

Role of Technology Incubation on Entrepreneurship Development in Nigeria: a Case Study of Minna Technology Incubation Centre

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Abstract

Technology incubation has played an important role as an instrument for entrepreneurship development around the world and so the objective of this paper is to examine the role of technology incubation and entrepreneurship development in Nigeria with particular emphasis on the activities of TIC Minna. The methodology of exploratory case study approach was employed using secondary data. The findings include establishment of Forty-three new ventures, one thousand four hundred and ninety-one jobs were created, value addition on nine entrepreneurs' products and a number of community improvement initiatives. The paper recommendations include recognition of technology incubation as an entrepreneurship development programme, promotion and development of technology incubation to fast track entrepreneurship development in Nigeria, harmonization of technology incubation and entrepreneurship development agencies in the country etc.

Keywords: *Technology incubation, Entrepreneurship development, Nigeria*

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Background to the Study

Technology incubators are economic development tool use for promoting the concept of growth through innovation and application of technology, support economic development strategies for small business development, and encourage growth from within local economies, while also providing a mechanism for technology transfer. Incubation is the temporary, facilitative support provided to start-up enterprises through the delivery of complex services and special environment with the aim of improving their chance of survival in the early phase of the life span and establishing their later intensive growth.

Technology incubation programmes as an entrepreneurship development tool generally have the economic development goals of creating jobs, building wealth by fostering the formation of new venture, fast-tracking research to industries linkages, facilitating innovation etc. In accomplishing these goals, incubators use strategies such as increased access to capital, the one stop shop approach, technical and business management training, contract procurement assistance, creating networking opportunities through clustering, creating access to credit facility, export assistance and technology transfer assistance. These services are provided through collaboration, synergy and liaison with other economic development and entrepreneurship development organization within the same region.

Technology incubation and entrepreneurship are closely linked in that the process of incubation aid in entrepreneurship development. Most policies of technology incubation are aimed at fast tracking entrepreneurship development as government and institution provides incubates with the necessary supports that stimulate their interest and nurture their ideas into realistic and self-sustaining enterprise.

According to NBIA survey in 2012, that in the past two to three decades, the growth of technology incubation around the world has been phenomenal as there are over 7000 incubation centers around the world. The pace at which, the incubation centers are spreading and expanding across the globe is because it has been identified as the backbone of entrepreneurship development and sustainability. The survey also conclude that it is pertinent that most incubation centers around the world lay more emphasis on provision of infrastructure, facilities, office services etc than entrepreneurship development.

The objective of this paper is to examine the role of technology incubation on entrepreneurship development in Nigeria using Technology Incubation Center in Minna as a case study to identify specific entrepreneurial functions performed by the incubation

The concept of technology incubation

There are several definitions and approaches to business and technology incubation. Conceptually 'incubation' is a diligent and planned process of 'co-location' therefore needs careful attention to the problems of entrepreneurs extending well beyond providing infrastructure and office services (Siyanbola, Jesuleye, Adelowo & Egbetokun, 2012; Kiridena, 2001). According to the National Business Incubators Association (NBIA), "Business Incubation catalyses the process of starting and growing companies, providing entrepreneurs with the expertise, networks and tools they need to make their ventures successful. Incubation programmes diversify economies, commercialise technologies, create jobs and create wealth".

The term incubator is a device for nurturing immature phenomenon to maturity or self sustenance under a control environment but a business incubator is an initiative that systematizes the process of creating successful new enterprises, by providing entrepreneurs with a comprehensive and integrated range of services, which include floor-space made available on a flexible and affordable, but temporary basis; common services that include secretarial support and shared use of office equipment; hands-on business counselling; access to specialized assistance such as research and development support and venture capital; and networking activities operating as a reference point inside the premises among entrepreneurs and outside to the local community. According to Lalkaka (1990), business incubation is a means by which visions of new businesses are turned into reality with reduced risks. Incubators aspire to have a positive impact on a community's economic health, by maximizing the success of emerging companies (Cassim, 2001). Business incubators have proved effective in many parts of the world. According to Rice and Matthews (1995), only 10 business incubators existed in the United States in 1980. There were nearly 500 by 1995, meaning a new incubator has been opening every week. The technology incubators generally focus on nurturing technology intensive enterprises and knowledge-based ventures.

