

## Performance Effectiveness of Technology Incubation in Nigeria

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Received date: July 25, 2014, Accepted date: November 13, 2014, Published date: November 20, 2014

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### Abstract

Evaluating the performance effectiveness of a Technology Incubation Centre in Nigeria, and most importantly, determining the causes of increasing failure rate of graduated entrepreneurs have been ignored by many studies. This study measures the performance effectiveness of TIC on the development of Small and Medium Scale Enterprises in Nigeria. The study aims at identifying how a selection of simple processes and techniques by TIC can support the growth and development of businesses during and after incubation looking at the lack of continuity in business of most entrepreneurs after incubation programme in Lagos Nigeria.

The sample for this study consisted of 30 graduated entrepreneurs selected randomly for a period of 15 years. Questionnaires, In-dept-interviews, participant observation, descriptive statistics, and the balanced score card, were adopted in data collection and subsequently, the analysis.

The results indicated that, out of the eight variables tested, (Technology transfer program, information symmetry, networking and mentoring, physical space and other facilities, monitoring and reporting, advertisement and promotion, collaboration and benchmarking and fund raising), seven were ineffective while only one showed effectiveness. The study reveals that though some support services are put on ground for the running of the program at TIC, the problem lies with the implementation. Recommendations were made on the ineffective variables highlighted for further improvement and suggestions for further research made.

**Keywords:** Technology incubator; Entrepreneurs; New technology-based enterprises; Incubation development; Incubator seed capital; Small and medium scale enterprises; Performances effectiveness

### Introduction

#### Background

“Government all over the world is tirelessly devoting substantial resources to the establishment of small firms” [1]. It would be unimaginable to come across any country that ignores the important role of small and medium scale enterprises (SMEs). Such an action would have serious implications for the country’s economic growth and development. The focus of this thesis is on performance effectiveness of technology incubation with special reference to Nigeria. It is important to note that Nigeria is not the only country in which technology incubation has attracted government attention. In the United States of America (USA), President Obama has pledged \$250 million annually in federal funds towards innovation and job creation and this has further shown the importance of Technology Incubators. Dinah Adkins [2] confirmed the gesture as a commitment to innovation, entrepreneurship, and technology. This shows the importance attached to incubators as the vehicles for Small and Medium Scale Enterprises growth and development. In an earlier study by O. Adegbite [3] on Business Incubators and Small enterprise development in Nigeria, he defined Incubator according to the services they render.

Technology Incubators offer experienced and knowledgeable staff members, Physical facilities, and other support services to entrepreneurs who in turn contribute to the economic development of the country. The provision of these resources to entrepreneurs, reaffirms incubators as the anchor of success of entrepreneurs [4].

#### The problem

Measuring the performance effectiveness of technology incubation is not easy. Jaygoltz suggested that small and new businesses fail because of lack of funds and effective managerial ability. Incubators are meant to act as a solid foundation for start-ups by offering them experienced monitoring skills; however, the ability of incubators to perform their role is often questionable especially in the area of performance effectiveness. Government needs strong evidence to show that the resources being allocated to Incubators are worth the investment. Technology Incubation Centre (TIC) stakeholders need to be aware of how the Incubator performs and what added value it creates to the economy. This paper aims to investigate the added value of Technology Incubation to the growth and development of SMEs (in relation to the objective for which it was set up), measuring the performances of Technology Incubator thereby, finding out the effectiveness of TICs in the development of SMEs. The study looks at the

Performance of graduated entrepreneurs from 1997 to 2011 and investigating the causes of high failure rate of businesses after Incubation in Nigeria.

## Objective of study

The general objective of this study is to evaluate the performance effectiveness of Technology Incubation Centre on the development of Small and Medium Scale Enterprises in Nigeria.

To achieve this objective, the following specific objectives have to be achieved:

Determine the significance factors that facilitate entrepreneur success in Technology Incubation Centre in Lagos, the industrial and commercial capital of Nigeria.

Identify the factors that are rendered effectively and those that are not effectively rendered to entrepreneurs in Technology Incubation Centre.

Based on the above, the study will make recommendations on improving the Technology Incubation programme in Nigeria for more effectiveness.

## Research questions

The study attempts to find answers to one major question and six minor research questions.

The Major Research Question is

How effective is the performance of Technology Incubation Center in the development and growth of Small and Medium Scale Enterprises?

Arising from this question are the following minor research questions:

How do the support services offered by Technology Incubation Centre Lagos facilitate Business success of entrepreneurs?

Why are there high failure rate of businesses after incubation in Technology Incubation Centre Lagos-Nigeria?

Will increase in the number of Professional staff enhance the performance effectiveness of Technology Incubation Centre?

How does the flow of information from the Management assist the entrepreneurs?

How does the role of Centre Manager affect the success of Technology Incubation Program?

In what way will Science Park help in the post incubation of entrepreneurs?

## Research methodology

This is an exploratory single case study, with large variables to be considered. According to Yin [5], A case study investigates a real-life case which does not have a clear evidence. Case studies allow theories to be developed, tested and compared with the results [6].

We use multiple sources of data including: interviews conducted through Skype, participant-observation and questionnaire from entrepreneurs who graduated between 1997 to 2011. The questionnaire was used as research instrument to collect primary data, both the balanced score card was used to trace how the support services rendered in Technology Incubation Centre, claimed to lead to business development and subsequently improved business performance. Descriptive statistics was used to present and analyze the

performance effectiveness of the support services used as independence variables.

In this study, literature from other sources is reviewed to help enrich the research. Findings will be summarized, conclusions and recommendation made and areas for future work suggested.

The research offers different benefits to different stakeholders.

Incubator can help universities to become entrepreneurial organizations. It helps to build innovation through Research and Development and makes University to be successful in the area of knowledge transfer and also generate employment opportunities for graduates.

Incubator generates self-employment and high quality jobs thereby reducing the rate of unemployment in the Country. It is a vehicle for idea creation, business development and commercialization.

It contributes to the growth of the economy. Incubators attract innovation and high technology businesses and create a brand image for the Organization and region where it is located. Technology Incubation is regarded as tool for community development.

Incubator is like an equipped Institution of learning where every facility is provided for the entrepreneurs in other for them to concentrate only on doing business. New Start-ups without background, gets brand value from an Incubator. Knowledge and Network is easily accessible and shared in an Incubator. Ideas are developed and human resources are shared thereby creating a favorable business community.

This study was carried out in search of a solution to a problem observed in Technology Incubation Centre Lagos. This problem is the high rate of business failures after incubation. There is evidence that a significant number of businesses fail within the first three to five years of leaving the Centre while some could not even make it through the first year. As a senior staff of the Centre, the researcher tries to investigate the Performance Effectiveness of Technology Incubation on the growth of Small and Medium Scale Enterprises in other to determine the causes of business failure in Lagos TIC.

The study is focused on Lagos Technology Incubation Centre. The respondents are the graduated entrepreneurs from Lagos Technology Incubation Centre from 1997 to 2011.

The research became necessary due to increasing number of business failures among graduated enterprises in Lagos, Nigeria. Most graduated entrepreneurs are not able to continue their businesses after the incubation period despite the infrastructure on ground. The study investigates if there are other factors that are necessary for business growth which has been neglected by the Centre.

The study aims at investigating the Performance Effectiveness of Technology Incubation Centre on the development of Small and Medium Scale Enterprises. The findings, conclusions, and recommendations are based on the data collected from these graduated entrepreneurs.

This research has a number of limitations.

First, this study focused on graduated Entrepreneurs and getting in touch with them was not easy as some of them have moved to different locations and changed addresses without notifying the TIC management, while some are no longer in business.

Second, there is fear of inaccuracy of data due to the fact that it was collected through questionnaire distributed by colleagues in Technology Incubation Centre and the possibility of putting in good effort in data collection is minimal.

Third, the crime rate in Nigeria affected the data collection as most respondents did not give out sufficient information for fear of falling into the hands of fraudsters especially their phone numbers for a possible feedback.

This study assumed that technology incubators enhance the development of Small and Medium Scale Enterprises.

Providing constant electricity supply and other facilities is expected to enhance Entrepreneur performance.

Experts mostly professionals are leveraged with junior and less experienced staff for backups in performance achievement in Technology Incubation Center.

The role of Centre manager balances quality assurance and direction, using best practice to meet the needs of entrepreneurs.

Finally, it is assumed that there is free flow of information between the Management and the Entrepreneurs.

## Organization of the study

The rest of this paper is structured in five sections. Section 2 gives an overview of the most relevant and important literature review on this topic; Section 3 gives the historical background of Technology Incubation Centre-Lagos. Section 4 discusses the theoretical framework for this research. In this chapter, the Problem definition and research objectives is elaborated in more detail; Section 5 focuses on the presentation and analysis of data and describes how the data was collected and what the findings tell us; Section 6 shows the summary and conclusions of the study. Finally, a recommendation was made and further research areas suggested with bibliography and appendix attached.

## Literature Review

### Introduction

The idea of business incubation started in the USA, conceived of in 1959 by Joseph Mancuso as a real estate venture. In the effort to make use of unused space at Batavia, New York [7]. From the 1970s, Innovation and technology became the target of business incubators in developed countries, followed by collaborations with tertiary institutions in 1980s. UK and Europe got to know about incubation programme through innovation centers, and science parks that are into the support services of Small and Medium Scale Enterprises. A record from the National Business Incubation Association (NBIA) shows that there are about 7,000 incubators worldwide. According to Adkins and Dinah [2], Incubator has a breakdown of 1,000 in Asia, 1,400 in North America, 1,115 in the United States. 900 in Europe and close to 400 in Latin America.

Considering that Africa is still a developing Continent, the need for industrial development is very crucial. This prompted the involvement of the African Incubator Network (AIN), a development program run by Infodev which provides support to 24 incubator projects in 10 African countries namely: Angola, Ghana, Kenya, Mauritius, Mozambique, Nigeria, Rwanda, Senegal, South Africa and Uganda.

Business incubators main focus is on sectors which are relatively technology-intensive.

### An overview of small and medium scale enterprises (SMEs)

From the record of the European commission, Enterprises can be regarded as Micro, if they have a turnover of 2 million and a workforce of less than 10, Small if they have a turnover of less or equal to 10 million and a workforce of 50 and Medium-sized enterprises if they have a turnover of less or equal to 50 million and workforce of 250. The importance of Micro, small and medium-sized enterprises can not be over emphasized. It contributes to 99% of all enterprises, creates 75 million jobs. "It serves as a medium whereby societies convert technical information into products and services". Stevenson and Jarillo [8] considered entrepreneurship as an approach to management, defining it as a process by which opportunities are pursued by individuals on their own or inside Organizations.

Jeffry A Timmons and Stephen Spinelli Jr. [9] stated that if you teach a person how to work for others, you feed him for a year, but if you teach a person to be an entrepreneur, you feed him and others for a life time

Knaup [10] and Headd in their analysis of the survival of firms, stated that the survival rate of businesses are slim especially after establishment. According to US Census Bureau website, 2007, in the year 2005, 671,800 new businesses were established, while 544,800 businesses were shut down. This is a big cause for concern because the economy of any country depends on the survival of Small and Medium Scale Enterprises. According to Jaygoltz, businesses fail because of certain reasons. Some of the reasons he gave are: A new business competing against Best Buy, trying to have subsidiaries prematurely and improper book keeping, inadequate funding, losing of core customers and expertise staff, Excessive competition, and legal battle. High cost of factory space, unskilled workers, poor management, improper future planning, power struggles, and non access to new Technology.

Some features have been identified as key factors that facilitate growth of businesses in an Incubator. These include working closely with the entrepreneurs and focusing on their needs. Treating the entrepreneurs as friends and taking their success as the success of Technology Incubator. Helping them with funding, technical assistance and encouraging internal networking and collaboration among entrepreneurs. All these factors are taken care of in an incubation centre where enough training is given to entrepreneurs on how best to manage their businesses and there is Infrastructure already on ground for easy take off. These factors will be elaborated later in the analysis of the literature.

Performance Effectiveness is a measure of how employees carry out their duty and seeking ways of doing their job better. Effectiveness is the measure of roles, functions and job tasks in other to achieve efficiencies, competence and productivity.

The purpose of this study is to investigate, analyze and evaluate the performance effectiveness of Technology Incubation Centre Lagos in the development of Small and Medium Scale Enterprises. The study focuses attention on studying the effectiveness of Lagos Technology Incubation Centre in relation to the goals and objectives of its establishment measuring the performance of graduated entrepreneurs from time period of 1997 to 2011.

