.

This gap is further noted in the literature on SSA's incubators which is dominated by challenges, obstacles, lessons to learn from North's best practices, showing that incubation has fallen short of its expectations. There is a need to elaborate how the incubation concept was adapted to SSA and what strategies can be applied in order to enhance their effectiveness and sustainability.

This paper, therefore, discusses the incubation adaptation strategies for SSA incubators through analysis of existing incubation models.

II. METHODOLOGY

The study was done through a multiple case study design of six incubators from Tanzania, a developing country located in the Eastern region of SSA. The case study method was used because it is suitable for investigating contemporary phenomena within its real life context and also it is an empirical enquiry for understanding a phenomenon which is not well known [14]. Since the concept of BTI and its adaptation in Tanzania is not a very well-known phenomenon it thus required a case study approach in order to gain more understanding.

Data was collected from six regions in Tanzania namely, Arusha, Dar es Salaam, Mbeya, Mwanza, Rukwa, and Zanzibar Urban West, which are currently implementing incubation programmes. Sources of data included incubatees, incubator managers and directors. Data was also collected through observation and documentary analysis. These multiple sources of evidence served for triangulation purposes too.

Incubator managers and directors provided insights of the establishment and operations of BTI. This formed a basis for understanding the incubation models of Tanzania. The analysis of various documents provided referential information concerning incubation models from both developed and developing countries. Interviews and focus group discussions (FGD) were used to collect views and experiences from incubator managers, directors and incubatees.

Interviews with incubator managers and directors took place at respective BTI offices. The interviews were facilitated with a semi-structured interview guides.

At the beginning of the FGD, the incubatees were given an introduction of the research topic, aims and the focus of discussion. Thereafter, the participants were divided into smaller groups of 5-6 participants each, and provided with guidelines to facilitate the discussion.

The interviews and focus group discussions were recorded after getting the approval of the respondents. The recordings were transcribed, translated (language) and analysed by content

analysis and descriptive statistics to establish the internal validity.

The study also used observation and document review methods in gathering information. The observations were done when attending incubators' special events, and also performing some works at the incubators. The document review method used data sources such as government policies, incubators' policies and reports.

III. RESULTS AND DISCUSSION

A. Respondents to Interviews and Focus Group Discussions

A total eight interviews were conducted from BTIs in six regions as summarized in Table 1. Each interview took an average of 90 minutes.

TABLE I. INTERVIEW RESPONDENTS PROFILE

Region	Incubator Name	Number of incubators
Arusha	Tanzania Engineering and Manufacturing Development Organisation	1
Dar es Salaam	Small Industries Development Organisation	1
	Dar es Salaam Teknohama Business Incubator	1
	Tanzania Renewable Energy Business Incubator	1
Mbeya	Small Industries Development Organisation	1
Mwanza	Small Industries Development Organisation	1
Rukwa	Small Industries Development Organisation	1
Zanzibar Urban West	Zanzibar Technology Business Incubator	1
Total		8

Additionally, focus group discussions were conducted in two incubators involving 29 incubatees (see Table 2). The two incubators were a representative of Tanzania mainland and island incubatees, and also the choice of the two incubators was influenced by the availability of incubatees to convene at the same venue at the same time.

Each FGD was spilt into smaller groups and they were given an average of 50 minutes for discussion after which a joint group discussion was convened for

each group to present their findings. The FGD was found useful in revealing and discussing new issues and clarifying unclear concepts.

TABLE II. FOCUS GROUP DISCUSSION PARTICIPANTS

Region	Incubator Name	Number of incubatees
Dar es Salaam	Small Industries Development Organisation	19
Zanzibar Urban West	Zanzibar Technology Business Incubator	10
Total		29

B. Identification of incubation models from the North which have been adapted in the South

There exist different types of incubator models, which can be used in implementing the incubation concept. These include For-profit incubators, Non-profit incubators, Mixed-use incubators, Technology incubators, University incubators, Networked incubators, Rural incubators, Women incubators, etc. [3, 15, 22]. Despite these varying models for Business Incubation (BI), they are all categorized in either: the incubator's goals/objectives, type of facilities and services provided, funding mechanism, type of incubatee served, incubatee's business focus/sector and location [2, 4, 15]. The types of BTI have also been described as either being Full service business incubation, Sheltered estate services/Managed workspace or Virtual incubator/ without walls. Furthermore, the European Commission proposed a "generic business incubation model" as a basis for description and analysis of implementation of incubators (see Fig.1). The model constitutes the input, process and output of BI [16].