The technology incubation system (TIs) is variously represented by entities such as Technopolis, Science Parks, Research Parks, Technology Parks, Technology and/or Business Incubators. These entities operate as separate organisations but are mostly integrated with other players in the innovation system. The terms Science Parks, Research Parks and Technology Parks as well as Technology Incubators (TIs), Technology Innovation Centres (TICs) and Technology Business Incubators (TBIs) are used interchangeably in many countries depending on the level and type of interaction between R&D community, venture funding and industry (Lalkaka 1990).

In this paper the term business incubator will be taken to mean a controlled environment-physical or virtual- that cares, and helps new ventures at an early stage until they are able to be self-sustained while TI will apply generically to all the organizational forms for promoting technology-oriented SMEs respectively. The organizational format of TIs also varies and could generally be categorized as public or not-for-profit incubators, private incubators, academic-related incubators and public/private incubators which are referred to as hybrid in most literatures. Also, TIs may thus have a wide range of goals and objectives giving rise to different forms of incubators specializing in accessing diverse resources.

The concept of Entrepreneurship

In today's world where technological change, liberalization, outsourcing, and restructuring rule, the subject of entrepreneurship has gained greater interest and discussions centered on what actually constitute entrepreneurship and how far it extends. The term entrepreneurship is derived from the French word *entreprendre* – to undertake. This suggests that entrepreneurship is the process of undertaking activities concerned with identifying and exploiting business opportunities while assuming its associated risks. Entrepreneurship is about a kind of behaviour that includes initiative taking, reorganizing economic activities and the acceptance of its risks. It is important to note that entrepreneurial activities are universal and can therefore be promoted even in societies that manifest low entrepreneurship activities.

Small enterprises in particular are central in achieving sustainable growth. They constitute about 90% of the business population in North America and they accounted for the most new jobs in the country. Entrepreneurship involves taking chances, but new businesses do not

emerge by accident. They are usually founded as a result of motivated entrepreneur gaining access to resources and finding niches in opportunity structures. Hence, entrepreneurship could be seen as the process of identifying and exploiting unique business opportunities that stretch the creative capacities of both private and public organizations. Sue and Dan (2000) argue that entrepreneurship is influenced by genetic power, family background and economic environment. Since economic environment could support or suppress entrepreneurship, governments world over undertake to develop macroeconomic policies that focus mainly on providing access to resources and support services to individuals and organizations that display flair for expanding their business horizons.

Poverty among people is usually caused by inadequate income due to shrinking job opportunities as well as high rate of failures of new businesses (Donald & Hodgetts, 2002). Small-scale businesses tend to add jobs faster than big companies because they are highly adaptable, innovative and responsive to new business and market challenges (Frese & Rauch, 2005). Thus, supporting entrepreneurs becomes a critical policy issue especially since those new businesses that do survive tend to expand employment and growth of the nation's economy. The important question to be asked is why too few young businesses grow in meaningful ways? Bruno et-al (1987) maintains that there are three categories of reason for high business failures: product/market problems, financial difficulties and managerial problems. This suggests that the responsibility for creating and growing new businesses does not rest entirely on government. Individuals and organizations are required to analyze key success factors in business environment and take personal responsibility for survival and growth of their own ventures. On its part, government is expected to provide adequate infrastructure and friendly policy guidelines.

Incubators and Entrepreneurship Development

Incubators are available in various types rendering a range of long and short-term assistance and they help in establishment of new enterprise in one way or other. Many of these provide only guidance, technical assistance and consulting to entrepreneurs and offer Business Development services. ICT incubators are major examples of these Incubators where clients access to appropriate rental space, shared basic business services and equipment. Few incubators assist only in developing new ideas and arrange for venture capital funding. Incubators are sometimes known as Business Accelerator as it accelerates start-ups by providing quick knowledge, support services and resources (Lewis, 2011).

