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# Challenges of Establishing Technology Incubation in Nigeria

# Abdulmalik Ndagi

Department of Business Administration, Faculty of Management and Social Sciences, Ibrahim Badamasi Babangida University, Lapai; Niger State, Nigeria

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Corresponding Author: Abdulmalik Ndagi

# Abstract

The contribution of technology incubation to the economic and industrial development of the developed and emerging economies cannot be over emphasized. Some of the challenges are enormous and a serious hindrance to the establishment of technology incubation and associated benefit of the incubation concept in Nigeria. Therefore, the objective of this paper is to identify the challenges of establishing technology incubation in Nigeria and make appropriate recommendations. Exploratory methodology was adopted for this paper where relevant secondary literature was reviewed and data so collected analyzed accordingly. The findings among others include, lack of commitment to the incubator value proposition and core principle, lack of feasibility study, appointment of incompetent incubator manager, wrong selection of site/location for the establishment of incubation centre and lack of appropriate financial plan. Based on stated above findings, this paper recommendation include, appropriate vision and focus on the core principle of incubation, conducting feasibility study and need assessment before embarking on the establishment of an incubation centre, appointment of a proactive and entrepreneurial skilled incubator manager, selection of strategic location for the incubation centre that can be accessible by potential suppliers.

### Background to the Study

The term incubator, which is more widely known with the life giving support to premature babies or phenomenon—to enable them survive the critical early period of life, is what has been adapted to economic development and regeneration. Therefore, economically definition of Incubation/Incubators varies with their services, their organizational structure and in the types of clients they serve. Technology Incubation have different goals which include job creation, new venture creation, wealth creation, value addition to clients products, process and services and transferring technology from universities and major corporations to entrepreneurs/enterprises (Semilor & Gill, 1986). Technology Incubation centre clients are key to the development of new and innovative technologies creating products, processes and services that improve the quality of our lives in communities around the world.

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, 2001). 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, Olaopa and Siyanbola (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.

Lewis (2001) sees technology incubation programme as an innovative system designed to assist entrepreneurs, innovators and inventors in the development of new technology -based firms. It seeks to effectively link talents, technology, capital and know-how in order to accelerate the development of new businesses, and thus speeds the commercialization of technology. It is a facility that helps the early stage growth of technology-based enterprises by providing shared facilities such as space, office services, and business consulting services. This concept, which constitutes a very potent economic development tools, has generated great desire and has undergone extensive development in the USA and many other countries such as in Europe (Germany, France, Britain etc), Asia (India, Japan, China, Korea etc) in the context of new global trend of engendering real sector development through small and medium scales business.(NBIA, 2010)

Technology Incubation programme as a tool for economic development makes provision of job creation, employment opportunities targeting unemployed university graduates, retrenched public sector employees, retired research institution employees, retired private sector employees, and established industrialist desiring to expand or diversify their businesses (Lalkaka, 1996).

Despite these laudable functions and growth of Technology incubation in the developed and emerging economies across the globe, the growth of technology incubation in Nigeria has

been quite slow due to numerous challenges of the basic requirement for the establishment of incubation centers. If these challenges are identified and overcome technology incubation could have a smooth growth and wider spread across Nigeria. The main objective of this paper is to identify key challenges in the establishment of technology incubation centre in Nigeria with special focus on Technology incubation centre Lafia – Nasarawa State.

# 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 cotedevoir, 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(40) incubation centers, South Africa with about thirty-six (36) while the rest of other countries house the remaining twenty (20).

Technology Incubation Porgramme 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 fifteen (15) incubation centers in Nigeria but as at 2013 there are about forty (40) government-owned incubation centers in the country with about two hundred and eighty seven (287) entrepreneurs and six thousand two hundred (6,200) job created. (National Board for Technology Incubation [NBTI],(2013)

### Characteristics of Technology Incubator

Different types of incubation centre provide different services, depending on the needs and the problems faced by local enterprises within the community. The key elements are the provision of an environment where start-up enterprises can start their work quickly and can expand their operations rapidly. These are achievable according to Erlewine and Gerl (2004), by the following characteristics:

- Provision of factory-like workspace and graduated but subsidized rents on flexible terms, allowing the enterprises to pay monthly rent and with the flexibility to move to larger or smaller units after the pre-incubation period.
- 2. Selection– incubation centres vet the business and the business ideas/proposals to ensure that those selected can gain most from the incubator and offer most to the local economy. This usually means excluding retail and trade activities (since they are generally over represented) and choosing business activities that are under represented in the local economy, types of business incubation centres are more likely to focus are businesses with the potential to grow and develop quickly.
- 3. Provision of business advice and support services ranging from business planning, market advice, accountancy, legal and registration support
- 4. Provision of common facilities (conference rooms, restrooms, reception areas), staff (reception staff), and equipment (conference equipment, photo copiers, fax machines)