### Classifications of incubators

Incubators are classified according to their area of interest in business. McKinnon and Hayhow [11] categorized incubator into different types namely: manufacturing Incubator, technology Incubator targeted Incubator, and mixed-use Incubator that doesn't focus on a particular industrial sector. Lewis also put incubators according to their organizational structure namely: Economic

development organizations, Institutions of higher education, For-profit entities, Not-for-profit entities, and Public Private Partnerships. Another Author, Etzkowitz [12] categorized incubators as University incubator and Network incubator. Bollingtoft and Ulhoi [13] focused on the 'networked incubator' which is a for-profit collaborative incubator that is aimed at creating Jobs.

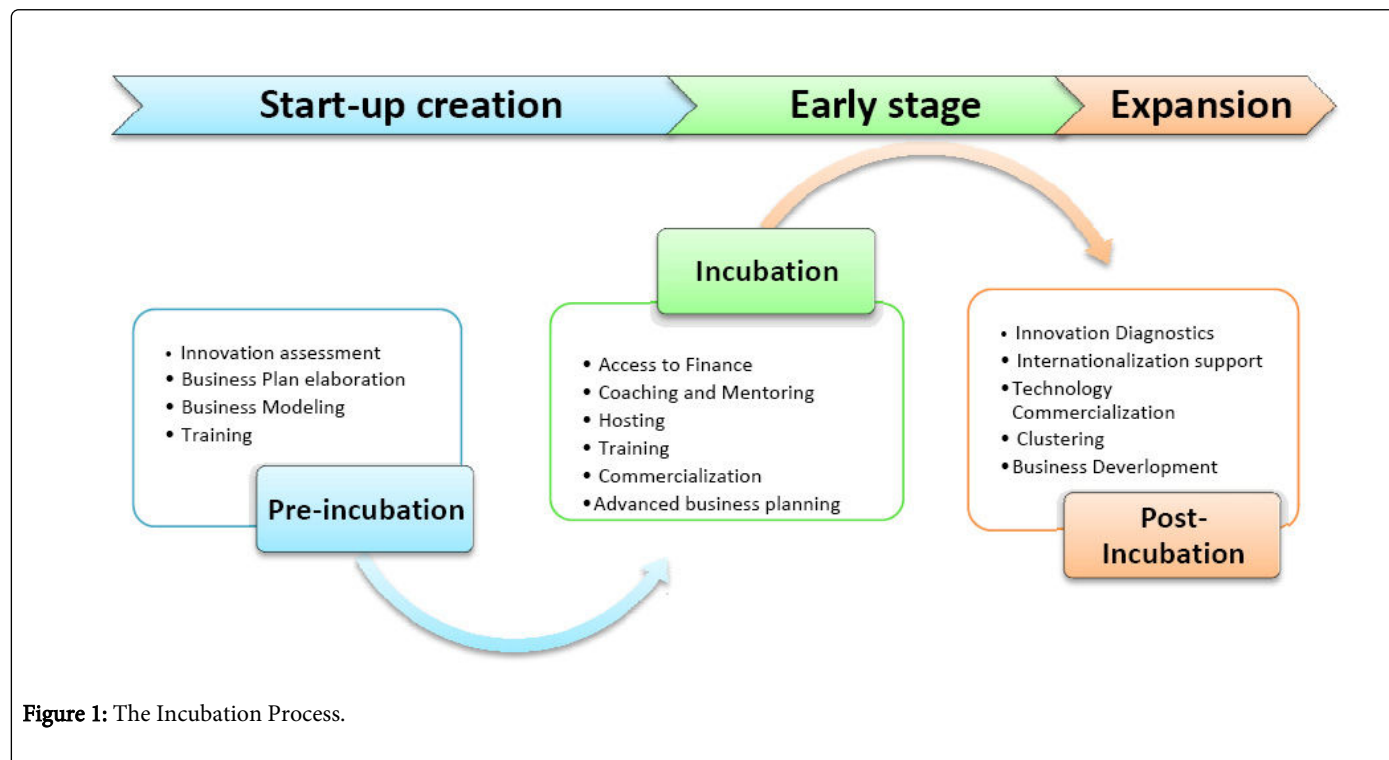


Figure 1: The Incubation Process.

Incubation of businesses is categorized into 3 stages as shown in the Figure 1.

### Phases of incubation

Pre-Incubation is the first of three phases of technology incubation programme. This phase allows entrepreneurs to have free accommodation and free business support to help them with the investigating and defining of how they intend to develop their company and putting this story in a sound business plan describing the business opportunity being pursued, a marketing and sales strategy, the proposed management team, the operational aspects of the business, and the finances of the business.

Pre-Incubation helps entrepreneurs as they develop their business ideas through to commercialization of their products. The process is highly subsidized, and company development is measured against their ability to sustain the business while weathering the storm associated with starting a business.

In the second phase, the incubation phase, the business idea is nurtured and developed through series of problem solving. According to Simon Problem can be defined as what exist in a disturbed state. Problem-solving is a change from that state of discomfort to a more desired state of the entrepreneur. Incubation programme involves daily monitoring and assessment followed by reporting to see that problems that have been identified are resolved by the expertise staff.

During the Incubation period, information symmetry is needed. There is free flow of information from the management to the entrepreneurs which helps in solving entrepreneur's problems thereby helping in the growth and development of Small and Medium Scale Enterprises.

In the third and final phase, the evaluation phase, where graduated companies are linked to spaces and Resources providers to support them as they leave the incubation Centre.

This comes in the form of monitoring and assessment of the business activities of graduated entrepreneurs and making sure that they still enjoy all the support services in a highly subsidized way for business continuity. It is highly recommended that they are moved to a Science Park which is a bigger place for housing technology and it is managed by specialized professionals.

### Identification of performance effectiveness

In order to determine if the resources allocated to the establishment and maintenance of Technology Incubation Centre is worth the effort, it is very important to identify the performance effectiveness of the centre and those managing the centre to avoid running a failed programme which is seen by Bovensand't Hart [14], as one that is unable to define a problem. Bergek and Norman [15], looked at the concept of "incubator" as an organization that creates a conducive environment for the birth and growth of new firms. Chandra et al. [16] also described Incubators as institutions of talent and technology.



In a similar study done by Colombo and Delmastro [17], they tried to look at how effective Technology Incubation is on new technology-based firms during their early year of establishment. They dwelt on lack of information on incubator support and tried to suggest ways of helping the new firms to find an appropriate management and strategy.

Hamdani [18] In his article, stated that the support services rendered by Technology incubators to Start-ups, create value for new firms. He stated that business incubators help young firms during their introductory stage of the business life cycle to enable them grow to maturity. Joanne, Scillitoe and Alok k Chakrabarti [19] in their review of the article originally written by Yli- Renko, Autio and Sapienza; also stated that Technology Incubators support affiliated ventures, especially new technology-based firms into growth..

Barber [1] is concerned with the sustainability of business after establishment. He pointed out the need to identify the problem of small firm and the merit of a shared high-technology, and the effect of Government Schemes like incubation programme on the development of Small and Medium Enterprises However Peter et al. [20], argued that non-profit incubators are in a much better position to select the best incubatees and this makes them to record a higher success rate than for-profit Incubator because profit incubators face pressure to make a profit for survival. This supports the motive behind setting Technology incubation centre by the Federal Government as a non-profit making Organization whose only motive is to see to the development and success of businesses. He also described Business incubation as an innovative organization that creates value through combining entrepreneurial drive of a start-up with resources available to large sized firms and helping those start-ups to survive.

Bergek and Norman [15], in their study on Science parks and Incubators and their impact on innovation process, compared Technology Incubator with a machine that is used in hospitals where infants are put until they reach a good status to face the environment conditions for growth and improvement. They differentiated between a science park and an incubator, recommending that new technology based firms should operate in an incubator for 3 to 5 years to become mature before entering science parks. Knopp [21] in her article also differentiated between Incubators and research and technology parks. While Incubators nurture the growth of start-up and new firms, Research and technology parks, provide business environment for corporate, government or university and small businesses for Post-Incubation. The paper also stated that the services offered by an Incubator depend on the particular market served, and the resources available in that Incubator.

Chandra et al. [16], used incubation in China to show Government involvement in Technology Incubation programme, stating that Chinese government adopted this programme as part of a plan to address market failure in innovation and technology. They looked into the determinants of incubator success, along with the role of government on incubation programme. Gwen [22] highlighted all the necessary resources that incubators offer to new firms from their foundation stage of business to commercialization.

Merlot had a contrary view about Incubators. He used business incubator unit in the republic of Ireland to compare the advantages with the disadvantages of having a business under a shared facility. He reasoned that firms that have attained some level of growth should have some privacy, free from interference from the incubator management team and the prying eyes of other Entrepreneurs, but at

the same time, he agreed that incubators provide basic facilities for start-ups. Other similar views are that of Hansen et al. who pointed out that it will be difficult to measure success at start up levels.

In other studies where business incubator's firms were compared with firms that are not located in the incubators, Aernoudt [23] found that firms that went through the incubation programme perform better than those that are on their own. According to Ratinho et al. [24] Incubators that are not technology based are not regarded as being successful.

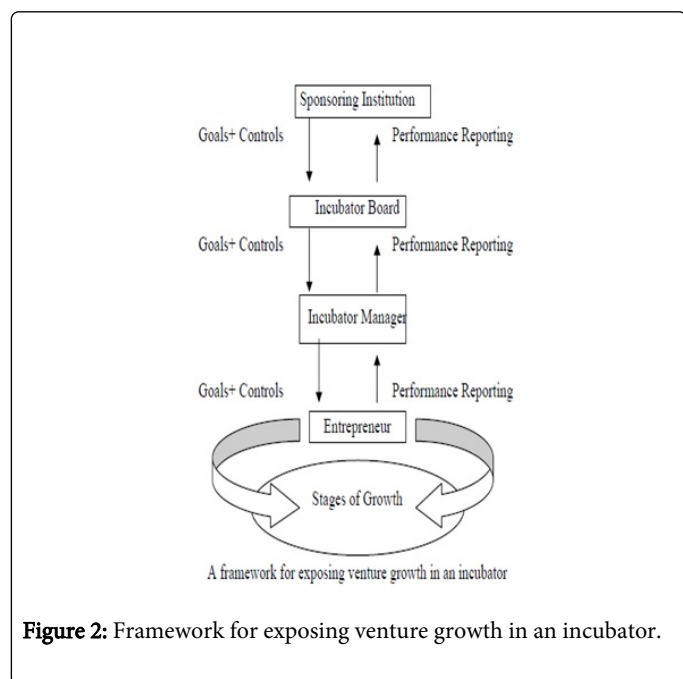
### Analysis of studies

This paper examines critically the performance effectiveness of Technology Incubation Centre on the development of Small and Medium Scale enterprises in relation to the increasing failure of businesses after incubation programme in Nigeria trying to investigate how effective Technology Incubation is in solving the problems of Small Medium Scale Enterprises. Problems can be defined as a change from discomfort to state of peace and Value creation for Small and Medium Scale Enterprises in an Incubator is the change that occurs from the complicated state at the time of admission to a desired state after graduation. This change needs a monitoring and evaluation process by expertise staff, a conducive business environment and linkage to the supply of raw materials and higher institutions for Research and Development. Other literatures in this topic have been dwelling on the objectives of setting up an incubator and the business support services provided by Technology Incubation Centre but none has taken a good look at investigating the performance effectiveness of technology incubation and finding out the causes of failure of businesses after incubation especially, in Lagos Nigeria

Most of these studies have also focused on the number of new firms, jobs and firm survival but without relating it to how different incubators organize and manage their incubation processes. What type of support services an Incubator offer and if all incubators meet the same criteria? This will lead to identifying the factors that determine the effective performance of a Technology Incubation Centre vis-à-vis the expected outcome. Despite the rising number of incubators and the continual research on their performances, there is still doubt as to their performance effectiveness on the development of Small Medium Enterprises. Because Incubators have different classifications as discussed earlier, it's very important to identify the objective of setting up a particular Incubation in other to identify the type of business it handles and its success rate. These objectives of establishing a particular Incubator should be identified and stuck to in other to avoid deviation. Furthermore, the incubation control process should be appreciated. Though different people have different views and doubts on the performance effectiveness of Technology Incubation Programme [13], these doubts are not totally wrong considering the high rate of corruption in the civil service and the (I don't care attitude) of government workers in Nigeria. Figure 2 illustrates a framework for exposing venture growth in an Incubator.