Essentially, the incubation programme is to assist and support the transformation of selected, early stage businesses with high potentials, into self-sufficient, growing and profitable enterprises (Lewis, 2011). By reducing the risks during the early period of business formation, the incubation sustains the new enterprises that might otherwise fail due to lack of adequate support. In doing so, the incubation programme contributes to the economic growth by creating jobs and offering other socio-economic benefits. According to Adelowo and Egbetokun (2012), technology incubation programme can therefore be seen as an economic development tool designed to accelerate the success of high technology entrepreneurial enterprises through the provision of an array of technology business support resources and services in a controlled work environment.

Promotion of small and medium scale development is yet another contribution of technology incubation programme to the economy, that is it assists in incubating knowledge-base skilled and unskilled workers, start-ups into commercially viable products/services by providing specialists in various area of endeavors, skilled training, guidance, critical support services,

such as invention and innovation, financing, laboratory, library, networking/ ICT, quality control workshop support services to all tenants or small and medium scale businesses at each centre, and a conducive environment (affordable, well-equipped workspace) to entrepreneurs.

Defining some of the assistance given to entrepreneurs within the incubation centres, Onmonya (2011) said, once entrepreneurs are accepted into the business incubator, the business incubator analyzes their needs and designs a program to strengthen and accelerate the business. The business incubator is proactive in assisting the clients, and will offer assistance in areas that the entrepreneurs may not be prepared to deal with on their own. The business incubators may also require they incubates to take training courses to ensure a certain level of management knowledge.

While the exact mix of services depends on what is needed in the local market, business incubators usually provide the following four types of service: i). An office space with meeting rooms, telecommunications, reliable electricity, and in some environments, security services. ii). Management issues, such as business planning, financial management, marketing and regulatory compliance on formal matters, such as applications for registration and licensing. iii). Providing seed loans, or taking equity in the enterprise iv). Experienced business professionals, knowledge sharing with like-minded entrepreneurs, and links to business relationships and opportunities.

The value of a psychologically supportive environment cannot be overemphasized. Most of infoDev's business incubators identified the contrast between entrepreneurship and local values as a key challenge for their clients, and many cited culture as their clients' most significant barrier. Therefore, it is not surprising that entrepreneurs cite the psychological support provided by incubation staff and fellow entrepreneurs in the incubator, who “believe in you and your ideas” as having especially high value. One grateful entrepreneur referred to his incubator as an “oasis of cultural safety.”

Entrepreneurship according to Nwoye (2011) is any attempt at a venture creation such as a new business start-up, expansion of an existing business by an individual, team or corporate body. She further argued that entrepreneurship is often associated with functions of innovating and risk bearing, sole activity that brings productive resources together to create an output whose value is hoped to exceed the cost of all the productive resources and assumes a societal leadership role of spearheading the society's allocation of scarce productive resources among alternative uses. She concluded in her book entrepreneurship development and investment opportunities in Nigeria that entrepreneurship is a process by which individuals or groups pursue opportunity, leverage resources and initiate change for the purposes of creating value.

Entrepreneurship according to Mainoma & Aruwa(2012) is a dynamic process of creating incremental wealth by individuals who assume the major risks in terms of equity, time and providing value for some products or services. They further argued that the product or service may not be new or unique but the entrepreneur through securing and allocating the necessary skills and resources must infuse value. This process is known as innovation and new venture creation through four major dimensions of individual, organization, environment and process.

Entrepreneurship is therefore concerned with what an entrepreneur actually does which include utilization of resources in managing an enterprise and assuming the risks and maximizing profits from the business venture. It is a very dynamic process of both the entrepreneur and individual in the society (Tende, 2011). He further posits that successful entrepreneurship requires the entrepreneur to possess certain managerial skills which include the ability to conceptualize and plan effectively, manage other individuals and time effectively and to learn new techniques in handling business operations and ability to adopt to change and to handle changes in their environment.

Entrepreneurs are action oriented, highly motivated individuals who undertake the following functions: entrepreneurial planning, identification of investment opportunities, decision-making, organization of resources, business leadership, bearing enterprise risk, creative and innovative activities etc (Mainoma & Aruwa 2012).