- 5. Provision of utility services (telephone, water, gas, drainage) at affordable rates and without high initial connection fees
- 6. Incubation team– the support will be packaged by one –site business advisor/advice team, as well as having brought in specialist services;
- 7. Graduation the businesses are encouraged to move on once they have grown, gained markets and maturity

# Criteria for Establishing Technology Incubation centers

There are many different types of incubators with different focus and goals; hence, different types of sponsors can set up an incubation centre. In United Kingdom according to United Kingdom Business Incubators (2012), that universities, local authorities, recently privatized state businesses, local economic development organizations and local NGOs, as well as local economic development enterprises, are all involved in the establishment of incubators. In Nigeria three main sectors are basically responsible for the establishment of technology incubators, which are:

- 1. The Government: influence the development of the economy and entrepreneurship and enable technology and knowledge transfer and the creation of new jobs and new ventures.
- 2. Private sector operators: entrepreneurs, companies and business associations that could be both users and financiers of incubator projects.
- 3. The University/Research Institute: particularly the Schools of Engineering, Economics, Computer Science and entrepreneurship development etc where there is a concentration of ideas and students who want to start a business.

Establishment of successful technology incubation centres requires a lot of time and hard work from major stakeholders. However, Colbert, Adkins, Wolfe and Lapan (2010) assert that there are certain factors if considered during the establishment of incubators might help to surpass challenges to succeed at the initial stage of conceptualization planning and establishment of an incubation centre. These factors include:

**Carryout anew Business market Assessment**: This means, identifying demands and business support needs and defining the target group or business aims of the incubator. This stage may entail a small business survey and analysis of the type of workspace and services needed. Often information will be available from local NGO's or from business associations. Evidence from countries where incubators have reached advanced level of development shows that demand for properly run incubators exceeds supply.

**Identify the location/Site**: Find a suitable site and assess its facilities (water, power, telephone connection, electric generation). If reconstruction is needed, it should be designed properly and allow for business flexibility, good security, tidiness and cleanliness. Location should preferably be close to services, utilities, and potential customers or clients. Space must be available for one-stop-shop advice services, meetings and facility management. Ideally there should be space for future expansion.

Appointment of Incubator Manager: The incubator manager is one of the most important factors in the future success of the incubator. His/her ability to create and maintain a positive business environments and culture is necessary to sustain the incubator in long-term. The manager should be chosen before the incubator starts operating in order to ensure the same rules are followed for all potential tenants. Operational issues must also be clear, management must be transparent and completely separated from local political or any other non-business issues. A municipality might choose to do this by setting up a partnership arrangement with local business association or NGO taking on the management functions, alternatively a municipality could set up a semi-independent agency. It is essential that the management function can operate without influence from any external powers.

## **Developed Business Plan**: The business plan should specify:

- i. Which business services will be provided (these will underpin the performance of the incubator): a) Which will be permanently located in the building and which will be brought in as necessary) How many/how often the services will be provided to each business, c) The charging policy or her criteria that will beset d) The types of target result/outputs that will be set
- ii. The operational rules of the incubator: a) Criteria for entry,b) Rental policy,c) Exitpolicy,d) Break-even point analysis (comparing expenses and expected incomes from rents and services provided).
- iii. The marketing strategy: a) The types of businesses to be targeted, b) Aspects of long-term sustainability

**Establish Funding Agreement**: This should clearly state who funds what, and to what extent the facility is independently run. (Even if a municipality is funding an incubator, it should not be directly involved in its management). It is important to ensure this step involves all parties in order to avoid future conflict. The business plan and funding agreement should be reviewed after the incubator is designed. It is vital to confirm that the overall operational aim is to generate employment through business support, not a social aim.

**Complete the Incubator Site:** The last stage is the completion of the site, which will inevitably require works and equipment. This is best done with the participation of the business advisor and incubator manager who will have to live with the result. The equipment and work should drive the business plan and the identified service level to success.

**Identify Tenants:** Even before this location is ready for use, the marketing strategy outlined in the business plan should encourage enquiries and applications from aspiring start – up businesses and pre-start advice and business assessment selection step.

**Sign tenancy Agreement:** The new tenants can then sign an agreement with the incubator and can begin activities in the incubator.