This frame work looks at the stages of growth of entrepreneurs starting from the conception of business idea to the development of prototype and maturity. It shows how entrepreneurs benefit from the program, what role centre managers play in the development and growth of the entrepreneur businesses, the services being rendered by expertise staff of the centre in other to see to the development of the incubatees. It also looks at the role of the National Board for Technology Incubation in overseeing the activities of the Center Manager, making sure that there is constant monitoring and

evaluation of the entrepreneurs. The sponsoring institutions include the government and other stakeholders whose goals are to see to the smooth running of the program by providing the necessary infrastructures for nurturing the business of these entrepreneurs to growth. The entrepreneur reports their performances to the Centre Manager who then reports to the National Board and finally, the Board reports the overall performance to the Federal Ministry of Science and Technology who then evaluates the performance report to ascertain the growth and development of the entrepreneurs. It is a continuous circle and there is feedback across the activity set. Information moves back and forth between entrepreneurs. Critically, the pursuit of the framework appears not to have delivered its intended goals as entrepreneurial activities passing through Technology Incubation programme in Nigeria appear not to have delivered high success rate. This necessitates the need to examine the factors that influence the performance effectiveness of Technology Incubation Centre on the development of small and medium scale enterprises.



### Important support services

Accordingly, this study will look at the fundamental but at times, neglected factors that contribute to the performance effectiveness of Technology Incubation Center. These factors are:

### Technology transfer programme

Human Resources are the most important tool for performance success. Therefore, there is need for effective knowledge transfer to entrepreneurs. According to Obe an effective technology transfer programme for linking knowledge to entrepreneurs would include knowledge transfer partnerships, knowledge transfer networks and small business research initiative. These entail effective training support for developing entrepreneurs. In this regard, an innovation based incubator should involve highly specialized and qualified team.

Furthermore, technology transfer program would be enhanced by effective back-up. These may entail leveraging experienced senior staff

with the back-up of more junior and less experienced colleagues. In this process, the role of the Centre Manager may require balancing quality assurance with best effort using best practices. These reflect the notion created that the managing of business incubators entails the need for the Manager/CEO with overall responsibility of managing the centre, to be effectively supported by professional staff in the core activity areas, including business advisory to create an atmosphere for knowledge and idea generation. In that case the entrepreneur should be open to ideas.

Technology transfer programmes should also feature opportunity for shared knowledge among entrepreneurs. Through shared knowledge relationships, entrepreneurs can adapt resources and combine competences, thereby increasing their value. This enables adaptation of resources in such a way that they mutually reflect in one another [25].

The above suggest that technology transfer includes characteristics that promote performance effectiveness. These include opportunity for knowledge transfer, effective training support, effective back-up, atmosphere for knowledge and idea generation, openness of leadership to ideas and shared knowledge among entrepreneurs. Therefore, technology transfer is expected to have positive relationship with TIC performance effectiveness.

### Information asymmetry

Information as symmetry in the content of this study is the convergent of all relevant information pertaining to incubation programme as known to both the entrepreneurs and the TIC Management. Strong information symmetry is needed for an intensive Technology. Incubator provides entrepreneurs with guided information for effective business management and by sharing information, value will be created and cost reduced. The above shows that Information Symmetry has characteristics that promote performance effectiveness. These include: level of Information Sharing, Good Communication, Good Rapport, and the Proper flow of Information,

Therefore, Information Symmetry is expected to have a positive relationship with Technology Incubation performance effectiveness.

### Networking and mentoring

Networking and knowledge exchange are very important tools for business development and at the same time, very crucial to Technology Incubators and helps Small and Medium Scale Enterprises to create innovation at an international level for commercialization and internationalization. It is difficult to describe and measure Networking, and Knowledge exchange is not easy to measure because of their social and academic nature but the impact can be felt from the output generated. Networking in an Incubation centre enables the entrepreneurs to benchmark with other entrepreneurs, get inspiration, develop common ideas and assess the performances of their businesses. Millan et al. [26] talked about networking, organization explores blue ocean area of business, identify core competences and gain high market share.

From the above, it can be deduced that Networking has features that strongly promote performance effectiveness. These features include: Innovation for commercialization and internationalization, inspiration, idea development, business development and assessment, knowledge sharing, skill acquisition, identification of core

competences and Blue Ocean, structured business process, increased market share and scientific research. This shows that Networking is expected to have a positive relationship with the performance effectiveness of Technology Incubation.

### Physical space and other facilities

The premises, factory units and packing stores should be adequate to the efficient delivery of service. These facilities should be built and allocated according to the stage of incubation. For pre-incubation, there should be rooms for pre Incubation, Workstations, Connectivity, and Offices with toilet facilities. For Incubation, there should be Incubation Space, Secretarial Space, and Reception, Product display centre, Meeting rooms, Cafeteria, Conference room, Laboratory, First aid room, Library, Offices with toilet facilities, Store room, and fully equipped training room. For Post Incubation, there should be a conference room, Research Centers and Laboratories. A strong security system should be put in place and a car park created.

The importance of physical space cannot be overemphasized, looking at large premises, factory units, packing stores, workstations, toilet facilities, conference room, laboratory, library, Secretarial Services, reception, fully equipped training rooms, good security system, a well structured car park, display centre and first aid room. All these shows that physical space is expected to have positive relationship with Technology Incubation performance effectiveness.

### Monitoring and reporting

Monitoring involves daily visiting of entrepreneurs to identify their problems and report same to the Centre Manager and assessment of their production and sales record to ascertain their performances over a period. It is important to listen very carefully while monitoring in other to analyze correctly the problems of the entrepreneurs so as to come up with in-time response to meet those demands. Planning, Implementation and Service offering should go hand in hand. Regular observation and recording of activities of the entrepreneurs is required and reporting back concrete figures in other to keep up with the hopes and needs of entrepreneurs. In evaluating the business performances, their financial statement should be looked into and an accountant assigned to help them in the preparation of financial statement. The entrepreneurs should be made to submit quarterly and annual report of their businesses.

Conclusively, the above showed that performance effectiveness of Technology Incubation has a close relationship with Monitoring and Reporting looking at these characteristics: Daily visit, regular observation, problem identification, assessment of production and sales record, problem solving, recording of activities, reporting, financial statement preparation and submission of quarterly and annual reports. All these are expected to have a positive relationship with Technology Incubation performance effectiveness.

### Advertisement and promotion

Technology Incubation Center advertises to the general public through the media, post bills, trade fairs, and exhibitions and through word of mouth. The services they offer and how to gain admission into the centre is highlighted to convince other entrepreneurs and SMEs to join Incubation programme. The products of the entrepreneurs are also advertised on a regular base. There is a display centre where all the products from different entrepreneurs are displayed with price tags. A weekly Friday sales is organized in front of the centre with subsidized

prices and regular promotion done in a popular Agege market in Lagos Nigeria.

This shows that Advertisement and Promotion has characteristics that promote performance effectiveness. These characteristics include advertisement through the media, post bills, trade fairs and exhibitions, word of mouth, provision of display centre, Friday sales and constant promotion. All these are expected to have a positive relationship with Technology Incubation performance effectiveness.

### Collaboration and benchmarking

Collaboration involves cooperating with other entrepreneurs localized in the same geographic area to gain access to a pool of knowledge base that will increase the entrepreneur's capacity for innovation [27]. Business grows faster when entrepreneurs pool their different core competences together to develop and use technology for the market.

According to Cooke [28] "Clusters are known to exhibit the same technological and organizational learning process". Joint learning is based on collaboration and it is related to the creation, exchange, and combination of knowledge [25].

Benchmarking is a measuring tool of incubator performances and their effectiveness in the development of Small and Medium Scale Enterprises. It involves taking a critical look at other Technology Incubation Centers to be able to measure performance based on the success of other centers and make changes where necessary. There should be room for benchmarking in Technology Incubation Centre to allow performance and efficiency check-up and to compare a specific process to another. It will be interesting to discover if environment and resources affect the extent to which goals can be achieved, and since resources are limited and not available in the same amount in all countries, levels of Incubator performance will vary from one region to the other even within the same Country. Variance becomes greater when one compares one Incubator with another in the same country. When Incubators in Lagos state is benchmarked with Incubators in other state of the federation, the difference acts as a comparison and helps in performance improvement and implementation of best practices.

Therefore, the above shows that collaboration and benchmarking has a close positive relationship with performance effectiveness of Technology Incubation looking at these characteristics: Cooperation with other entrepreneurs, pooling of core competences, organizational learning process, sharing of resources and capabilities, interactive joint learning, comparison of specific process, performance and efficiency check up.

### Fund-raising

One of the most needed supports Incubator offers to new firms is funding. This is giving a loan to start-ups to aid them in the survival of infancy. This type of loan is called seed capital and it is given with the lowest interest rate of 5% over a period of 3 years. The federal government gives this loan partly by sourcing machineries for the entrepreneurs and giving them part of it as working capital. Incubators should be able to attract resources to increase their value to the entrepreneurs who in turn should demonstrate that there is a high return on investment in their businesses. It is very important for an entrepreneur to identify how much money is needed at every stage of the business cycle, when, where and how to get it on acceptable terms.



These four variables in the outer circle of the framework provide support and also have some influence on the performance effectiveness of TIC.

The above suggest that fund-raising has characteristics that promote performance effectiveness. These include opportunities for giving loan as seed capital, sourcing of machineries, working capital, minimal interest rate and longer repayment period.

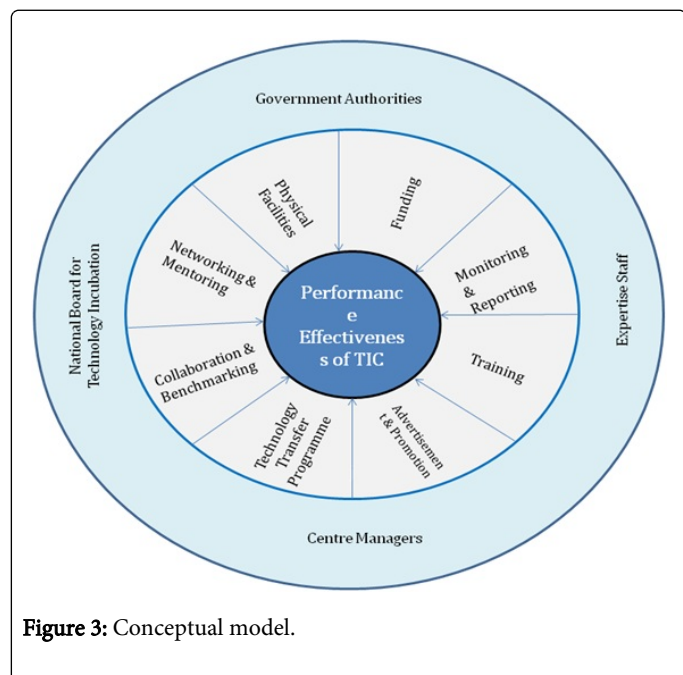


Figure 3: Conceptual model.

Figure 3 shows the Conceptual model used in this study. It highlights the effect of the independent variables (Technology transfer Program, Information Symmetry, Networking and Mentoring, Physical Space and Other facilities, Monitoring and Reporting, Advertisement and Promotion, Collaboration and Benchmarking and Fund raising), on the dependent variable (Performance Effectiveness of Technology Incubation). It shows that with the independent variables, Technology Incubation can achieve effectiveness with the help of other variables which include the Federal Government of Nigeria (Federal Ministry of Science and Technology, The National Board for Technology Incubation (NBTI), The Centre Manager and the expertise staff of the Centre. The Federal Ministry of Science and Technology is monitoring the activities of both the Board and the Centre Manager to see to the effective and efficient running of the programme. They provide all the amenities necessary for a successful incubation e.g. constant power supply, laboratories and Internet services etc.

### Knowledge gap in the reviewed literature

Regardless of the study carried out in 2001 by Oyeyemi Adegbite on Business Incubators and Small enterprise development in Nigeria, there has not been any study, even, in the literature reviewed so far on the Performance Effectiveness of Technology Incubation in Nigeria. This is an important knowledge gap for a country that has the largest population in Africa (currently estimated at over 160 million), rich in human and natural resources, has over 25 Technology Incubators spread among the 36 States of the Federation, and a Technology Incubation Regulatory Board (NBTI) in Abuja, the Federal Capital.

This study aims at closing this gap by appraising the performance effectiveness of the pioneering Technology Incubation Centre in Lagos, Nigeria's Commercial Capital, from 1997 to 2011. The Centre was established in 1993. The period covered by this study has been chosen because of some important reasons: First, involvement in admission, training, monitoring and evaluation of entrepreneur businesses and graduation, and secondly, observation of high failure rate of businesses after incubation over the period specified.