Technology Incubation Programme in Nigeria

Incubation programme was introduced to Africa in 1988 by United Nations Development Programme (UNDP) to test run the concept on pilot scheme in four (4) countries of cote-devoir, Nigeria, Equatorial Guinea and Zimbabwe. In 2008, the incubation programmes has spread across Africa with approximately about one hundred incubation centers. Nigeria has about forty-four (44) incubation centers, South Africa with about thirty-six (36) while the rest of the other countries houses the remaining twenty (20).

Technology Incubation Programme in Nigeria began since 1988 with feasibility study for the establishment of pilot centers at Lagos, Kano and Aba. The feasibility study is to ascertain the viability of Technology Incubation Centers in these commercial cities. This study led to the establishment of Lagos Centre in 1993, Kano in 1994 and Aba in 1995. The success of these three pilot centers facilitated the establishment of Minna, Nnewi and Calabar in 1998. Meanwhile by 2005 there were seventeen (17) incubation centers in Nigeria but as at 2012 there are about forty (40) incubation centers in the country with about two hundred and eighty-seven (287) entrepreneurs and six thousand two hundred (6,200) job created.

The integrated entrepreneurship development approach of technology incubation centers in Nigeria has seen to the successful grooming, fostering and nurturing of potential entrepreneurs/enterprises to a creative technology value added budding entrepreneurs and enterprises. This show that technology incubation is an independent variable while the entrepreneurship is the dependent variable which means technology incubation is not an end to means but a means to an end as technology incubation centers are only facilitating entrepreneurship development through a structured entrepreneurship development programme within the technology incubation centers.

Although not all entrepreneurs and entrepreneurship are driven by technology incubation, but all technology incubation nurtures incubates to be successful entrepreneurs by providing the environment to build their business from conception to successful ventures. Therefore, the existing expectation of incubation-driven entrepreneurship to provide the training, nurturing and conducive environment for incubates to nurture their business to successful ventures. They also provide support for small enterprises to overcome business skills, infrastructure, market linkage, financing and “people connectivity” constraints, and expose entrepreneurs to information and communication technologies (ICTs) that help increase the productivity and market reach of enterprises across sectors.

Technology Incubation Centre, Minna

Technology Incubation Centre Minna was established on 21st April 1998. It became operational August 1998 with six (6) incubation units and five (5) pioneering entrepreneurs. Since establishment the Centre has received the total of 141 applications for incubation units. Incubates seventy. The first set of incubates graduate in the year 2002, so far the Centre has graduate thirty-two (32) incubates. And current monitor five non-resident incubates within and outside Minna Metropolitan. The Centre has commercialized nine (9) research and development result from both Tertiary and Research Institutions. The National Agency for Food Drug Administration and Control NAFDAC has certified and approved 14 various package of the Centre's Agro Processing and Allied Product. Presently the Centre has twenty-four (24) Residence Incubates.

Two hundred and thirty-one (231) Incubates staff, 853 Skill Acquisition training, 408 adhoc job. The Centre has contributed a total sales value of four hundred and two million, Six hundred and five thousand eight hundred and sixty three naira (402,605,863.00) to the economy. Training both managerial and technical is one of the mandates of incubation programme. The Centre has organized twenty-seven managerial and eleven technical skills training for entrepreneurs within and outside the Centre. The Centre has finance entrepreneur's business through the Centre's Seed Capital revolving loan to a tune of (2.8m) Two million, eight hundred thousand naira while some of the entrepreneur where link to Developments Banks, Bank of Industry (BOI) to access the sum of Ten Million Naira for business development. (N10,000,000.00) and N7.5M Seven million five hundred thousand Naira from NERFUND.

Methodology

This paper adopted exploratory study methodology approach as suggested by Cooper and Schindler (2003) that exploratory research uses secondary data from extant literature to underpin the theoretical and contextual frameworks of technology incubation. This was also predicated upon the lack of adequate information on the activities of technology incubators in Nigeria, more so, in Niger State. The researcher also used qualitative reasoning to draw up conclusions that are the hallmark of exploratory case studies methodology. This is a position supported by many other researchers (Page & Meyer, 2000; Saunders et al., 1997). Based on the findings from the exploratory studies on the extant literature, an appraisal of the Minna Technology Incubation Centre was made to ascertain the extent to which it contribute to the entrepreneurship development of Niger State and the country at large, its level of achievement, entrepreneurs financing and funding portfolio, the training and the ability of the entrepreneurs, marketing and sales turnover and the incubation programme and the entrepreneurial intentions.

