

Technology Incubation Programme and Intellectual Property Spinoffs from the Military Cradle: A recipe for continuous Economic Growth

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Abstract: The military establishment is ubiquitous and omnipresent in the Nigerian life. Almost everything is of concern to the military, including housing, medicine, agriculture, manufacturing, and transportation. It is impossible to escape the reach of the military because everything has some military relevance. The military parades professionals and experts in virtually every field and especially in engineering and science; alongside well equipped laboratories and workshops for targeted researches, experiments and prototyping. The activities and works of these professionals lead to inventions and innovations, most of which are yet to be tapped and made public. Hitherto, the Military have been isolated as a different unit of the society but there are innumerable ways the Military would be invaluable apart from its major role of protecting lives. Intellectual property (IP) is an umbrella term used for human innovations and creativity that are capable of being protected under national law and international treaties. IP includes a diverse range of technologically based commercial assets from patents for new inventions through to copyright works. The object of business advancement, enhancement and development which measures a country's economic development is a progression whose rate is proportional to the rate at which pertinent IPs are commercialized. Technology Incubation programme (TIP) is a popular economic development tool which has been used by both the development and developing economics to fast track local and regional economic development through encouraging and enabling IP based start-ups. There is obviously pertinent researches and IPs from the cradle of military scholarly works which can be harnessed. This paper discusses how TIP and Spin-off companies can be drawn from the cradle of research and innovation in the Nigerian Military and subsequently commercialized to reverse the current recession.

Keywords: Research, Military, Intellectual Property, Technology Incubation, Spin-off companies

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I. Introduction

Technology plays a fundamental role in wealth creation, improvement of the quality of life and real economic growth and transformation in any society. Analysis of technologically advanced economies shows that at each level of the economy, science and technology provide the engine for economic growth. Science and Technology creation as well as its practice grows through knowledge production by way of generation of need driven and solution based IPs developed and proliferated through the creation of such IPs based companies or spinoffs which are aided from start-up to independence using TIP and other economic transformation tools. Beyond acquiring arms and ammunitions in preparation for war or protection of the integrity of Nigeria, the importance of science and technology, research and engineering in transforming Nigeria economy has become the concern of the military. We are concerned that the many researches in the military which have generated millions of patentable and economically useful inventions from which viable spin-offs would have evolved are hitherto lying fallow due to lack of Army-Civil Stakeholder technological collaborations.

Generally speaking, a recession is a significant decline in economic activity spread across the economy and for quite some length of time. Recessions are typically visible in real GDP postings (reported quarterly), and in four other monthly data series: real income, employment, industrial production, and wholesale-retail sales. All the indices project the inactivity or lack of activity in the industrial sectors of the economy. Recession could be caused by two broad factors: internal (endogenous) and external (exogenous), and that recession has impact on the economy through its effect on business, financial markets, stocks and dividends, product quality, credit conditions and socio-political structures. Instruments of monetary and fiscal policies can be used to counter recession and bring about economic growth. Monetary authority can pursue accommodating/easy monetary policy to stimulate economic activities. (Tule et al, 2012).

But the use of monetary policy to reverse recession would yield sustainable results only if the policy can impact to the extent of engendering increased industrial activities. Job congestion used to describe a

situation where for lack of innovation, people bunch into one trade until it becomes saturated and unprofitable cannot effectively reverse recession. It is conceived that enhancing industrial activities by whichever means legitimate and available would inadvertently work to reverse the recession. Innovative Micro as well as Innovative Small and Medium Enterprises are the means by which recessions can be reversed absolutely. These MSMEs can readily evolve as spin-off companies emanating from researches in the military. For effective creation and sustainability of the industry, Military academic institutions and research centres as well as Universities, research institutes and other stakeholders in the civil life must play their roles in innovation creation in the needed sectors.

The quick reversal of the recession would depend on our creation, assimilation, proliferation and utilization of science, innovation and technology and other developmental processes and procedures like spinoff companies' generation and technology business incubation programme which has been employed by advanced countries to ensure economic development in all sectors. Targeted researches in the military aimed at the creation and evolution of processes, procedures and products of military worth can also be employed for related use in civil life and vice versa. Dual use technology refers to fields of research and development that have potential application to both defense and commercial production. Imaging-sensor technology, for example, has broad application in surveillance systems, video cameras, and robot vision systems that find both military and commercial uses. In fact, at the generic level, most of today's important technologies can be considered dual use (Perani, 1997). Effective technological collaboration between the military and other related agencies proposes an auspicious scenario for both parties as pertinent technologies in the civil life would also be harnessed to enhance defense related technologies.