### Summary and Conclusion

This paper has critically reviewed the theoretical literature related to Technology Incubation and its performance effectiveness in the development of Small and Medium Scale Enterprises. The session began with a brief history of Incubation, an overview of Small and Medium Scale Enterprises and the causes of business failures. The phases of Incubator as well as its classification were done for identification of the area of study. The session then proceeded to examine other authors' views on the topic, in order to gain insights into the research. Finally, the literature was analyzed and some important factors were highlighted which helped in identifying the success factors. The session ended with identification of the knowledge gap revealed by the reviewed literature which this research intends to close, and lays a sound foundation for the historical background of Technology Incubation Centre Lagos.

### Theoretical Framework and Research Methodology

The strength of a quantitative research depends on a sound theoretical base. A theory itself, comprises a body of principles to explain phenomena and it is derived from the Greek word 'therein', which means 'to look at'[29].

The development of small and medium scale enterprises (smes) is largely dependent on the effective performance of Technology Incubation Programme. "Entrepreneurship is a process by which an individual has the vision, skill and mindset to start a business" [9]. Effective entrepreneurs are internally motivated and have a passion for innovation. Technology Incubation helps entrepreneurs identify their talents, strength and weakness develop the ability to recognize when there is an opportunity and be able to seize it and build the business. To determine the performance effectiveness of Technology Incubation entails measuring its performance (support services) with success rate of graduated entrepreneurs to determine the impact it has on the development of small and medium scale enterprises.

According to Yin [5] "A case study investigates an unknown situation in a real life context." The research question is based on "how" and "why" about a contemporary set of events which the researcher has no control over and with the goal of investigating the link between performance effectiveness of Technology Incubation and the development of Small and Medium Scale Enterprises and tracing the business growth of entrepreneurs after Incubation programme. The study needs the drawing on a wider array of documentary information from graduated entrepreneurs in addition to conducting interviews in other to define the research questions which has both substance and form. It was stated earlier in the methodology in chapter 1, that the study is an exploratory case study. This is because the area of this investigation is new, some variables were not identified before as success factors and the clear idea of the problems that will emerge in the cause of the study is not known. Therefore, by doing exploratory studies, the researcher aims at developing concept more



clearly, establish priorities, develop definitions and improve the final research design. If the problem of the failure of businesses after Incubation is found not to be as a result of non-performance of Technology Incubation Centre Lagos, subsequent more studies can be cancelled.

By using explorative studies, money and time was saved considering the limited time given in conducting these studies. The use of case study necessitates the multiple source of evidence used in this study.

Qualitative studies refer to the meaning, definition, model or metaphor characterizing a research [6]. This study is an exploratory study and deals with live experiences of the respondents and using qualitative method will best capture the real data from participants and Organizational behavior. According to Labuschagne [30] qualitative studies show the processes and meanings that are critically investigated and not measured in terms of quantity. The qualitative data collection instruments used in this study is:

The balanced Score Card: The Balanced Score Card was developed to measure the financial and non financial performance of an Organization using the financial, customer, internal process, and Knowledge capital to achieve effectiveness” [31].

Interviews: These are guided conversations and very important because this case study is about human affairs and needs well informed respondents to provide insight. According to Rubin and Rubin, actual questions in a case study interview are supposed to be flexible and unbiased”. In the course of this study, 10 people are interviewed, 5 graduated entrepreneurs, 2 staff of National Board for Technology Incubation Abuja and 3 Senior Staff of Technology Incubation Center Lagos.

Participant-observation: This is listed because the researcher is a senior staff of Technology Incubation Centre Lagos and has witnessed the admission and graduation of entrepreneurs and has also observed the failure rate of entrepreneurs after graduation, hence the desire to carry out this research to determine the performance effectiveness of Technology Incubation Center Lagos and the reasons for lack of continuity of businesses after incubation.

“Quantitative studies show how statistical findings and conclusions are applied to research using numbers” [7]. Quantitative refers to a measure of model created in the qualitative studies. Quantitative techniques are used in this study for data collection and analysis.

Questionnaires were administered to graduated entrepreneurs from 1997 to 2011 with thirty-five (35) respondents out of a population of fifty (50) graduated entrepreneurs. The choice of Probability sampling( simple random sample) is to provide a known zero chance of selection for each population and to get a greater accuracy of results through better supervision, and better processing and also to save time because the larger the sample size, the longer it will take to collect the data. The collection of the data was done with the help of colleagues in the office who took time to locate the graduated entrepreneurs in their various new business addresses.

The mixing of the two methods is to allow for proper insight which a single method cannot provide so it is always good to combine methods to produce a complete analysis [32]. Morse and Chong [33] stated that a single method does not give a comprehensive research. Though the use of mixed method is new and appears complex and difficult to achieve [34].

This study used mixed method to optimize the strength and minimize the weaknesses of using one method [35]. The qualitative research method is dominant in this study. The quantitative method was used to analyze the data collected.

It is important to consider the financial and non financial performance measure of Technology Incubation and the most important measure to use is The Balanced Score Card. “The Balanced Score Card was developed to measure the financial and non financial performance of an Organization using the financial, customer, internal process, and Knowledge capital to achieve effectiveness” [31]. It is very important as a tool for long term planning and shows the totality of company’s activities and where to expect future growth. In the case of Technology Incubation Centre, it considers the independent variables from different perspectives because TIC objective must meet its goals and it shows the effective and ineffective support services in Technology Incubation Centre.

The Balanced Score Card has four perspectives in the performance measurement of Technology Incubation Centre:

Financial perspective which considers how Technology Incubation Centre looks to Sponsors (Federal Government of Nigeria)

Customer perspective which is replaced with Entrepreneur Perspective, considers how the organization looks to entrepreneurs.

Internal process which shows what Technology Incubation Centre must excel at, and

Learning and growth which looks at the actions the Centre will take in other to improve and create value.

The use of The Balanced Score Card in this study is to measure the non financial performance of Technology Incubation Centre Lagos – Nigeria shown in the Figure 4.

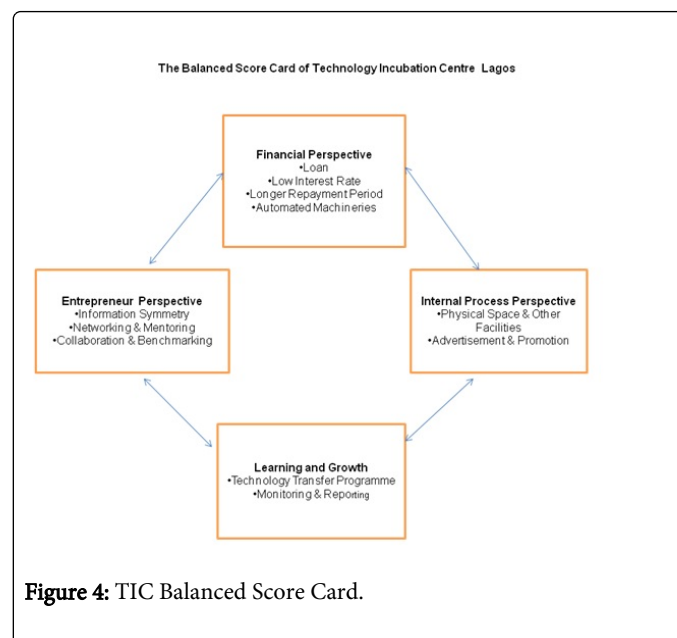


Figure 4: TIC Balanced Score Card.

“Rigor gives value to Research and this involves reliability, Validity and objectivity” [32]. Reliability gives the same result in different circumstances using the same tool. In this study [36], According to the same Author, Validity is the extent to which our measurement gives

the result that is expected. Objectivity is related with making sure that the data used is original.

In this study, an effort has been made to get the same result using different research methods and the data received was recorded personally to avoid adulteration. Interview was conducted with three staff from Technology Incubation Centre, two staff of National Board for Technology Incubation and five graduated entrepreneurs in order to ensure reliability and objectivity.

Quantitative study identified relevance, Plausibility and reproducibility. Relevance shows the relationship between the variables and the data used. Plausibility aims at making sure that theoretical data are real [37].

Rigor in qualitative study includes credibility, transferability and auditability. Credibility is the extent to which the researcher attracts the view of the readers [32].

Transferability refers to the extent to which findings can be applied to other context or group of people. In this study, collection and analyzing of data are clearly stated. The findings from the questionnaire show that it can be reproducible under similar rules and conditions.

Auditability is related to dependability which is the extent to which findings can be repeated if the process is repeated with similar participants under the same condition [36].

In this study, the procedure for collection of data was discussed with the researchers' supervisor, mentor and friends for authentication and the research proposal defended before a committee of academics.

Confirm ability shows that data are real and determined by participants based on the context of the study. The researcher used evidence of data collection such as questionnaire, notes from interviews, photographs, list of graduated entrepreneur and annual report to show that the data were real.

The study is made up of the following Variables:

- Eight Independent Variables
- One dependent Variable
- Four other variables

These are variables that affect the dependent variables and have to be measured specifically. They are:

**a. Technology transfer programme:** This comprise the quality of human resource, training organized for entrepreneur, leadership role of the Centre Manager, and knowledge sharing.

**b. Information symmetry:** This is the free flow of information between the entrepreneurs and the management, good communication, good rapport, and commitment.

**c. Networking and mentoring:** Involves the role of the sponsoring body, Skill acquisition, Inspiration, business idea development, synergy generation, increase market share, and linkage to research institutes.

**d. Physical space and other facilities:** This include the premises, free factory unit, store, conference centre, work station, laboratory, library, Secretarial service Centre, fully equipped training room, first aid room, product display centre, good security system, car park, uninterrupted power supply, Generating set, and post incubation accommodation.

**e. Monitoring and Reporting-** This involves daily monitoring and assessment, problem identification and solving, Preparation of financial statement, and submission of annual and quarterly report.

**f. Advertisement and Promotion:** Advertisement through the Media, trade fairs and exhibitions, post bills, word of mouth, display centre, Friday sales, and regular promotion.

**g. Collaboration and Benchmarking:** Resources and capability sharing, Organizational learning process, interactive learning, comparison of specific process, and performance and efficiency checkup.

**h. Fund Raising:** Linkage to financial institutions for soft loan given to entrepreneurs with low interest rate and longer repayment period, linkage to automated machineries suppliers and raw material for production.

From the questionnaire, section A is the Bio data while section B shows the significant of each variable in describing the performance effectiveness of Technology Incubation and is rated on a scale of "1" to "5" as shown below:

1-Strongly Disagree

2-Disagree

3-Neutral

4-Agree

5-Strongly Agree.

In the analysis in chapter 5, strongly Disagree and Disagree are merged as negative opinion while Strongly Agree and Agree are merged together to show positive response. Neutral remained the same.

### Dependent variable: performance effectiveness

This study is aimed at investigating the Performance effectiveness of Technology Incubation Centre. Measuring the performance of Small and Medium Scale enterprise and most importantly, determining the causes of increase in failure rate of graduated entrepreneurs have been ignored by many studies. Amid this oversight, this study venture to measure the Performance effectiveness of Technology Incubation Centre in the development of Small and Medium Scale Enterprises.

Growth and development are heterogeneous [38]. The performance indicator used include: Output, Sales turnover, Number of employees, and Net worth.

The properties of Performance Effectiveness include:

**Output:** The positive outcome of the production carried out after incubation program. This is determined by the percentage change in output during and after Incubation.

**Sales turnover:** The rate at which the sales volume has increased from incubation Period to after graduation.

**Number of employees:** Whether the number of workers has increased after incubation.

**Net worth:** The total worth of the business after incubation compared to Net Worth during Incubation.

The respondents were asked to write down their answers in the box provided in the Bio data section A of the questionnaire. While conducting the interview, the conversation centered on what the

variables meant to the entrepreneurs and around the research questions.

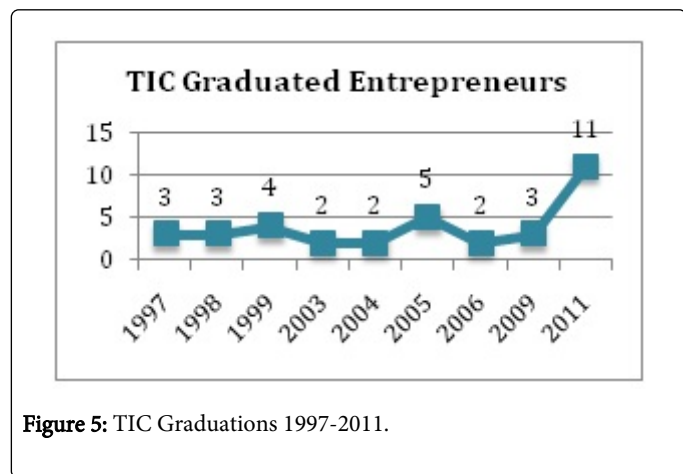


Figure 5: TIC Graduations 1997-2011.

Other variables act as a catalyst to the independent variables [39].