Results and discussions

The ultimate of entrepreneurship development is new venture creation, job creation, wealth creation, value addition and community improvement; It is interesting to find out that Technology Incubation play a significant roles in the above mentioned ultimate of entrepreneurship development. The technology Incubation Centre that is the case study of this paper presents the following results to buttress the roles of Technology Incubation in entrepreneurship development in Nigeria.

New venture creation -TIC Minna graduates

S/N	Graduate Incubates	Products
	2002 GRADUATES	
1	Kad Engineering	Maize Flour
2	Dijmed Ventures	Soap
3	Al-Habib Pottery	Ceramics
4	G.P.C. Nigeria Ltd	Roofing Tiles
5	Budah Enterprises	KunuZaki
6	Marytan Bags	Bags
7	Pauli-footwear	Shoes
8	J.Y. General Ventures	Detergent
9	Takimo Enterprises	Tie & Die
10	A & Shine International	Honey
	2004 GRADUATES	
11	Ates Ventures	Exercise Books
12	Emma Associates	Animals Feed
	2006 GRADUATES	
13	Besque Field Engineering	Fabrication
14	Galen Rice	Rice Flour
15	Shammah Ventures	Animal Feed
16	Ugo-Oma Confectioneries	Bread and Cake
17	Mayaki Enterprises	Ceramics
18	S. P. Polythene	Polythene Products
19	Ogbe-de-Best	Flavor Juice
20	UNDP	Skills acquisition
	2008 GRADUATES	
21	Al-Assabr	Polythene products
22	Agaie Industries	Sheanut Butter
23	Jummy Honey	Honey
24	New Life Yoghurt	Yogurt
25	Leey Jay Pharm.	Menthylated Spirit
26	El-Bhi Ventures	Beans flour
27	Anemeh Priestly Food	Serelina
28	El-Shaddai Enterprises	Polythene Products
29	Danbis Enterprises	Polythene Produce
30	Blessdom	Cassava processing
31	Real Tech. Engr.	Simple/Complex machine and
32	Alhasan Global Concept	Polythene products
	2010 GRADUATES	
33	Pechamms Telecom	Computer Assembling
34	Mohoveg Ventures	Shear butter
35	Korlems computers	Korlems computers
36	Chi chi Confectionery	Chi chi Confectionery
37	Ladder Multi-Purpose Cooperative Society	Ladder Multi-Purpose Cooperative Society
38	Famous Intercontinental	Polythene
	2012 GRADUATES	
39	Jummurite	Vegetable oil
40	Al-Nasr	Ceramics
41	G M Honey	Honey
42	De`leonard Technology	Fabrications
43	Sunka Hi-Tech	Fabrication
44	Goa loaNig Ltd	Polythene

Source: Brief on TIC Minna list of graduates

Job Creation- TIC Minna

1	Entrepreneurs` Staff	231
2	Skills Acquisition training that result into jobs creation	853
3	Entrepreneurs` ad-hoc (casual) Staff	408
	TOTAL	1, 491

Source: Brief on TIC Minna Jobs created 1999 - 2009

Value Creation

S/N	Incubatees	Product	R & D Results	Sources of R & D
1	Budah Enterprises	KunuZaki	Preservation of Kunuzaki in bottle	FIIRO,
2	Mayaki Enterprises	Ceramics	Rice Husk for Glazing Ceramics	PRODA
3	Nagarta Chalk	Chalk	Reversed Engineering of chalk moulding machine	SEDI- Minna
4	Yakubu General Ventures	Detergent	Neem oil and Neem leaf for Soap production	NARICT,
5	Budah Enterprises	KunuZaki	Complete kunuzaki processing plant	SEDI- Enugu
6	Ugo-Oma Confectioneries	Confectionaries	Production of 20% cassava bread and cake	FIIRO,
7	Emma Associates	Animal Feeds	Fortification and strengthen of egg shell using calcium	F.U.T., Minna
8	Ugo-Omo Confectionaries	Confectionaries	Fortification of Bread with protein	F.U.T., Minna
9	Jummarite Ventures	Groundnut Oil	Filtration using NaCl	F U T, Minna