The concept of Technology Incubation was introduced to the Nigerian Government by the United Nations Development Program (UNDP) and the United Nations Fund for Science and Technology for Development (UNFSTD) in 1988. The Federal Government then commissioned a consortium of three firms to advice on the desirability and implementation modality. Eventually, the first Technology Incubation Centre (TIC) in Nigeria was established in Agege in 1993, followed by the ones in Kano and Aba in 1994 and 1996 respectively (Adelewo et al, 2012). The objectives of technology business incubation in Nigeria as summarized by Adelewo et al 2012 are (a): to boost the industrial base of the country, commercialization of R&D results, upgrade and enhance the application of indigenous technologies. (b): to nurture the start-up and growth of new innovative businesses engaged in value added and low, medium, and high technological related activities over a period of time, and (c): to promote functional linkage between research and industry. Today, the country has established 28 TICs and six extensions, under the National Board for Technology Incubation (NBTI). The TIP becomes the industry pool of the country as most stakeholders in the industry are active members of the TIP family.

Proceeding from dual use technologies achieved by researches in the military, dual use processes and products evolved and other spin-off technologies that are generated can be collated and harnessed for effective economic impact. Dual use processes are processes which can be used in the manufacture of both defense and commercial products, such as soldering, process control, and computer-aided design. For defense acquisition, these processes are frequently tied to military standards that may make them defense unique, resulting in the segregation of defense and commercial production. Also dual use products are items used by both military and commercial customers. Notable examples are global positioning systems used for navigation, aircraft engines, and most medical and safety equipment used by military. Some modified commercial products are similar enough to those used by the military to be considered dual use. Some examples are the Air Force's KC-10A Extender aircraft (which is a modified version of the Chevy Blazer) (Perani, 1997).

It is opined that when requisite solution based IPs created in our military academic and research centres as well as civil universities, research institutions and companies engaged in R&D, are employed to create spin off companies which shall be fostered through TIP already established in the country; the needed technological revolution that would take the country to the next level would have been boosted. The study proposes a strongly structured collaboration which would consistently and effectively harness IPs from the military and stated agencies to produce innovative industries in the micro, small and medium scale industrial levels. The collaboration is fashioned in accordance with the triple helix model where the government, the academia (military research outfits inclusive) and the industry (collated and coordinated by NBTI) are brought together to ensure infusion of innovation into the industry with enabling government policies to vivify the programmes and favourable decisions.

II. Statement of the Problem

Presently Nigeria is undergoing economic recession and grossly under equipped by way of technological knowhow and requisite machines to prosecute or install needed infrastructure to position her as a developed country. It is thus technologically backward and falls short in the following areas:

- i. It is unable to produce her own military hardware with which to defend herself if the need arises.

- ii. It cannot produce capital goods such as tractors, lathe machines, drilling machines, cars, trains, and other earth moving equipment.
- iii. It is unable to exploit her natural resources except with the help of foreigners who will normally provide the technology and expertise to undertake the exploitation of her natural resources.
- iv. It is unable to mechanize her agriculture i.e. crude implements are still used for agricultural production activities by a large percentage of those who are involved in agricultural production.
- v. It depends on other countries for the supply of its spare parts for industrial machinery
- vi. It exports raw materials to other countries as against finished products

Uwaifo and Uddin, (2009) states that Nigeria's shortcoming in meeting the above stated conditionality marks her out as a technological backward country. Correlating this obvious fact Eneh (2011), opines that Technology diffusion is at the lowest ebb in Nigeria and that with Nigeria's educational system in prolonged crises of decaying infrastructure and the attendant agitation of staff for a change, R&D which is the most significant driver of industrial performance is poor and therefore cannot be appropriated for meaningful development in Nigeria. (Eneh, 2011). It can be conceived that the military and other relevant stakeholders can engender formidable collaborations that would impact positively on reversing the afore-stated current trend thereby reversing the recession.

III. Intellectual Property and Spinoff Companies

Intellectual property is a "power tool" for economic development and wealth creation that is not yet being used to optimal effect in all countries, particularly in the developing world. It is a practical guide to using those intangible assets – such as knowledge, information, creativity and inventiveness – that are rapidly replacing traditional and tangible assets – such as land, labor and capital – as the driving forces of economic health and social well-being. The premise underlying IP throughout its history has been that the recognition and rewards associated with ownership of inventions and creative works stimulate further inventive and creative activity that, in turn, stimulates economic growth (Idris, 2003).

The continuum from problem → knowledge → imagination → innovation → intellectual property → the solution, in the form of improved products and new technologies continues to be a powerful driver for economic development.