Avoiding too Many Meetings: UKBI (2012) further postit, that local authorities and government employees often manage in centralized way or with often address to

municipality or the ministries. Effective incubator cannot operate this way. In order to avoid practice of "getting approvals "business plan and every financing contract must have an agreement that incubator manager/business consultant will be the person who makes decision. If this is not adequate, it is necessary to name in advance a person who will be "protector of interest "and will solve doubts and help to make right decision in the moment when it should be made, not after arise discontent of companies in incubator center. This is equally related to company registration and issuing documents – where will be insured at the time that companies tenants – renters of incubator may grow and mature. Therefore, incubator' personnel have to agree with local authorities to arrange a special place where registration can be done and document issuing jobs.

**Secure Flexible Private Capital:** development funds can be often provided from business sector or other independent bodies. Providing of flexible financing or giving grants may be vital important to ensure that incubator may prepare second phase or satisfy needs for growth after started mature. Involvement of successful local entrepreneurs and representatives of interested international organizations in Council board at the beginning may facilitate this in some later incubator phase.

**Develop Small Business Advisory Capability**– consultant services to small enterprises that incubator provides are fundamental characteristic of incubator. Most local authority employees and interested entrepreneurs have little experience with small companies in the market economy. It might be difficult to name someone who would have appropriate qualifications or experience related to small and new-started companies, but it is necessary to avoid compromise in this important area. Incubator will have small chances for success unless you have real good consulting service for advising small companies.

### Strategies for Design and Implementation of an Incubation Program

A number of key strategies have been identified for the design, establishment and implementation of an incubation program to mitigate against failure according to Lakalka, (2000). These strategies include among others the followings;

## Consistency between Objectives and the Broader Strategic Framework

Incubators should not be treated as stand-alone operations and should not be conceived for stand-alone goals. Incubators are designed and implemented to pursue defined objectives as part of a broader strategic framework (territorially orientated [regional strategy] or of particular policies [job creation, social policies, competitiveness] or a combination of these factors). Strong consistency with overall economic goals needs then to be combined with a long-term approach (on average at least 10 years), which is needed to ensure the establishment and sustainability of the incubation industry as well as the proper functioning of the business environment where incubators operate. Policy makers should consider a deeper investment in understanding the drivers of success in particularly effective business incubation models. These investments should be followed with pilot initiatives that seek to test the findings and replicate these models in a variety of environments.

Consistency between objectives pursued and suitable service mix Incubators can be established to meet a range of public sector objectives, from social inclusion to fostering growth of innovative businesses. Incubators need to design a range of services tailored on their target groups. As well as the basic administrative services de- signed to reduce operational costs of clients, a mix of business (training, coaching, mentoring) and technical (production advice, access to specific equipment, etc) services are required to meet the needs of their target group. The actual service mix should reflect an analysis of the needs of clients for the specific objectives of the incubator.

### Stakeholder Support

The involvement and support of stakeholders (consisting of sponsors drawn from the business community, government, the local society, venture capital providers, entrepreneurs, etc) and incubator management are vital for incubator success. It is important that there is clarity, consistency and cooperation from all stakeholders. There should be consensus on a mission that defines the incubator's role in the community and quantifiable objectives to achieve the mission. Incubator programs should develop stakeholder support, including a resource network and capacity building initiatives.

### **Investing in Pre-incubation**

Lakalka, (2000) further posit that a pre-incubation program is to assist potential entrepreneurs to develop their ideas and learn basic business skills through a mixture of training and coaching is critical to ensuring that the incubator takes on clients close to business launch. Incubator clients should be selected through clear evaluation criteria appropriate to the objectives of the incubator. Pre-incubation should help potential entrepreneurs to prepare their applications, but should not be a guarantee of acceptance. In public policy terms this means incubators should set out a clear strategy for pre- incubation, indicating numbers to be involved, how they are supported and expected numbers and time periods to generate clear clients. A clear and transparent set of selection criteria to be applied to applicants must be defined and communicated at an early stage. It should reflect the objectives of the incubator and its target market.

#### Address gaps in the Business Environment

In addition to services designed to meet the needs of individual clients, incubators are often asked to develop services or to intervene in order to address weaknesses in the business environment. Incubators need to analyze the local business environment and propose solutions to any particular problem faced by their clients if successful growth businesses are going to be successfully launched. Incubators should build on their reputation and network of relationships and collaborations in order to positively influence the business environment dynamics. Nevertheless, existing weaknesses in the regulatory and enterprise support frameworks should be targeted also at government level through the adoption of adequate initiatives supporting SME activities. Policymakers may also take into consideration the opinions of incubator associations when identifying main strategic priorities.