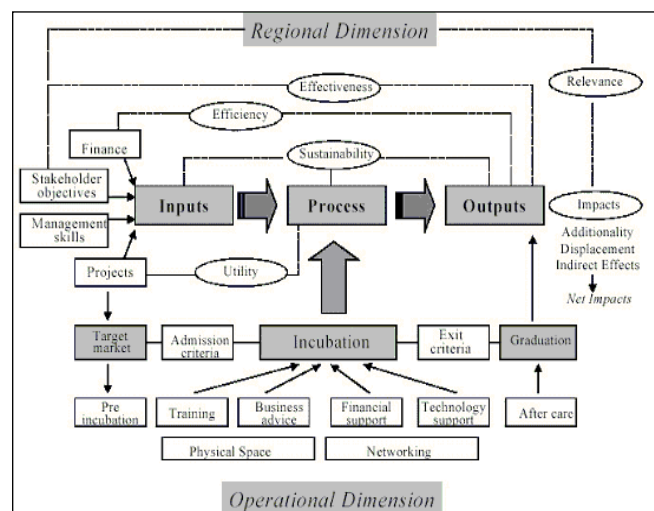


Fig. 1. Generic Business Incubation model [16]

Reference [17] noted that BI approach practiced by many developing countries has been derived from the American experience. He associated this with participation in the conferences of the American National Business Incubators Association (NBIA) and access to their publications.

In addition, the sponsorship for establishment and operation of many incubation initiatives in developing countries has greatly emerged from USA. An example of such sponsorships is infoDev, which is a grant program managed by the World Bank and supported by a consortium of donors that in 2002 launched an initiative to support incubators in developing countries [3]. This study has found that sponsorship and expert advice from the donating country are very influential in the Southern country's decision to adopt the respective Northern country's incubation model. The results of the study show that four out of the five incubators in Tanzania have been receiving grants from USA organisations (see Table 3). This might be influential for Tanzania to adopt the USA incubation models.

However, incubation model is also influenced by culture of the host country. The American culture is characterized by low power distance, high individualism, high masculinity and weak uncertainty avoidance unlike the European culture, which is less entrepreneurial and reserved compared to Americans [18]. Furthermore, as in [19], USA has a more legendary equity culture than Europe, of which is expressed by the development of seed financing and business angels' networks.

For the case of Tanzania, it has a history of British's colonial legacies and it had been under Socialism whereby the activities of business and private sector were not widely practiced since the economy was being dominated by large state-owned firms; contributing to the level of entrepreneurial spirit, equity culture and willingness to take risks to be low. These characteristics align with the European culture more than the American culture. Hence, the incubators existing in Tanzania are also influenced towards the orientation of European models than Americans' models. At embarking on BTI in Tanzania, a Consultative Document on the National Business/Technology Incubator Programme was prepared in 2002 and it reflected lessons learned and experiences from other countries, mainly the European Union (EU) and the United States of America (USA) [20, 21]. The document was adopted as the guideline for development of a National Business Incubator Programme (NBIP), which was to be one of the key implementation mechanisms of the SME Development Policy [22, 23]. In the process to replicate BTI in the South, as in [20] argued for adopting a staged approach, whereby different BTI models from the North could be viewed not as separate and mutually exclusive alternatives but rather as "modules" selected according to the objectives, the particular needs of the target area and groups, and the resources available, in order to create a tailor-made set of BTI services.

An example of the modular approach proposed as in [20] is through the establishment of an 'Incubator without Walls' as a first step in the development of business incubators with the aim of keeping start-up costs to a minimum, and opting for a multi-purpose business incubator model. Furthermore, the approach is linked to a medium-term strategy of gradually introducing stricter admission and exit criteria as a natural development process after establishing an 'Incubator without Walls' in order to allow for the upgrading of business incubators within realistic expectations. Thus the Tanzanian incubation models are an integration/blend of the American and European model.

Much of the BI literature has been of configuration of the incubators. However, the theoretical approaches to BI are limited. Business Incubation literatures have drawn theories that are used in other research domains including Economics and Behaviour theories. However, there is no explicit theory of BI [15]. This study found that there is an opportunity to use the theory of Resource-Based View (RBV) and Knowledge Based View (KBV) of firms for BIs. The RBV and KBV describe how firms possess and develop their resources and capabilities in order to gain competitive advantage, grow and be profitable. Using resource-based view and knowledge-based view, incubators' possession, accumulation and supply of bundles of resources and capabilities serves to assist incubatees to tackle the constraints of lack of access to resources and capabilities. The choice of RBV and KBV reflect the developing country context in where the case study is embedded, unlike developed country context where resources and capabilities are not only limited to their availability but also on how they are allocated, used and their quality.