Other variables used in this study are Technology Incubation support service providers:

**Expertise Staff:** These are professional staff trained in their field of specialization on business development and entrepreneur management.

**Centre Manager:** the Centre manager is saddled with the leadership role of overseeing the overall activities of the center.

**Board Members:** National Board for Technology Incubation is a body created to regulate the activities of Technology Incubation Centre.

Government authorities (Sponsor). The federal ministry of Science and Technology is the body sponsoring the program. They provide the entire infrastructure for efficient running of the programme.

Every Research has certain limitations. This is no exception.

First, this study focused on graduated Entrepreneurs and reaching the graduated entrepreneurs will be difficult as some of them have moved to different locations and have changed addresses without notifying the TIC management.

Second, there is fear of inaccuracy of data due to the fact that it will be collected through questionnaire distributed by friends and relatives and the possibility of putting in good effort in data collection is minimal.

Third, the crime rate in Nigeria will definitely affect the data collection as most respondents will not be willing to give out information for fear of falling into the hands of fraudsters. Finally, most entrepreneurs might have bias opinions thereby not giving accurate rating.

Every research is based on some assumptions: In this study, it is assumed that Lagos technology incubator enhances the development of Small and Medium Scale Enterprises. Equipping Incubators with constant power supply and other amenities will enhance Entrepreneur performance. It is also assumed those experts mostly professionals are leveraged with junior and less experienced staff for backups in performance of duty in Technology Incubation Centre Lagos. Finally, it is assumed that the role of Centre manager balances quality

assurance and direction, using best practice to meet the needs of entrepreneurs and those respondents are answering the questionnaires truthfully and honestly.

This Session discussed the problem statement, looked also into the Research objective. The theoretical frame work and the choice of doing a case study were stated. The choice for using mixed Research methods (Quantitative and Qualitative). The Balanced Score Card was used to analyze the independent variable to determine their effect on the dependent variable. The Rigor of the thesis was also defined. Figure 5 depicts the operational zed variables of the study. The Performance indicators used were stated. The dependent variable, Independent and other variables used were explained. The Limitations and Assumptions were also stated.

In the following session, Data collected will be analyzed, presented and interpreted.

### Data Analysis and Interpretation

In the preceding session, we discussed in detail the theoretical frame work and the Methodology used in research data collection. The problem was defined, research objectives and research question revisited. In this section, the data collected and the interview conducted are analyzed using descriptive statistics. Important information in the documents collected is stated. The sample and questionnaire are highlighted together with the demographics. Finally, the responses were analyzed to determine the impact of the independent variables on the dependent variable.

The overall population of graduated entrepreneurs from the 2008 annual report of Technology Incubation Centre was 50 in number. Out of the 50 graduated entrepreneurs, a sample of 35 was selected from the graduation year from 1997 to 2011 and questionnaires giving out to them. 30 questionnaires were answered and returned while 5 were not returned. The choice of a sample of 35 was to reduce sample errors because the larger the sample, the smaller the error that will occur.

Thirty- five (35) questionnaires were designed and issued out with thirty received back. The questionnaire is made up of an introduction, the demographics and 8 variables which formed the independent variables. The 8 variables which formed the basis of the hypothesis had sub-variables forming sub questions under them. Each question measured a sub variable which together evaluated the major independent variable. The rating was done on a scale of 1-5 with 1 being the least while 5 was the highest. (1=strongly Disagree, 2=disagree, 3=Neutral, 4=Agree, 5=Strongly Agree).

In the cause of this study, thirty five questionnaires were designed and sent out for data collection, thirty was filled while five were not filled. Out of the ones that were not filled, two entrepreneurs were deceased and their businesses closed while three entrepreneurs could not be located. The response rate is 85.71% which offered a good foundation to initiate an analysis of the responses as shown in the (Table 1).

Questionnaire sent	Response	Response Rate
35	30	85.71%

Table 1: Response Rate Source: Researchers' Data Base.

The respondents comprised thirty Entrepreneurs that graduated from Technology Incubation Centre from 1997 to 2011. Of the thirty, twenty six were male, while four were female. It is interesting to note that thirteen respondents are 60 years and above, twelve respondents are 50 years and above, while only four of the respondents are between 40 to 49 years.

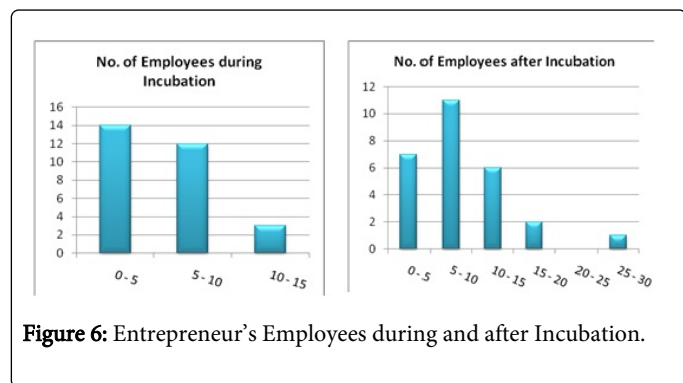


Figure 6: Entrepreneur's Employees during and after Incubation.

From 1997, three entrepreneurs graduated from Technology Incubation Centre, three in 1998, four in 1999, two in 2003, and eleven in 2011 which recorded the highest number of graduated entrepreneurs as shown in the figure above. Out of the thirty-five graduated entrepreneurs, fourteen are still in Technology Incubation Centre Lagos while sixteen have moved out and running their businesses. Five are out of business as shown in the Figure 7.

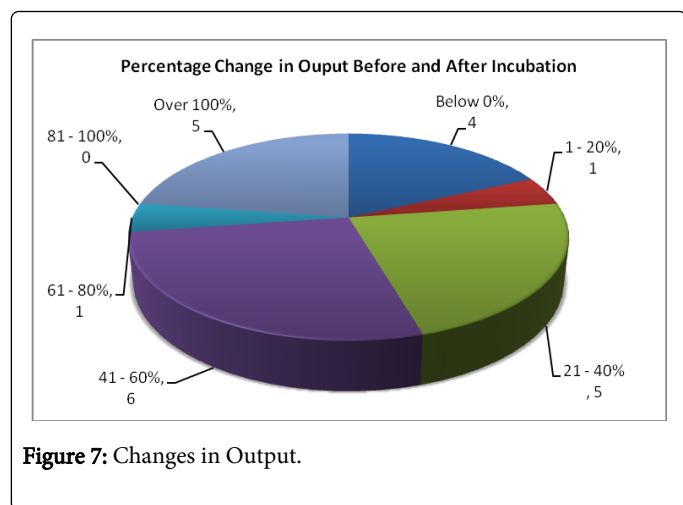


Figure 7: Changes in Output.

Looking critically at the number of employees the entrepreneurs had during incubation and the number they had as per the time of data collection as per Figure 5, it can be observed that fourteen of entrepreneurs that had 0-5 employees reduced to seven, two entrepreneurs now had employees of 15-25 after graduation and one has 25-30 employees.

From the analysis, measuring the performance effectiveness of entrepreneurs with number of employees suggest that Technology Incubation has a positive effect on the graduated entrepreneurs (SMEs) shown in the Figure 8.

The percentage change in output was recorded. It was observed that out of the thirty entrepreneurs as shown in figure 5 that, only four had a negative percentage change in output below 0, others recorded positive change in output during incubation and currently. One has a

percentage change between 1-20% while another one has 61-80%, five has 21-40%, and six has 41-60%. Five other entrepreneurs recorded a great increase in output above 100%.

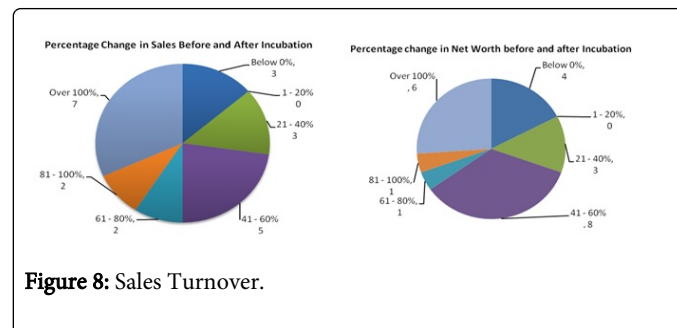


Figure 8: Sales Turnover.

From the analysis above, using Output to measure the performance effectiveness of Technology Incubation suggest that graduated entrepreneurs have a positive impact on Output.

Looking at the graph above, only three entrepreneurs recorded negative change in sales. The rest experience positive growth in sales after graduation. Three entrepreneurs recorded 21-40% change in sales, five recorded 41-60%, two 61-80, another two 81-100 and seven of the entrepreneurs have over 100% change in sales from incubation period to after incubation. This shows that Technology Incubation has positive performance effectiveness on the development of the entrepreneurs using sales as an indicator (SMEs).

Using Net Worth to measure the Performance effectiveness of Technology Incubation Centre Lagos shows that Technology incubation has a positive impact on the development of Small and Medium Sale Enterprises. As shown in Figure 5 above, from the data gathered from thirty graduated Entrepreneurs, only four recorded below 0% change in Net Worth. The rest has positive change with three having 21-40%, eight entrepreneurs have 41-60%, one has 61-80%, and another entrepreneur has 81-100% while six others recorded over 100% increase in Net worth. This shows that Technology Incubation has positive performance effectiveness on the development of the entrepreneurs using Net Worth as an indicator.

“The Balanced Score Card is used to measure the financial and non financial performance of an Organization looking at how the Organization can grow through improvement in the areas of financials, customer, internal process, and Knowledge capital to achieve effectiveness” [31]. It is very important as a tool for long term planning and shows the totality of company's activities and where to expect future growth. In the case of Technology Incubation Centre in this study, it considers the effect of the independent variables on the dependent variable looking at different perspectives because Tic objective must meet its goals in the satisfaction of the entrepreneur needs. The Balanced Score Card looks at the vision of TIC and the support services and also the measurement.

The Balanced Score Card has four perspectives:

- Financial perspective which considers how Technology Incubation Centre looks to Sponsors (Federal Government of Nigeria) and other stakeholders shown in the Table 2.
- Customer perspective which considers how the organization looks to entrepreneurs.



• Internal process which shows what Technology Incubation Centre must excel at, and Learning and growth which looks at the actions the Centre will take in other to improve and create value.

• The use of The Balanced Score Card in this study is to measure the non financial performance of Technology Incubation Centre Lagos – Nigeria. The targets and initiatives adopted in the balanced score card measure are targets of Technology Incubation Centre as per their objectives and strategies.

A suggested framework for the balanced score card analysis may be as follows:

• Technology Incubation Centre is a non-profit making government organization. It derives its financing from the federal government of Nigeria. The only area where the Centre looks at in this perspective is on securing loan for the entrepreneurs.

Objective (Support Services)	Measures	Analysis	Findings
Fund Raising.	Loan given by	To compare the actual amount needed (10 million naira) with the amount given (5 million naira).	Insufficient amount given.
Offer attractive package for the Entrepreneurs inform of Loan given with low interest rate and longer repayment period.	National Economic Reconstruction Fund(NERFUND)		
		To compare the interest rate given (15%) with the entrepreneur's expected interest rate (5%).	High interest rate
	In 2011.		
		Compare the repayment period stipulated by the fund provider(2 years) with the expected repayment period of the entrepreneur (5 years).	
	Low interest Rate		Shorter Repayment Period.
	Longer repayment period		

**Table 2:** The Financial Perspective. Source: Researchers' Data Base.

Securing loan in form of seed capital for the entrepreneurs is very vital for their business growth. Looking at the analysis, the amount of loan granted to the entrepreneurs in 2011 is not sufficient. From the record of the European commission [40], Small enterprises should operate with 10 million and 50 million for Medium-sized enterprises.

The interest rate is equally too high as to compare with what the entrepreneurs expected. The repayment period is too short for successful utilization of the fund.

How do Entrepreneurs	Measures	Analysis	Findings
Information Symmetry	Information flow	To determine the level of relevant information sharing. (95%)	Adequate flow of relevant information.
	Communication	To compare the timelessness of information and feedback on complaints.(One day)	Prompt feedback
	Good Rapport	To find out the level of relationship between TIC & Entrepreneurs. (daily visit)	Cordial relationship
Networking and Mentoring	Sponsor's Participation	To determine the level of involvement of TIC Management, National Board, and the Federal Government in Technology Incubation Program	High involvement
	Skill acquisition	To find out the degree of skill acquisition during incubation period.	Negative Skill acquisition.
	Business idea development	To access the level of business idea development.	Low level of business idea development.
	Capability building	To compare the quality of training during and after incubation	Low quality training
	Interactive learning		Low interactive Joint Learning.
Collaboration and Benchmarking	Comparison	To determine the degree of interactive joint learning.	No room for comparison.
	Performance checkup	To compare specific process with other entrepreneurs	Very low level of advertisement (twice a year).
	Media advertisement	To compare the frequency of media advertisement.	Not frequent (Three trade fairs in a year).
	Trade fairs	To access the number of trade fairs attended in a year.	Not often( Three exhibitions in a year)
	Exhibitions	To access the number of exhibitions attended in a year.	Not adequate
Advertisement and Promotion	Display Centre	To access the degree of display of products.	Zero level
	Friday sales	To determine the frequency of Friday sales.	