# **Commercial Approach**

When the incubators are designed to improve the growth and success rates of new businesses, they need to be focused on satisfying the needs of clients and delivering high value cost effective services to enhance the clients' commercial focus. As such the incubator should adopt the same business-like approach to their operation. The policy framework needs to encourage a business mindset and/or discipline for a public benefit in line with the set objectives and assess the performance of incubators in those terms. This has an impact also on the funding policy adopted. The grant application process should require clear business and action plans from the applicant incubators, along with measurable performance outputs in terms of clients, financial sources etc. that indicate the commercial intention and expected achievement.

### Ensuring Elements of Competition and merit in Grants Assignments

Public support can be important in the early stages of incubation programs. However, governments are suggested to ensure the efficient use of funds. This can be achieved through the organization of open competitive rounds for grant funds, which can contribute also to develop a commercial approach of applicants. Then, keeping funded incubators accountable for their performance also contributes to ensure efficiency in incubation management. Introducing an element of competition into the provision of grant-supported services has also been demonstrated to greatly improve performance in most instances.

# Financial Sustainability

A financial self-sustainability goal can be encouraged and actively promoted, as it will also contribute to an efficient management of the incubator. The benefit of this strategy is to gradually introduce commercial discipline to clients. To achieve sustainability, incubators often need to develop a range of alternative funding sources, both public and private. Initial public funding can be granted but then should decline in favor of other funding models (commercial income, equity in incubated companies, royalties, etc). When applying to grant funds, incubators can also be asked to indicate which funding model they intend to adopt in the longer term.

# Networking and Public Private Partnerships

Partner networks contribute to incubator successes through sharing the wisdom reaped from both achievements and failures, and help expanding market opportunities for entrepreneurs and graduates. These networks typically include universities, R&D centres, industrial contacts, financial institutions and professional service providers such as lawyers, accountants, marketing specialists, venture capitalists, angel investors, and volunteers. An incubator needs to have clearly defined mechanisms to ensure that it and its clients are in contact with key stakeholders in important networks, and that the incubator is clearly recognized as a centre of expertise within these networks. Strong cross-sector partnerships or PPPs can create important value for incubators by filling gaps in the organization's service model, mitigating operational risk and creating a platform for influencing the broader business environment. PPP models should be promoted either in the ownership or in the governance of incubators. Associations can also play a relevant role in creating networks among members.

### Incubator Manager

An effective, committed, knowledgeable incubator manager and staff are critical to the effectiveness of an incubator. The manager in particular needs to be able to lead the sup-port team, manage the incubator's important networks, understand the business needs of clients and pre-incubation businesses, as well as support the staff of the incubator in delivering effective services to meet these needs. Failure to employ a suitably skilled and motivated manager is one of the key reasons for the failure of an incubator. The business plan for an incubator should preferably set out the qualifications and experience of the proposed manager. At the very least a clear personnel specification, job description and recruitment and selection system should be spelled out in advance of funding. Policies that unrealistically limit salaries, appoint managers on the basis of performance in government or other bureaucracies, or recruitment not based on competitive criteria, are very unlikely to lead to successful incubators. Donors should consider investing more directly in leadership development of incubator managers, including capacity building for high potential individuals, global networking and knowledge-building opportunities, and disseminating effective strategies for recruiting and retaining talent in the incubation sector.

# Monitoring and Appraisal

The design of a monitoring and appraisal system for a business incubation program is critical to identifying unexpected problems that are preventing successful outcomes and where further improvements can be made, as well as to tracing best practices to share within the incubator network. The introduction of indicators of performance as a part of a monitoring and appraisal system is also important to ensure the achievements of concrete results as well as to allow a constant program improvement. Incubator managers should carry out constant internal monitoring also. Benchmarking exercises can be helpful to incubator managers for understanding how well they are doing performance-wise compared to peer programs elsewhere in the country or even worldwide – and in understanding what they can do differently to improve their performance with clients.

### Methodology

This paper adopted exploratory study 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 and awareness on the procedure for the establishment of technology incubators in Nigeria by the government who are the major promoters. The researcher, relying on his wealth of knowledge and experience on technology incubation also used qualitative reasoning to draw up conclusion, which is 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 Technology Incubation in Nigeria was made to ascertain the challenges affecting the smooth takeoff of the Centers.

## **Findings and Discussions**

Successfully examining secondary data based on our methodology the results from our findings as well as the discussions are as follows;

Lack of commitment to the Incubator value proposition and core principles. Value proposition implies that every technology incubation centre must have its vision, mission, objectives and goals well articulated. Each incubation centre must have a value proposition from the conceptualization stage and clear understanding of the core principles of incubator. This is in conformity with NBIA (2006), that the two most important principles which, characterize effective business incubation are: the incubator drive to have a positive impact on its community's economic health by maximizing the success of emerging enterprises and the incubator as a dynamic model of fostering and nurturing of selected enterprises through sustainable and efficient business operation guided by the basic principles of incubator. Therese are core principles and value propositions that are necessary in establishing an Incubation Centre. If these are lacking, then the centre is destined to fail.