Intellectual property rights (IPR)—the copyrights, patents, trademarks and similar rights upon which the lion's share of creative and innovative products and services rely—have a vital role in growing the economies of developed and developing countries all over the world, in spurring innovation, in giving large and small firms a range of tools to help drive their success, and in benefitting consumers and society through a continuous stream of innovative, competitive products and services and an expansion of society's overall state of knowledge (Dixon, 2015).

For many years, economists have tried to provide an explanation as to why some economies grow fast while others do not; in other words, why some countries are rich and others are not. It is generally agreed that knowledge and innovation have played an important role in recent economic growth. It is presently realized and theorized that the accumulation of knowledge is the driving force behind economic growth. For countries to promote growth this theory goes, their economic policies should encourage investment in new research and development (R&D) and subsidize programs that develop human capital (Idris, 2003).

Research Spinoff is defined as "a new company founded to exploit a piece of intellectual property created in an academic or research institution. The significance of intellectual property rights in economic activity differs across countries and depends (1) on the amount of resources countries devote to creating intellectual assets as well as (2) the amount of protected knowledge and information used in production and consumption. One useful indicator for the magnitude of resources devoted to the creation of new knowledge and information is a country's expenditure on research and development (R&D) (Braga et al, 1999).

The technology-based spin-off company appears to be a potentially powerful mechanism for transferring technology from an R&D organization to a commercial organization. Furthermore, several studies indicate that the formation of spin-off companies is a more successful route to commercialization than licensing. Pertinent reasons why spin offs are important entities are identified: (a). They are supportive of local economic development; (b). They knock down barriers to economic development in poor regions; (c). They create high economic value; (d). They create new job opportunities; (e). They induce investments in university technology; (f). They encourage inventor participation; (g). They are the best commercialization mechanism for uncertain technologies; (h). They foster additional research; (i). They are "magnets" in attracting and retaining the best professors; (j). They help to train students; (k). They are high performing companies (Grimaldi et al, 2007).

IV. Technology Incubation Programme

TIP is a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts. A business incubator’s main goal is to produce successful firms that will leave the program financially viable and freestanding. These incubator graduates have the potential to create jobs, revitalize neighborhoods, commercialize new technologies, and strengthen local and national economies.

In general, a business incubator will focus on a range of services on clients that are designed to help them launch well managed businesses. This mix of services is generally drawn from: administrative services (photocopying, bookkeeping, etc.); business advice services (coaching, counseling, mentoring, training), technical services (technical advice, access to expensive equipment, etc.), finance raising, and networking opportunities (between clients, links to wider business community). Other services (loan & venture capital funds, lobbying for special services/bureaucratic treatment, etc.) are sometimes developed to help clients overcome specific problems in the given business environment. Clients can be resident, non-resident or affiliated to the incubator. The services targeted on clients are costly in relation to many other types of business development services (training programs, advice services) but are justified by supporters as “investment in success” because the concentrated support services should lead to higher survival and growth rates of incubated businesses (InfoDev., 2010). Figure 1 depicts the general incubation process. The prospective entrepreneur after meeting the entry criteria is admitted and during incubation is supported with training, business advice, funds and technology knowledge. On graduating from the TIC, the graduated entrepreneur is still eligible to access some advice as “After Care Services” (referred to as Post incubation in the TIP scheme) till he becomes financially viable and freestanding. Business incubation practice, all over the world is structured in the pattern shown in Figure 2 above, but the objectives may differ from country to country. For instance the Jewish State of Israel in 1991 launched Nationwide Technology Incubation programme to utilize the S&T potentials of immigrants from the Soviet Union. The programme is a tremendous success. When the United States recognized the existence of critical mass of scientists, technical infrastructure, ethnically diverse and world-class universities in the system they launched the “Silicon Valley Incubator” which generated 7,000 electronics and software companies, 300,000 top scientists (1/3 born abroad) with many new firms and new millionaires made almost every month. (Adelewo et al, 2012).