C. Modifications made during the adaptation of incubation models.

During the transfer of BI from North to South, the following options could have been chosen, either to do nothing ("copy and paste"), adapt or fundamentally rethink the whole idea of the original incubator concept. This study found that the Tanzanian incubators had adapted the BI concept from North and had done modifications at various phases of incubation cycle. Furthermore, the institutions which host incubator facilities carried out the modifications differently (see Table 3). This study also revealed some distinguishing features in each incubator as follows:

Case1: This incubator focuses on ICT businesses, thus its incubatees' product lifecycle is shorter compared to other incubators which are mainly multi sector-based. This develops an understanding on the relationship between incubation outcomes and specialisation. The incubator's specialisation on ICT products has led to visible incubation outcomes of short time to market and early graduation, which might make sense for this particular incubator to be seen more successful than others.

Case2: This is a public organization under the Ministry of Industry, Trade and Investment for supporting small industries countrywide since its establishment in 1973. Although it started BTI program in 2003, its credibility, government funding support and broad avenues for trade fairs are more advantageous to its incubatees than for other incubators.

Case3: The selective admission approach of its incubatees is stage-based such that there are strict admission criteria and the selected incubatees undergo orientation for detailed assessment of their needs and awareness on BTI. After admission, incubatees are kept under observation for a probation period of about 3 months before being fully enrolled into the incubator. The stage-based admission approach make sense particularly for selection process because personality or character is the key selection criteria as compared to business idea and skills due to its importance, difficulty in assessing and difficulty in the ability to assist promoting it as part of BTI unlike for business idea and skills.

Case4: This incubator is hosted at a Research and Development Institution, which transfers its developed technologies to the incubatees for use in their production activities. There is also a common production area/ central workshop which the incubatees are sharing particularly for milling their food products, of which reduces their operations costs and at the same time brings competition and co-operation amongst them. Thus it develops understanding on the relationship between incubation outcomes and co-production.

Case5: The management structure of this incubator is constructively composed of proactive strategic board members from the government, private sector and development partners. Its location is based at the Institute of Science and Technology. This might make sense for the incubator's success due to deployment of triple helix approach.

Nonetheless, it has been found that during adoption of BTI there are features which are challenges to all. These included focusing on start-ups in general without making a distinction between the different stages of business development. The study found that BTI served new starts-ups which are in the establishment stage as well already established existing firms which are in the growth stage. It was also found that some of those start-ups were dealing with products which are already available in the market. Furthermore, most of the incubators still put more emphasis on Tangible/Physical attributes rather than Intangibles, such that some of the incubators are seen as real estate business leading to ambiguity between BTI and other Business Development Services (BDS). On the other hand, the BTI's funding scheme is still highly dependent on government and donors unlike other sources of funds such as banks, venture capitalists or micro-credit institutions. The incubators are not entrepreneurial themselves to enhance their own sustainability. It was found that

majority of them do not even have a business model/plan in place. Other observed features were low level of public awareness on BTI, low number of innovative applicants for BTI, and weak coordination amongst BTI stakeholders/committees.

TABLE III. PROFILE CASES OF THE INCUBATORS

MODIFICATION	Case1	Case2	Case3	Case4	Case5
Application	Ad-hoc request – filling online application form customized to stage of business development	Ad-hoc request – filling paper based application form	Ad-hoc request – filling paper based application form	Ad-hoc request-filling paper based application form	Business Plan Competition Ad-hoc request
Selection	ICT related innovative ideas, start-ups or companies	Innovative ideas	Renewable energy related innovative ideas	Innovative ideas	Innovative ideas in ICT, Tourism, Agribusiness
Incubation stages	Ideation:3months, Start-Ups:6months, Companies:3yrs Post-incubation	Pre-incubation Incubation: 3yrs Post-incubation	Incubation:2yrs Post-incubation	Incubation:3yrs Post-incubation	Innovation:1month, Pre-incubation:3months, Incubation:9months Post-incubation
Sponsorship	Government, Private, Donors	Government, Donors	Private, Donors	Government, Donors	Government, Donors
Management structure	Chief Executive Officer, Finance Manager, Business Development Officer, Administrative staff and BTI Board.	Regional Manager, Technical Officer, Credit Officer, Business Development Officer, Food Technology Officer, Regional Accountant and Steering Committee.	Steering Committee, Manager, Administrative Assistant, Marketing Officer.	Manager, Marketing Officer, Technician.	Steering Committee, Manager, Business Development Officer, Technical Officer.
Service provision	Business Development Services, Mentoring, Finance, Legal, Customer Linkage, Training, Shared Services, Skills Development, Office space.	Work premises, Access to modern technology and technical assistance, Financial services, Marketing, ICT facilities, Networking, Training and mentoring.	Training, Marketing, Linkages to different actors, Investment support, Office, Networking, Meeting and reference library, Coaching.	Work premises, Access to modern technology and technical assistance, Financial services, Marketing, Networking, Training and mentoring.	Financial support, Mentoring and coaching, Office space, Training, Legal, Technology support, Networking, Shared equipment & machinery, Marketing.