Lack of feasibility study and business plan affect the smooth establishment of any incubation centre. Proper feasibility studies were not carried out before the incubation centre was located in Lafia. Other locations were not given appropriate attentions and centres located without proper consideration is likely to fail. This finding is consistent with info Dev (2013) which identified a number of incubator challenges to include:- inadequate feasibility study, which is the evaluation of the incubator concept vis a vis the environment to ascertain its commercial viability and technical feasibility before embarking on incurring expenditure.

Appointment of incompetent manager is a major challenge in the establishment of technology incubation centre. As stated earlier, the incubator manager is one of the most important factors in the future success of the incubator. Their ability to create and maintain a positive business environments and culture is necessary to sustain the incubator in the long-term

To a large extent the effectiveness of technology business incubators could be linked directly to the skills, vision, commitment, and entrepreneurial leadership talent of their managers (Boyd, 2002).

Mistakes in selecting the most suitable location and design of facilities tailored to the requirements of technology incubation are challenges to the establishment of the centre. Selection criterias for entrepreneurs and enterprises are not adequately streamline could lead to incubation establishment failure. This will lead to selecting inappropriate entrepneurs to the centre thereby depriving qualified entrepreneurs the opportunity of benefiting from the resources of the centre.

Lack of financial plan hinder smooth establishment of technology incubation centre, as source of cash in-flow is not certain. The number one challenge of most technology incubation centers according to Long (2012) is reaching financial sustainability which takes time to experiment and arrive at the right revenue model in a given context. Lack of identification of appropriate major stakeholders that will facilitate the process.

#### **Conclusions and Recommendations**

Governments considering investment in technology incubation should think of incubators as an integral part of a broader innovation and economic development program that strengthens the over-all innovation and entrepreneurship ecosystem. The most effective business models for technology incubation comprise a mix of earned and non-earned income and, in this context, funding support from well-recognized source lends credibility to local technology incubation and enables them to get the local buy-in required for long-term sustainability.

Pre-requisites for an incubation program and the determinants for success in its establishment are numerous but there are many informal incubator work aspects that can make it successful or unsuccessful. The most important ones according to Lakalka, (2000), is to focus the energy and resources of the technology incubation on developing the enterprises within it, utilizing networks of state, university and community support. The resident companies, not by the workspace itself, create new jobs and economic growth. In some countries the tendency is to spend much effort on preparing perfect plans rather than on developing the human resources and providing real services for enhancing firm-level performance. Manage the technology incubation as a business-like and demand-led enterprise, which progressively recovers significant proportions of its operating costs. The managers of services for entrepreneurs have to be entrepreneurial themselves. They must network with local professionals in creative ways and mentor the client-businesses.

Based on the findings, the following recommendations were made:

- 1. Vision statement and focus for the Incubator will avoid misunderstandings and conflicts as core concepts must be clearly explained to all stakeholders and commitments obtained from carefully selected sponsors at the outset.
- 2. Feasibility study will serve as a complete evaluation of the market, technical and financial viability of the incubation centre viz-a vis effectiveness and sustainability
- 3. Appointment of a proactive and entrepreneurial skilled manager is key to the success of establishing or over coming some of the challenges of establishing incubation centre
- 4. Choose a location and building that will enable the incubator to generate sufficient revenues and support the technology incubation. The building should be of high quality, conveniently located and well equipped (telephone exchange, computers, copiers, faxes, satellite communications) in order to attract creative enterprises. A marketing campaign is needed to promote the incubator-as-service-provider.
- 5. Entrepreneurs and enterprises that have the potential to grow and create jobs should be the target of the selection committee. The incubator manager must resist political pressure to admit entrepreneurs and enterprises that do not meet agreed criteria. Business plans and the commitment, management, marketing competencies of the entrepreneurs should be rigorously evaluated. A business/technical advisory group can advise the manger to make sound selections, then to be endorsed by the Board.
- 6. There is a need to ensure steady source of fund and utilization pattern to also ensure successful establishment, development and management of technology incubation

- centre. Customize the delivery of services and address development needs of each company.
- 7. Identification of the right stakeholders through careful observation and definition of the ecosystem.
- 8. Creating awareness, emphasizing the important of incubation and interest amongst political leaders.

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