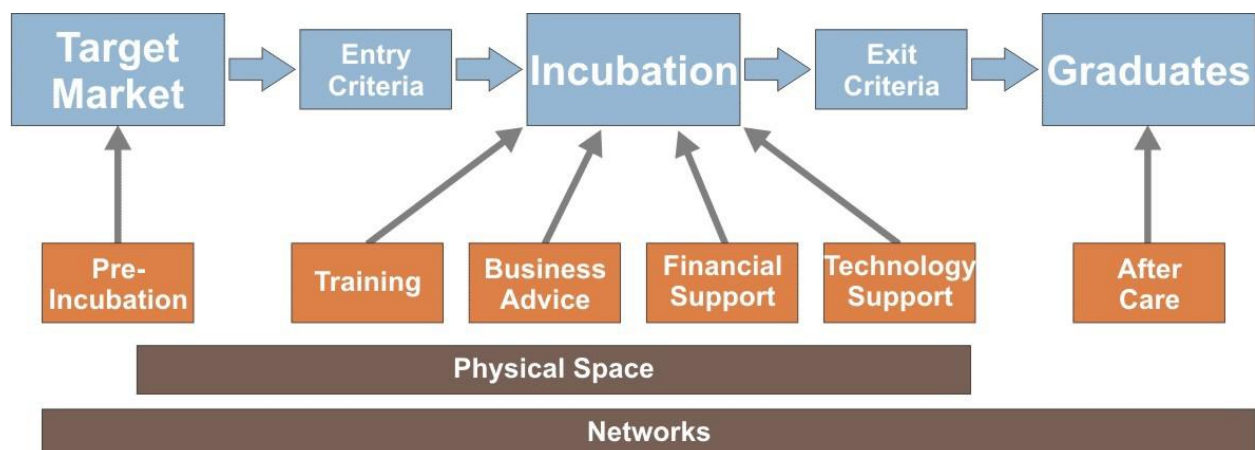


Figure 1: A typical business incubation process (InfoDev., 2010).

The role of the National Board for Technology Incubation (NBTI), is to coordinate the Technology Incubation Programme (TIP) in Nigeria while the actual incubation process takes place at the Technology Incubation centers (TICs) spread all over the country. The functions of NBTI inter alia are policy implementation and coordination which involves development of operational guidelines. Other roles include supervision, monitoring and evaluation; Financial Management and Control; Sourcing of fund; National and International Liaison; Program Planning and Development as well as provision of legal services. (Obaji et al, 2012). At the TIC level the incubation process is initiated if a prospective entrepreneur has an idea and wants to be incubated. He will then put his proposal in writing together with the technical and business plans for consideration by the management of the TIC and if it is analyzed and found to be proactive, then he will be admitted. (Jibrin, 2013). The goal of TIP is to assist small scale budding entrepreneurs to overcome the initial hurdles of carrying viable R&D results as well as innovative efforts into profitable enterprises (FMST, 2005). And the mandates are:

- i. Provide a platform for speedy commercialization of technologies by effectively linking talents, technology, capital and knowledge.
- ii. Create, nurture and develop value-added technology-based enterprises.
- iii. Promote the establishment of and management of viable science and technology parks, technology incubators and technology-based enterprises.
- iv. Enhance linkage of tenant/technology know-how and capital in order to develop techno-entrepreneurship culture based on continuous value addition.
- v. Promote and facilitate the application of indigenous technologies and knowledge.
- vi. Set standards for and regulate the establishment and management of Science and Technology parks and Incubators

V. Recommendations

The Nigerian Military boasts of several higher institutions and technologically based research centres and parades professionals and experts in virtually every field and especially in engineering and science; alongside well equipped laboratories and workshops for targeted researches, experiments and prototyping. Similarly Nigeria civil life boasts of at least one Federal University and one State university in virtually every state with several sciences, engineering and technology faculties, schools and departments which generate lots and lots novel intellectual properties mostly stemming from the final year projects of graduating students. The Federal and state Ministries of Science, technology and agricultural related sectors also has several research and development institutions for targeted R&Ds in various areas. These military research institutions and agencies as well as other private and public companies engage in R&D activities and churn out several innovative needs driven IPs which usually end either in the blueprint or in the prototype. These intellectual properties from the entire R&D spectrum can be used to create profitable solution based spinoff companies to drive the technological and economic development of the country.

It is suggested that formidable and targeted collaboration between the Military, NBTI and other stakeholder institutions be established to enable the creation of several pertinent spinoff companies using the IPs from the Military Cradle of pertinent R&Ds. These companies shall then be admitted as entrepreneurs of technology incubation centres (TICs) where they would be aided to access administrative, financial and technological advice as well as available access to finance until they grow and become freestanding. The outfits are bound to greatly enhance production and productivity in the country thereby deteriorating the recession.

VI. Conclusion

Nigeria is in economic recession and technologically backwards lacking the ability to solve most of its technological problems and predominantly relying on importation to procure the needs of its citizenry. The difference between advanced and developing countries has been identified with the disparity in their technology knowledge production and utilization. Our Military are profoundly and consistently executing technological researches which products and processes can be employed to foster industrial growth in the public life. Our universities and research agencies are similarly engaged. Several IPs in the many pertinent sectors of the economy are evolved but hitherto unharnessed. Recession is dislodged through enhanced industrial production and productivity. It is proposed to fashion a formidable collaboration between the military and relevant stakeholders to foster the creation of spinoff companies from the products of these IPs and then use technology incubation programme as a tool to transform them into full-fledged freestanding companies thereby industrializing the nation and reversing the recession.

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