**Table 3:** Customer Perspective. Source: Researchers' Data Base.

With the insufficient fund given coupled with the high interest rate and shorter repayment period, it can be seen that Funding is not effective in the Performance effectiveness of Technology Incubation Centre.

This comprises of beneficiaries of services (Entrepreneurs) and upstream suppliers of funds like government agencies and banks. Federal Institute for Industrial Research (FIRO) for training of entrepreneurs, Raw Materials research and development for the supply of raw materials, National food and drug administration and control (NAFDAC), and Standard Organization of Nigeria (SON) for product registration and quality control. For the purpose of this study, Entrepreneurs are the focus of analysis because the goal of TIC is to achieve effectiveness through entrepreneur acquisition, entrepreneur retention, entrepreneur satisfaction and entrepreneur profitability. The researcher looks at the service attributes of TIC (The quality of service, cost of service, and functionality), Customer relationship (quality of services rendered, experience and personal relationship); and brand building (Image of the Centre) as shown in the Table 3.

Objective (Support Services)	Measures	Analysis	Findings
Physical Space and other facilities	Modern factory space.	To build well structured Factory Units by August 2011.	Project not carried out
	Free Accommodation	To assist the cost reduction.	
	Constant Power Supply.	To ensure constant Power supply.	Increase in Other charges.
	Longer Incubation Period and post incubation space (Science Park)	To extend the incubation period from five to ten years and establish a science Park for post incubation.	No constant Power supply.
	Automated Machineries	To source for automated machineries for entrepreneurs by July 2011	No extension and no Post incubation space
	Business Assessment	To determine the rate of daily assessment and evaluation of entrepreneur record.	No linkage
	Problem solving	To assist entrepreneurs in preparation of financial statement, business plan, and annual report.	Not sufficient
Monitoring and Reporting			No assistance

Table 4: Internal business process Source: Researchers' Data Base.

Entrepreneurs are the major customers of Technology Incubation Centre and measuring the performance effectiveness of Technology Incubation based on information symmetry shows that there is adequate flow of relevant information, Prompt feedback, and Cordial relationship. Using Networking and Mentoring shows high involvement of the TIC management, The Board, and the Government, Negative Skill acquisition, and Low level of business idea development which could be attributed to low quality training and low interactive joint learning without room for comparison gotten from Collaboration and Benchmarking. Advertisement Promotion is to be worked on because it is not sufficient, Media advertisement, trade fairs and exhibitions, display Centre and Friday sales are all not adequate

Therefore, the analysis shows that variable like Information Symmetry is very effective, while Networking and Mentoring, Collaboration and Benchmarking, and Advertisement and Promotion are not effective in the Performance Effectiveness of Technology Incubation Centre.

The internal business process measure focus on the internal process in Technology Incubation Centre that will have the greatest impact on the satisfaction of the entrepreneurs under the programme as shown in the Table 4. The Balanced Score Card approach is to incorporate innovation processes into the internal business process perspective by providing modern infrastructure, Establishing a Science Park for Post Incubation, Extension of Incubation period, Technology Innovations, Monitoring and Reporting of entrepreneur business activities.

The target of having well structured Factory Units by August 2011 and Automated Machines for all entrepreneurs before July 2011 was not accomplished. Extension of Incubation period from 5 to 10 years has also not been implemented and there is no plan yet to set up a Science Park in Nigeria. Annual report confirmed that there is inadequate supply of electricity. The daily business assessment and assistance in financial statement, and annual report preparation are not sufficient. Therefore, Physical Space and other facilities, and Monitoring and Reporting are not effective in the performance effectiveness of Technology Incubation Centre.

Objectives (Support Services)	Measures	Analysis	Findings
Technology Transfer Program	Human Resource	To employ five professionals July 2011.	No employment of professionals.
	Training	To send five staff selected from different departments for training every month.	
	Quality Leadership	To assess the quality of the Centre Manager.	No Constant training of staff.
			Average

Table 5: Learning and Growth. Source: Researchers' Data Base.

This is the fourth perspective of the Balanced Score Card which identifies the infrastructure that Technology Incubation Centre must build to create long term growth and improvement. Learning and growth comes from three principle sources: people, systems, and

organizational procedures. It will typically reveal large gaps between the existing capabilities of people, systems, and procedures and what will be required to attain the best performance shown in Table 5.

Technology transfer program which was measured by the quality of human resource and expertise staff with target of employing five professionals and organizing trainings for five staff from different departments every month is not seen as being effective in TIC. The quality of the Centre manager is also not high. Therefore, Technology Transfer with variables such as quality human resource, training, and quality leadership are not effective in the Performance effectiveness of Technology Incubation Centre Lagos.

The performance effectiveness of Technology Incubation can be measured by considering the various services they offer to the entrepreneurs. The following sections analyses responses from the entrepreneurs on the performance effectiveness of the various services rendered by Technology Incubation Centre which was also the independent variables in this study. Performance Effectiveness will be measured to be effective if the percentage agreement of the respondents is above a 60%. In assigning this effectiveness scale the researcher was guided by the fact that individual perceptions of the incubatees play a significant role in the responses with each of them having his/her own priorities on the different independent variables and thus a scale of 60% level of effectiveness to accommodate these.

S.no	Support Services	Descriptive Statistics	The Balanced Score Card	Interview	Participants' Observation
	Independent Variables	Effectiveness	Effectiveness	Effectiveness	Effectiveness
1	Technology Transfer Program	No	No	Yes	No
2	Information Symmetry	Yes	Yes	Yes	Yes
3	Networking & Mentoring	No	No	No	No
4	Physical Space & Other facilities	No	No	No	No
5	Monitoring & Reporting	No	No	No	No
6	Advertisement & Promotion	No	No	No	No
7	Collaboration & Benchmarking	No	No	No	No
8	Fund raising	No	No	No	No

**Table 6:** Overall findings on Independent Variables.

Technology Transfer Program is measured by the quality of Human Resource, Effective Backup of senior with less experienced staff, Effective Training/Support Programme, Training Quality, and

Training in Industrial Trade, Leadership role of Center manager, Shared Knowledge, and Monitoring of Prototype of Machines.

From Figure 6 above, 38.20% of the respondents agreed that Technology Incubation Centre offers all the support services under Technology Transfer Programme to the entrepreneurs. 32.50% disagreed while 29.29% remained neutral.

Using the scale above, training support, effective back-up, and atmosphere for knowledge and idea generation and openness of leadership to ideas and shared knowledge among entrepreneurs properly implemented. We may therefore, conclude that technology transfer is not effective in Technology Incubation Center.

Information Symmetry is the condition where all relevant information pertaining to incubation programme is known to both the entrepreneurs and the TIC Management. This is measured by the level of Information Sharing, Good Communication, Good Rapport, and the Proper flow of Information.

12, 65% agreed that there is equal share of relevant information in Technology incubation Centre. 15% of the respondents disagreed while 20% remained neutral. 65% agreement is above the judgement scale. We may therefore aver that Information Symmetry has characteristics that influence Performance effectiveness in Technology Incubation Centre.

Networking and Mentoring in Incubation programme involves: Full participation of Technology Incubation Centre management in the programme, Full participation of National Board for Technology Incubation, Participation of the Government, Inspiration gotten by the entrepreneurs through Networking, Skill acquisition, Business Idea development, Synergy generation, Knowledge sharing, High market share, Linkage to research Institute.

From the above Figure, 49.55% of the entrepreneurs agreed that Networking and Mentoring has a positive impact in their business. 34.57% disagreed, while 15.88% remained neutral. Judging with the stated scale above, Networking and Mentoring does not strongly promote performance effectiveness. The features which include: Innovation for commercialization and internationalization, inspiration, idea development, business development and assessment, knowledge sharing, skill acquisition, identification of core competences and Blue Ocean, structured business process, increased market share and scientific research are not properly implemented. This shows that Networking and Mentoring is not effective in the performance effectiveness of Technology Incubation.

Physical space is measured by the availability of Large Premises, Well Structured factory Unit, Packing Store, Free Accommodation, Longer Incubation Period, Availability of Conference Center, Work Stations, Laboratory, Library, Availability of Secretarial Service Center, Training Room First Aid Room, Product Display Center, Good Security System, Car Park, Constant Power Supply, Availability of alternative power supply, Facility Maintenance, and Post Incubation Space.

43.91% of entrepreneurs agreed that Technology Incubation Centre provides physical space and other facilities necessary for a successful business growth. 39.42% disagreed, while 16.67% remained neutral. This result shows that physical space and other facilities is not effective in the performance effectiveness of Technology Incubation.

This is the daily monitoring of Business activities, Assessment of Production and sales record, Problem Identification and solving,

Preparation of financial statement, and the submission of annual and quarterly report by the entrepreneurs.

47.31% of the respondents disagreed that there is monitoring and reporting in Technology Incubation Centre. 38.63% agreed, while 14.06% remained neutral.

This shows that Monitoring and Reporting does not have substantial relationship with performance effectiveness of Technology Incubation. The variables include: daily visit, regular observation, problem identification, assessment of production and sales record, problem solving, assessments of business records, reporting, financial statement preparation and submission of quarterly and annual reports. All these do not have a substantial relationship with the performance effectiveness of Technology Incubation.

This includes regular advertisement through the Media, Trade Fairs and Exhibitions, Post bills, Word of mouth, Promotion, Display of products in display center, Display, Friday sales and Promotion of entrepreneur products.

42.90% disagreement on Advertisement and Promotion. The difference between the results is small but considering that those that disagreed are more than those that agreed, Using the scale of 60%, it is concluded that Advertisement and Promotion does not have all the characteristics which include: advertisement through the media, post bills, trade fairs and exhibitions, word of mouth, provision of display centre, Friday sales and constant promotion. Therefore, Advertisement and Promotion is ineffective in the Performance Effectiveness of Technology Incubation Centre.

Collaboration and Benchmarking is measured using the characteristics which include: Entrepreneur Relationships, Friendless of TIC staff and Management, Resources and capabilities sharing, Organizational learning process, Interactive Joint learning, Comparison with other centers, Performance and efficiency check-up, and Benchmarking with other entrepreneurs

47.67% of the entrepreneurs agreed that collaboration and Benchmarking has characteristics that support performance effectiveness in Technology incubation. 27.52% disagreed, while 24.81% were neutral.

Therefore, using the scale of 60%, collaboration and benchmarking is not effective in the performance effectiveness of Technology Incubation.

Fund raising is the financial assistance given to entrepreneurs for their business. It can be in the form of Soft loan, Loan with Low Interest rates, Loan with longer repayment period, Sourcing of Machineries and Raw materials.

There is a big difference between those that disagreed and those that agreed on funding having a positive relationship with Technology Incubation effectiveness. 82.40% disagreed, 14.40% agreed while 3.20% of the respondents remain neutral. The percentage disagreement is more than the stated scale, therefore Fund raising's characteristics such as loan, sourcing of machineries, minimal interest rate and longer repayment period is seen to be lacking and therefore is ineffective in the performance effectiveness of Technology incubation Centre.

## Findings, discussion and analysis on performance effectiveness using interviews

Two rounds of interviews were conducted and focused on the research questions. Three senior staff of Technology incubator, and five graduated entrepreneurs was interviewed to sample their opinion. The respondents were grouped together according to their job for easy analyses. The time of the interview was in total about five hours and was conducted through Skype. They were conducted between the 22nd and 28th of July, 2011.

Questions were asked based on the following research questions and Independent variables:

**Question 1:** What is your view on the Physical space and other facilities in Technology Incubation Centre Lagos?

**Answer i. (Senior Staff of Technology Incubation Centre):** The three staff of TIC explained individually that Infrastructures are already on ground In Technology Incubation Centre for successful running of the business especially accommodation which is now free. They stated that there is Laboratory for testing raw materials and finished products but admitted that electricity supply is a major problem in the Centre. They agreed that having Science park in Nigeria will actually solve the problem of post incubation space in Nigeria, stating that the five year incubation period is enough in other to allow others to benefit from the programme.