Source: Brief on TIC Minna R&D Commercialized at the Centre 1999 - 2009

Community Improvement

The following entrepreneurs firms that graduated from the incubation Centre, Minna has successfully built their production factories with in the community where they are contributing positively to the community in terms of enhancing economic activities through the purchase of local raw material, engaging the locals within the community as sales officials, engagement of the young ones as factory workers, the entrepreneurs also pay their taxes and levies promptly while contributing to the community in terms of social responsibilities.

The entrepreneurs' firms are:

- i. Jummy Honey
- ii. Anemehpresety foods
- iii. Kitchen friendly
- iv. Ugoma confectionary
- v. Al-AsabrNig.ltd

- vi. Leyjay pharmaceuticals
- vii. Chi-chi confectionary
- viii. Al-Ihssan Global concept ltd
- ix. Dijmed ventures
- x. Famous Intercontinental ltd

The above results based on exploratory case study methodology shows that the role of technology incubation in entrepreneurship development in Nigeria is significant vis a vis new venture creation as forty-three new ventures were so created at technology incubation centre, Minna. While one thousand four hundred and ninety-one (1491) jobs were also created at the centre within ten years only. Value addition was quite visible as value was added to nine entrepreneurs products at the centre from various institutions through collaborations, linkages and networking. Community improvement through ten entrepreneurs that graduated from the centre are still operating within the community and contributing to their standard of living.

Conclusion and Recommendations

This exploratory case study has exposed to a reasonable extent how the concept of technology incubation can be applied to fast track entrepreneurship development of states, regions and countries. The paper also confirms that TICs help the start-up of enterprises, especially in the technology sector with its attendant benefits of new venture creation, job creation, value addition, community improvement and general entrepreneurship development in Nigeria. This will lead to technology transfer domestically. It also portends as veritable tool for poverty reduction in view of its multiplier effects of wealth creations. However, state support is not just implementing a set of policies that succeed elsewhere, it is the ability of the state to set up Legal, Institutional and Regulatory frameworks that reflect a harmony between knowledge and physical infrastructure and the formal and informal institutional framework that will operationalize the policies and structure the idiosyncratic exchange processes of developing economies. More so, a success model cannot be copied too mechanically (De Beule & Van Beveren, 2008). Therefore, it requires further studies to ascertain the peculiarities of the host state, region and countries so as to ensure a perfect match between the philosophy behind the establishment of the TIC and the realities on ground.

Although not all entrepreneurs and entrepreneurship are driven by technology incubation, but all technology incubation nurtures entrepreneurs to establish successful enterprises by providing the environment to build their business from conception to successful ventures. Therefore, the existing expectation of incubation-driven entrepreneurship is to provide the training, nurturing and conducive environment for entrepreneurs to grow their businesses to successful ventures. The incubation centre also provide support for small enterprises to overcome business skills deficiency, infrastructure, market linkage, financing and people connectivity constraints, and expose entrepreneurs to information and communication technologies (ICTs) that help increase the productivity and market reach of enterprises across sectors.

This paper may not have come in a better time than now as Niger State is set to witness systematic implementation of the state industrial transformation master plan through the development of Industrial Parks, industrial clusters, innovation centres etc. The Minna TIC has successfully prepared some entrepreneurs to adequately avail themselves of the business opportunities that will ensue. When such happens, the current situation of poverty and

underdevelopment will be tackled, leading to improved socio-economic conditions of the people of Niger state. As earlier noted, the results from this model can be duplicated elsewhere, especially within the North Central of Nigeria which share similar characteristics of Niger state.

Specific recommendations include:

- i. Recognition of technology incubation as an entrepreneurship development tool.
- ii. Promotion and development of technology incubation to fast-track entrepreneurship development in the country.
- iii. Recognition of technology incubation as a poverty reduction instrument in view of its jobs and wealth creation ability and economic enhancement multiplier effect.
- iv. Harmonization of technology incubation and entrepreneurship development agencies in the country.

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