IV. CONCLUSION AND RECOMENDATIONS

Whether opting for USA or European incubation model, it should be taken into account that the Northern context is different from the Southern context. Thus calls for a need of the Northern incubation models to be adapted and not directly copied and pasted to the Southern countries. The national frameworks and policies to support incubation programs in the South, together with appropriate adaptation of BTI are inevitable for the success of BTI. Regardless to the fact that the Southern BTI's challenges are many but they are manageable.

REFERENCES

- [1] McAdam, M., and Marlow, S., "A preliminary investigation into networking activities within the university incubator," *International Journal of Entrepreneurial Behavior & Research*, 14(4), 2008, pp.219-241.
- [2] National Business Incubator Association (NBIA), 2010.
- [3] Khalil, M. A., & Olafsen, E., "Enabling innovative entrepreneurship through business incubation," in the *Innovation for Development Report 2009–2010*, pp. 69-84. Palgrave Macmillan UK.

[4] Akçomak, İ. S., "Incubators as tools for Entrepreneurship Promotion in Developing countries," Research paper/UNU-WIDER, 2009.

[5] Dee, N., Ford, S., & Garnsey, E., "A review of research on the role and effectiveness of business incubation for high-growth start-ups," Centre for Technology Management, 2012.

[6] Aerts, K., Matthyssens, P. & Vandembemt, K., "Critical role and screening practices of European business incubators," *Technovation*, 27, 2007, pp.254-267.

[7] Ratinho, T. & Henriques, E., "The role of science parks and business incubators in converging countries: Evidence from Portugal," *Technovation*, 30, 2010, pp.278-290.

[8] Mubarak AL-Mubarak, H., & Busler, M., "Incubator successes: Lessons learned from successful incubators towards the twenty-first century," *World Journal of Science, Technology and Sustainable Development*, 11(1), 2014, pp.44-52.

[9] Obaji, N. O., Olugu, M. U., & Obiekwe, B. C., "Business incubation adaptation and success factors in Nigerian context of a developing country: A literature review," 2015.

[10] Aggarwal, R., "Research on the state of business incubation system in Rwanda: Lesson for African countries," *Journal of US-China Public Administration*, 9, 2012, pp. 707-717.

[11] Tavoletti, E., "Business Incubators: Effective Infrastructures or Waste of Public Money? Looking for a Theoretical Framework, Guidelines and Criteria," *Journal of the Knowledge Economy*, 4, 2013, pp.423-443.

[12] Hoshino, S., "Business Incubation Policy in Japan. Special Topic: National Innovation System and Business Incubation," 2009, pp.47

[13] Lalkaka, R., "Business incubators in developing countries: characteristics and performance," *International Journal of Entrepreneurship and Innovation Management*, 3, 2003, pp.31-55.

[14] Yin, R. K., "Design and methods. Case study research," 2003.

[15] Hackett, S. M., & Dilts, D. M., "A systematic review of business incubation research," *The Journal of Technology Transfer*, 29, 2004, pp.55-82.

[16] Bizzotto, C. E. N., "The incubation process. Gene Institute-Fundação Universidade Regional de Blumenau, Santa Catarina. IDISC-InfoDev Incubator Support Center," 2003.

[17] Lalkaka, R., "Best practices in business incubation: Lessons (yet to be) learned," in *International Conference on Business Centers: Actors for Economic & Social Development*. Brussels, 2001, pp. 14-15.

[18] Hofstede, G., "Dimensionalizing cultures: The Hofstede model in context," *Online readings in psychology and culture*, 2(1), 2011, pp.8.

[19] Aernoudt, R., "Incubators: Tool for Entrepreneurship?," *Small Business Economics*, 23(2), 2004, pp.127-135.

[20] Armstrong, S., "Consultative Document on a Possible National Business Incubator Programme," to be Considered as a Possible Annex to the Government of Tanzania's Policy for SME Development 2002-2012.

[21] Temu, A., Kimambo, C. & Nyichomba, B., "An overview of the achievement of the UDSM technology incubators in Tanzania and their future prospects," 2nd International Conference on Mechanical and Industrial Engineering, 2012.

[22] Kimambo, C. Z., "Stimulating small and medium enterprises development for poverty reduction through business and technology incubation," 2005.

[23] United Republic of Tanzania (URT), Ministry of Industry and Trade (MIT), "Small and Medium Enterprise Development Policy", Dar es Salaam, 2003.