**Answer ii. (Graduated Entrepreneurs):** The Graduated Entrepreneurs acknowledged that Technology Incubation offer services like product registration, quality control but argued that those services are not rendered adequately to the entrepreneurs. Vital facilities like workstations, training room and even first aid room for accident victims are not available in the Centre. They also complained of intermittent power supply and expressed their disappointment at how the centre stays without electricity sometimes, making production impossible for the entrepreneurs. The entrepreneurs explained that the five years incubation period is not enough. As a Technology Based Incubator, enough time should be given for Research and Development, introduction of product, growth and maturity. The short duration of incubation is the reason why some entrepreneurs find it hard to vacate their units after graduation because they have not been allowed to properly move from one stage of business life cycle to the other.

## Conclusion from question 1

The Services offered by Technology Incubation are relevant if equally distributed. There are basic amenities lacking in the Centre like availability of workstation, conference centre, secretarial service centre, first aid room and steady power supply. New SMEs are faced with the challenge of business management and it is the duty of the staff to deliver these services in a way that it will be of maximum benefit to the entrepreneurs.

Finally, it has been observed that Physical space and other facilities are not properly managed in Technology Incubation Centre and resources are not equally distributed. Therefore, as per these responses, Physical space is not effective in the performance effectiveness of Technology Incubation and should be improved upon.

**Question 2:** How do you view Technology transfer program in relation to the quality of human resource and training in Technology Incubation Centre.?



**Answer i. (Senior Staff of Technology Incubation Centre):** The officers said that most of the staff of the Centre are Bachelor degree holders but advised that staff should be placed in the department according to their field of specialization and they should be enough motivation to bring out the best in staff. They also confirm that expertise staff is backed-up with less experienced staff in the Centre. They confirmed that there is no enough training for the staff to boost their performances.

**Answer ii. (Graduated Entrepreneurs):** The Entrepreneurs complained that the quality of human resource in the centre is very low. They suggested effective training for the staff because as the said, most employees go for trainings that are not related to their field of work just to receive financial benefit. They rated the quality of training organized in the Centre as low and called for improvement. They stated that the Centre is deviating from the initial objective of developing prototype of machines and felt that there is no opportunity for shared knowledge in the Centre.

### Conclusion question 2

From the interview, the quality of human resource is low. Professionals in the field of business development and entrepreneurship should be employed for effectiveness. More training should be organized for the staff and entrepreneurs in the Centre. Considering the lack of quality human resource and good training, Technology Transfer Program is seemed to be ineffective in the Performance effectiveness of Technology Incubation Centre.

**Question 3:** How does the flow of information from the Management assist the entrepreneurs?

**Answer i. (Senior Staff of Technology Incubation Centre):** The Officers stated that there is information symmetry in the centre. The relevant information is passed down to the entrepreneurs but because they hide their own information, it becomes difficult to identify areas where they need help. Some of them have this erroneous believe that looking through their sales and production record will make them to be over exposed so they don't give out accurate information about their businesses and "wrong diagnosis brings wrong treatment". They said.

**Answer ii. (Graduated Entrepreneurs):** The Entrepreneurs had a contrary view. He acknowledged that there is information symmetry in the centre. The management releases vital information to the entrepreneurs who are in need of it in other to manage their businesses effectively. He admitted that TIC management has enough information that can assist the entrepreneurs in building up a strong business foundation, and this information is released and communicated to the entrepreneurs. The staff has close relationship with the entrepreneurs.

### Conclusion question 3

From the interview above, it can be concluded that there is free flow of information in the Centre. The management has enough information that will assist the entrepreneurs in their businesses and the information is passed down freely. In any business Organization, there is need for effective communication in problem finding and problem solving. Therefore, Information symmetry is effective in the Performance Effectiveness of Technology Incubation Centre.

**Question 4:** What role has Networking and Mentoring played in the development of entrepreneur businesses, are the sponsors of this programme really committed to the running of the program?

**Answer i. (Senior Staff of Technology Incubation Centre):** They admitted that the networking activities in the centre are not encouraging. There is no synergy generation because there is no opportunity for the entrepreneurs to relate with one another and be able to share knowledge. They confirmed that the Board and federal ministry of Science and Technology are not highly committed to the smooth running of the programme.

**Answer ii. (Graduated Entrepreneurs):** The Entrepreneurs on the other hand blamed the Center for high failure rate due to lack of good networking. They admitted that the Centre is committed to the program but lacks proper implementation necessary for successful Incubation. They frowned at the way different types of businesses are housed together without grouping them accordingly and this does not allow for synergy generation. They stated that this improper classification of Lagos Technology Incubation does not give room for Networking and collaboration because businesses are not related. They also pointed out that the centre does not have adequate link with any tertiary institution for Research and Development.

### Conclusion from question 4

There is evidence to show that networking and Mentoring, which allows you to relate with others, get inspired and take appropriate measure for continuous improvement is lacking in the centre. From information gathered from all the respondents, it can be concluded that there is no Networking and Mentoring in the Centre. Therefore, Networking and Mentoring is not effective in the Performance effectiveness of Technology Incubation Centre.

**Question 5:** How do the role of staff and the Centre Manager in Monitoring and Reporting affect the success of Technology Incubation Program?

**Answer i (Senior Staff of Technology Incubation Centre):** They explained that the Centre Manager oversees the overall activities of the Centre. His decisions matters a lot on every issue in the centre. The staff engage in monitoring and report back to the Centre Manager who then report to the Board for problem solving. The quality of the Centre Manager determines the quality of services offered to the entrepreneurs.

**Answer ii. (Graduated Entrepreneurs):** The entrepreneurs stated that the Organization demand competent and quality leadership role from the Centre Manager to design and develop various innovative and technological solutions and to attract a large pool of talent. They expected the Centre Manager to be experienced in the field of entrepreneurship and business development assisted by expertise staff.

### Conclusion question 5

From the responses gotten, the Centre Manager has the overall responsibility of nurturing the entrepreneur businesses to growth. He has the responsibility of delivering best results. The infrastructure becomes useless if there is no competent hand to manage them and the programme fails if the Centre Manager does not deliver high quality services to the Entrepreneurs, making sure that there is monitoring and reporting of entrepreneur activities and that problem when identifies, is given the urgent attention it deserves. It can then be concluded that staff and the Centre Manager's role is very important

in monitoring and reporting in TIC Lagos. Therefore, Monitoring and Reporting is effective in performance effectiveness of Technology Incubation Centre.

**Question 6:** Can you say that there is Collaboration and Benchmarking in the Centre?

**Answer I. (Senior Staff of Technology Incubation Centre):** According to the officers, there is no close relationship between the entrepreneurs, The resource and capabilities in the centre are not utilized because of lack of cooperation between the entrepreneurs.

**Answer ii. (Graduated Entrepreneurs):** The entrepreneurs blamed the management for lack of collaboration in the centre. They complained that no activities are organized to bring the entrepreneurs together, stressing that there is no room for comparison and interactive joint learning.

### Conclusion on question 6

Collaboration and benchmarking is very important in performance and efficiency checkup. Entrepreneurs need to collaborate with one another to be able to enjoy good Organization learning process and good interactive joint learning. There should be room for comparison of specific process with others in the Centre. The responses shows that there is lack of cooperation among the entrepreneurs and ineffective benchmarking, therefore Collaboration and Benchmarking is not effective in the Performance effectiveness of Technology Incubation.

**Question 7:** What is the level of advertisement and promotion in Technology Incubation Centre?

**Answer i. (Senior Staff of Technology Incubation Centre):** The staff of the centre assured that the entrepreneur products are adequately advertised through trade fairs and exhibitions. They stated that there is a display centre where all their products are displayed.

**Answer ii. (Graduated Entrepreneurs):** They acknowledge that they attend trade fairs but complained that adequate notice is not always given to allow them produce enough goods and prepare their staff. They advised that proper advertisement should be done in the media to create awareness both to new applicants and for the products.

### Conclusion question 7

From the responses gathered, the level of advertisement in Technology incubation centre is very low. Most people are not aware that such a programme is in existence due to lack of proper advertisement. The trade fairs and exhibitions are done once or twice in a year which is not sufficient. There is no promotion for entrepreneurs' products. Therefore, advertisement and promotion is not effective in the performance effectiveness of Technology Incubation centre.

**Question 8:** How effective is funding in the performance effectiveness of Technology Incubation Centre?

**Answer i. (Senior Staff of Technology Incubation Centre):** The staff pointed out that the loan granted was out of merit for those that meet the criteria. The interest rate, they said is adequate when compared with what is obtainable in the bank. They explained that loan was given to eight entrepreneurs as at early 2011 with collaboration with National Economic Reconstruction Fund (NERFUND). Automated machines are to be bought and given to the entrepreneurs for faster and mass production

**Answer ii. (Graduated Entrepreneurs):** The graduated entrepreneurs frowned at the way things are done in the centre. They wondered how few entrepreneurs that are not even technology based should be given financial assistance while others are not. They concluded that fund raising is not effective in the centre.

### Conclusion question 8

From the responses gathered above, the amount of money given to entrepreneurs is too low and the interest rate is too high for start ups. The repayment period is also too short making it difficult for the entrepreneurs to make effective use of it. The assistance is not evenly distributed to all entrepreneurs. From the data gathered from the 2011 graduation booklet, out of thirty entrepreneurs, eight was granted loan at a tune of 5 million naira each. Fund raising's characteristics such as loan, sourcing of machineries, minimal interest rate and longer repayment period is seen to be lacking and therefore is ineffective in the performance effectiveness of Technology incubation Centre

Findings, Discussion and Analysis on Performance Effectiveness Using Participants' Observation Techniques by the Researchers

The researcher has been working in the Centre since 2002. Started as a commercial officer in charge of business development, and then rose to Senior Executive Officer Involved with post incubation monitoring and evaluation which made it possible to have close contact with the graduated entrepreneurs. The researcher has observed the development of the entrepreneurs for the past nine years.

This research grew out of interest to find solution to the problem of business failure after incubation. It will be interesting to note that out of the 35 graduated entrepreneurs, 16 have left the Centre with only 4 continuing in business. 14 are still occupying factory units in Technology Incubation Centre Lagos, making it impossible for new entrants to benefit from the programme. Out of the 14, 9 are still operating while 5 are out of business but still occupying a space. From personal Observation, The services that are effective in Technology Incubation are: Information Symmetry, Networking and Mentoring, and Collaboration and Benchmarking while Physical Space and Other facilities, Monitoring and Reporting, Advertisement and Promotion, Fund raising and Technology transfer Program are seen to be ineffective.

### Limitations of study

The limitations in this analysis are:

- The result might be biased because entrepreneur might have misunderstood the intention of the questionnaire since it was distributed by the staff of the Centre. They might have taken it as the normal data collected from them by the TIC Management, so they chances of giving their candid opinion is slim, for fear of loosing face with the Centre Manager.

- The measurement might be flawed because the researcher used a limited set of questions which has not been validated in any studies done before and there was doubt about the possibility that the respondents understood the questions judging from the overall ratings.

- More advanced techniques could not be used because the sample size was not large enough to use them and the research is qualitative dominant.

## Summary and conclusion

The session presented an analysis of data collected from graduated entrepreneurs, the survey and the interview. The data was analyzed using descriptive statistics. The Balanced Score Card was also used to look not only on the performance effectiveness as it relates to physical assets but on capabilities and innovation. In the next session, the findings shall be discussed and Recommendation given together with the Conclusion.

## Findings, Conclusions and Recommendations

The findings of the study suggest that the support services in Technology Incubation Centre are Technology transfer Program, Information Symmetry, Networking and Mentoring, Physical Space and Other facilities, Monitoring and Reporting, Advertisement and Promotion, Collaboration and Benchmarking and Fund raising. In determining the Performance Effectiveness of Technology Incubation Centre, data was collected through questionnaire. The respondents comprised thirty Entrepreneurs that graduated from Technology Incubation Centre from 1997 to 2011. Of the thirty, twenty six were male, while four were female. This difference could be attributed to the culture in Nigeria which demands that a woman should be seen as a weaker vessel and should be under a man for provision of needs. Women are not expected to own a business of their own without the supervision and encouragement from their husbands, though civilization is now taking precedent. This opposed the findings by Minniti and Arenius that women in less developed countries are mostly self employed.

It is also interesting to note that thirteen respondents are 60 years and above, twelve respondents are 50 years and above, while only four of the respondents are between 40 to 49 years. This shows that Technology Incubation attracts mostly retirees and people who are already matured and have fully decided on the area of business to follow and not trial and error.

From 1997, three entrepreneurs graduated, three also in 1998, four in 1999, two in 2003, two also in 2004, five entrepreneurs graduated from Technology Incubation Centre in 2005, two in 2006, three in 2009, and 2011 recording the highest graduates of eleven. The disparity could be associated to Technology Incubation Centre not having a stipulated policy on the number of entrepreneurs to be admitted at a time and not adhering to the exit rule. The data taken from graduated entrepreneurs from 1997 to 2011 shows that Out of the thirty-five graduated entrepreneurs, nineteen are still in Technology Incubation Centre Lagos with only six still operating while thirteen units are under lock and key. Out of the sixteen that have moved out, eleven are still in businesses, three out of business and two diseased. The collector of the questionnaire worked so hard to locate the entrepreneurs even in their home.

From the analysis above, it is established that out of the thirty- five, eighteen are no longer operating while the remaining seventeen are still operating and not in a full scale as suppose. This study aims at finding out the performance effectiveness of Technology Incubation Centre on the development of Small and Medium Scale Enterprises.

### Answer to major research question

How effective is the performance of Technology Incubation Center in the development and growth of small and Medium Scale Enterprises?

Major effectiveness is analyzed in terms of the support services rendered by Technology Incubation Centre to the Entrepreneurs.

The following factors have been analyzed as critical support services needed for business development in TIC. These variables and their effectiveness are described below using Table 6 which shows the overall findings on the effectiveness of these factors on the performance effectiveness of Technology Incubation Centre.

1. Technology Transfer programme is measured by the quality of Human Resource, Training, and Quality Leadership. From the analysis carried out, this factor is seemed not to be effective in the performance effectiveness of Technology incubation Center.

2. Information Symmetry is the condition where all relevant information pertaining to incubation programme is known to both the entrepreneurs and the TIC Management. This is measured by the level of Information flow, Communication and rapport between TIC Management and the entrepreneurs. This factor is seemed to be effective in the performance effectiveness of Technology Incubation centre.

3. Networking & Mentoring includes: Sponsor's Participation, Skill acquisition, and business idea development. It is ineffective in the performance effectiveness of TIC.

4. Physical Space and other Facilities include Free Accommodation, workstations, training room, first aid room, car park, good security system, Constant Power Supply, Generator, Longer Incubation Period and post incubation. From the analysis done, physical space is ineffective in the performance effectiveness of TIC.

5. Monitoring and reporting include the daily business Assessment, Problem identification and solving.

This factor is not effective in the performance effectiveness of Technology incubation Centre.

6. Advertisement and Promotion is measured by the rate of advertisement done through the Media, number of trade fairs and exhibitions attended in a year, the availability of good Display Centre and sales conducted on Fridays. Advertisement and promotion is not effective in the performance effectiveness of TIC.

7. Collaboration and Benchmarking include Capability building, Interactive learning, Comparison of specific process, Performance and efficiency checkup. These factors are not effective in performance effectiveness of TIC.

8. Fund Raising include the financial assistance offered to entrepreneurs such as Loan with low interest rate and longer repayment period. This factor is also not effective in the performance effectiveness of Technology Incubation Centre.

### Answer to minor research questions

i: How do the support services offered by Technology Incubation Centre Lagos facilitate Business success of entrepreneurs?

The findings of the study shows that the important factors required for a successful incubation programme are: Technology transfer Program, Information Symmetry, Networking and Mentoring, Physical Space and Other facilities, Monitoring and Reporting, Advertisement and Promotion, Collaboration and Benchmarking and Fund raising. The availability of these factors and the proper implementation will facilitate business success for the entrepreneurs in the Centre.

ii. Minor Research Question two. Why is there high failure rate of businesses after graduation in Technology Incubation Centre Lagos-Nigeria?

The findings of the study shows that the reason for the high failure rate is attributed to some factors, 'first, Linkage to providers of fund: funding is very important in business, but this vital aspect is neglected and entrepreneurs are left to seek for financial assistance from friends and relations and when they cannot get access to that, growth and development becomes difficult.'

**Secondly, advertisement and promotion:** There is no proper and regular advertisement of the Centre to create awareness and attract people with sound business ideas rather admission is done through nepotism. From the questionnaire given, 80% of the respondent filled that they know about Technology Incubation Centre through friends and others through other graduated entrepreneurs. None of the respondent got to know TIC through advertisement from the media. It is also a well known fact that growth of business is measured through increase in market share and customer base, but the products of the entrepreneurs are not advertised and no adequate promotion. The sales that are done outside the Centre every Friday has not been going on for years now. The Centre has not played any role in the marketing of entrepreneur's products except during trade Fairs which comes once in a year. All these play a negative role in the growth and development of a business.

**Thirdly, monitoring and reporting:** Monitoring and Reporting of entrepreneur business activities is suppose to be carried out on a daily bases with emphasis on their production and sales record, preparation of their financial statement and writing of annual reports. The provision of these services is lacking in the Centre and when entrepreneurs graduate without proper monitoring, the chances of business failure become high.

**Fourthly, physical space and other facilities:** This include having a well structured free accommodation, packing store, Conference centre, workstation, functional laboratory, Standard Library, Secretarial service center, fully equipped training room, first aid room, product display centre, good security system, car park, Constant Power supply, Generator and post incubation space. These facilities are not adequately provided in the centre. From the survey, 90% of the respondents suggested having constant power supply as a way of improving the performance of Technology Incubation Centre. Lastly, Technology Transfer Program: These include the quality of human resource in Technology Incubation Centre, how well senior and well experienced staff are backed with less skilled staff in the discharge of their duty, effective training for the entrepreneurs, capacity building for the staff of the centre. The leadership role of the Centre Manager, opportunity for shared knowledge among entrepreneurs. As earlier mentioned, the overall performance of entrepreneur business depends on the quality of professional staff assigned to them. The ability of the Centre Manager to deal more effectively with the problems of the entrepreneurs goes a long way in enhancing the development of entrepreneur businesses. There is need for good communication and free flow of information because information is very vital in business. Inadequate provision of these facilities contributes to business failure of entrepreneurs after graduation.

iii. Research Question three: Will increase in the number of Professional staff enhance the performance effectiveness of Technology Incubation Centre?

Table 6 above, shows that Technology Transfer Program is not effective judging from the Balance Score Card and Participants Observation From the interview conducted, the Entrepreneurs complained that the quality of human resource in the centre is low. Employing more professional staff will help in nurturing the growth of SMEs and help in delivering effective services to the entrepreneurs knowing that overall performance depends on the quality of professional assigned to entrepreneur problem and their ability to deliver quality information needed for business development and management.

iv. Research Question four: How does the flow of information from the Management assist the entrepreneurs?

Table 6 above shows that there is information symmetry in the centre. TIC management has enough information that can assist the entrepreneurs in building up a strong business foundation. It's important to identify areas where entrepreneurs need help because wrong diagnosis brings wrong treatment. With adequate information, the entrepreneurs stand better chance of winning the market and getting access to low cost raw materials. If the staff has close relationship with the entrepreneurs and there is good communication between the Management, the Board, and the entrepreneurs, resources and capabilities will be shared in common and this will help in Performance Effectiveness of Technology Incubation on the development of entrepreneur businesses.

v. Research Question five: How does the role of Centre Manager affect the success of Technology Incubation Program?

The Centre Manager oversees the overall activities of the Centre. His decisions matters a lot on every issue in the centre. He reports to the Board and to the government and act as a mentor to the entrepreneurs. The quality of the Centre Manager determines the quality of services offered to the entrepreneurs. The Organization demand competent and quality leadership role from the Centre Manager in other to design and develop various innovative and technological solutions and to attract a large pool of talent. The Centre Manager should be experienced in the field of entrepreneurship and business development and should be someone with great intellect and best effort.

Since the Centre Manager has the overall responsibility of nurturing the entrepreneur businesses to growth, he has the responsibility of delivering best results. The infrastructure becomes useless if there is no competent hand to manage them and the programme fails if the Centre Manager does not deliver high quality services to the Entrepreneurs, making sure that problem when identifies, is given the urgent attention it deserves. It can then be concluded that the Centre Manager's role is very important and has a role to play in the performance effectiveness of Technology Incubation Centre [41-45].

vi. Research Question Six: In what way will Science Park help in the post incubation of entrepreneurs?

A science Park is a bigger place meant for businesses and it is managed by professionals and has all the infrastructures needed for effective running of business. Post incubation space is a very big problem. Many entrepreneurs can not afford the exorbitant rent charged by landlords. The non availability of a science park in Nigeria is a big problem. Looking at Table 6, physical space is not effective in Technology incubation centre and post incubation space is included as the services to be rendered to graduated entrepreneurs by linking them to Space providers. Companies have a lot to benefit from being in a



shared environment. It increases the speed at which companies can connect to international market. Science Park assists companies to commercialize new technologies by building networks. Competition in the market place has forced business owners to collaborate and share core competences in other to beat competition. Without a conducive environment to continue business, entrepreneurs businesses dwindle but with Science Park, commercialization is ensured. Science Park is a bigger place for housing talent and technology. It is a place where businesses that has been incubated are admitted for further monitoring and business assistance. Science Parks are managed by Professionals. Having a science park in Nigeria will have a pos further boost the life of businesses after incubation.

From the analysis, measuring the performance effectiveness of entrepreneurs with some performance indicators from the demographics- Number of Employees, Sales Turn Over, Output and Net Worth suggest that Technology Incubation has a positive effect on the development of Small and Medium Scale Enterprises. (Graduated entrepreneurs). All the variables showed positive result which means that the programme is effective in the development of Small and Medium Scale Enterprises. But interestingly, the findings shown in Table 6 contradicts the earlier findings as portrayed in the demographic information (Number of Employees, Sales Turn Over, Output and Net Worth), all the independent variable except information symmetry proved to be ineffective in the performance effectiveness of Technology Incubation Center. The contradictory result proves that though the programme is very effective, the support services are not well implemented for optimum result. The first objective of the study which is to determine the significant factors that facilitate entrepreneur success in Technology Incubation Centre Lagos has been achieved with the factors being Technology Transfer Program, Information symmetry, Physical Space and Other facilities, Networking and Mentoring, Collaboration and Benchmarking, Monitoring & Reporting, Advertisement and Promotion, and Funding. The second objective which is to identify the factors that are rendered effectively and those that is not effectively rendered to entrepreneurs in Technology Incubation Centre Lagos has also been achieved with Technology Transfer Program, Physical Space & Other facilities, Networking & Mentoring, Collaboration & Benchmarking, Monitoring & Reporting, Advertisement & Promotion, and Fund raising being strongly ineffective while information symmetry is effective in the Performance Effectiveness of Technology Incubation. The recommendations for improvement on the implementation of the ineffective factors are made below in the recommendation [46-50].

This shows that despite the provision of all the necessary support services by the federal Government, only one of the services are effectively rendered while others are not well implemented hence the failure of businesses after incubation. From the study, it can be concluded that Technology Incubation is a laudable programme but its performance effectiveness on the development of Small and Medium Scale Enterprises can only be achieved through proper supervision and implementation of best practices.

### Recommendations

The ineffective variables need to be improved upon in other to ensure the successful running of the programme. There is need to site Technology incubator in an urban location that will attract high quality professionals. Technology incubator should have a minimum of 30,000 square feet of rental space. The Centre Manager should ensure that quality services and trainings are given to entrepreneurs on

business incubation process and there should be room for capacity building for the staff. Every entrepreneur should have access to adequate loan with low interest rate and longer-term repayment which is sufficient to make an impact in business taking into consideration the time it takes from Research and Development, to Introduction or Birth of a business down to Growth and Maturity. Constant advertisement should be done to create awareness of the centre. There should always be a common forum created for entrepreneurs to come together and share talents and benchmark. Technology Incubation should be sited near a university or a federal research laboratory so that entrepreneurs can have easy access to technical facilities, scientists, and engineers. The federal government should establish Science Park in Nigeria to ease the problem of post incubation. A proper arrangement should be made with Power Holding Authority for constant power supply and there should be a standard high capacity generator for power back up. The Centre Manager should be a highly motivated visionary individual whose goal is to see to the success of the entrepreneurs, and finally, Technology incubator should employ more professional and focus more on support programs than on physical infrastructure [51-53].

A critical look should be taken in some of the Incubators in developed countries like Netherlands as a benchmark for the improvement of TI programme in Nigeria. It will be interesting to discover if environment affects the extent to which goals can be achieved. Effectiveness has to do with the extent to which a certain type of resources can be used to attain specific goal and since resources are limited and not available in the same amount in all countries, levels of SMEs development will vary from one region to the other even within the same Country. Variance becomes greater when one compares developing Countries with developed Countries. When Incubators in Nigeria are compared to Incubators in the Netherlands, the difference becomes more glaring but this comparison should help in performance improvement and implementation of best practices.

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