Framework for Technological Entrepreneurship Development: Key Issues and Policy Directions*

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ABSTRACT
Entrepreneurship is acknowledged to be a significant driver of national wealth. In this paper, we present a framework for developing technological entrepreneurship particularly for developing countries, with supporting policy directions. Our thesis is that technological entrepreneurship, which exploits existing scientific and technological knowledge to meet market needs—is what brings about the national productivity and competitiveness that entrepreneurship is said to provide. Our framework stresses the fact that the innovation process is facilitated by technological entrepreneurship which is in turn pre-conditioned within the context of favorable policies, institutions, financial and institutional support.

Keywords: Entrepreneurship, Development, Innovation, Technological, Industrial, Commercialization, Framework

1. Introduction
Discussions relating to industrial development have made prominent the concept of entrepreneurship in recent times. However, it has been observed that while entrepreneurship which is the exploitation of business opportunity would bring about job creation and wealth generation, it has limitation in bringing about accelerated industrial development that would enable a country to compete in the frontiers of global rapid technological developments. Thus the concept of technological entrepreneurship has gained more and more attention among researchers, policy makers, government, scholars and firms alike. For instance, we have authors who have discussed the subject of technological entrepreneurship [1-4]. In this body of literature, emphasis seemed to be placed on high-potential technology opportunities, technical systems, innovation, production and commercialization. Within this context, very little technological entrepreneurship can be said to exist in Nigeria, and indeed in many developing economies. Most entrepreneurial activities are concentrated in non-technological priorities. This is because most technologies are foreign and imported; and continuous improvements and innovation from source countries on the imported technologies render them obsolete in no time. This paper therefore seeks to provide a framework for developing technological entrepreneurship, with supporting policy directions. To achieve this goal, the discussion focuses firstly on conceptualizing technological entrepreneurship, encapsulating its role in social and economic development, providing data on the current status in Nigeria before concluding with a discussion on the framework and policy directions.

2. The Concept of Technological Entrepreneurship
Technological entrepreneurship, also referred to as technology-based entrepreneurship, can be defined as the setting up of new enterprises by individuals or corporations to exploit technological innovation. It can also be described as the commercialization of emerging technological discoveries or innovation. Technological entrepreneurship is defined as a style of business leadership that involves identifying high-potential, technology-intensive commercial opportunities, gathering resources such as talent and capital, and managing rapid growth and significant risk using principled decision-making skills [4]. It is also defined the term as the process by which entrepreneurs assemble organizational resources

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and technical systems, and the strategies by entrepreneur-
rial firms to pursue opportunities [2]. Aderemi et al. [5]
positioned technological entrepreneurship as being needed
to make full use of the knowledge of science and tech-
nology currently available in meeting market needs,
thereby making the country in question more productive
and more competitive internationally [5]. This suggests
the necessary involvement of a process of industrial in-
novation in the country’s area of strength and endow-
ment to generate productivity and competitiveness. Ac-
cording to them, “Technological entrepreneurship is ini-
tiated and culminated in design, development, production,
engineering and commercialization of innovative new
products and processes”. Though the authors noted the
challenge of increasing the frequency and pace of tech-
nological innovation in all sectors of the country’s
economy, they noted that it can lead to productivity and
growth if only more and more entrepreneurs set up firms
to commercialize the sectoral innovations.

3. Features of Technological
Entrepreneurship

There are certain attributes that characterize technologi-
cal entrepreneurship. These attributes are elaborated be-
low:

3.1. High Potential Opportunity

A new technology-based venture is described as having a
high potential opportunity if it is capable of creating new
value for its customers, it has a significant level of tech-
nology understanding which is difficult to replicate and
can often be protected (patented), it has a significant first
mover advantage, it has a level of scalability, it creates a
barrier to entry, and it also has a high level of initial risk
which can be translated into high levels of return.

3.2. Technology-Intensive Opportunity

Technological entrepreneurship is described as a tech-
nology-intensive opportunity involving a process of prob-
lem solving, raising and safeguarding the quality of life,
needing technical skills and applications, identifying po-
tential market, improvement in quality of products in
order to improve competitiveness of the firm with ex-
pectation of saving in process cost. Furthermore, the suf-
ficient reason for embarking on technological entrepre-
neurship in borne out of the need to commercialize sig-
nificant innovations that are expected to guarantee sup-
pliers of materials, long-term stability of firms and in-
crease output.

3.3. Unique Technology Capable of Driving a
New Business

As firms can be viewed as bidding and competing for
customers’ purchases, and markets can be evaluated based
on the extent to which the profitability of a firm hinges on
meeting consumers demands if possible, better than its
rivals. Consequently, aside from having more share of the
market through aesthetic changes, price reduction, better
performance and so on, technological entrepreneurship
has the characteristic of being able to advance new tech-
nologies that can institutionalize new ventures that ade-
quately meet consumers’ need.

3.4. High Risk of Failure

One of the true measures of success for technological
entrepreneurs is the extent to which they are able to de-
velop and bring to market radically innovative new
products. Developing new products is especially a risky
business endeavor, because a technically feasible inno-
vation might not be economically profitable, and the
product may not survive the commercialization process.
Literature reported that success rates for new inventions
ranged from 1% to 85% [6-8]. From their observations,
less than 2% of potential technology-based venture ideas
(technology innovations) end up being registered as pat-
ent or intellectual property. Also less than 1% of business
plans received by venture capitals get funded. In fact,
many innovations that should have been commercialized
into a technology-based venture end up in shelves. For
instance, it was found that there is lack of faith in the
Nigerian Patent Law, which in turn provided little pro-
tection for local innovations [9]. Innovators consider this a
major problem in the commercialization of their products
and processes; 89% had not explored the use of the patent
law, even though the law had been enforced since 1970
and 6644 patents have been registered with only 177
owned by Nigerians.

3.5. Longer Time to Market

This refers to the uncertainty surrounding the commercial
success of an innovation because it is difficult to predict
the time lag between the launching of a product in the
market and the growth of sales due to unforeseen circum-
stances that could influence the demand for the product.

3.6. Demand of Infrastructure, Facilities and
Resources

Technological entrepreneurs are faced with several chal-
enges to development. Literature opined that the chal-
lenge that innovative entrepreneurs face are attributable
to inadequate resources, expensive patents and unavail-
ability of equity [10]. To this list we add the non-avail-
ability of venture capital within the Nigerian environ-
ment.

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4. The Role of Technological Entrepreneurship in Social and Economic Development

A vast body of research exists on the importance and varied contributions of technological entrepreneurship to job creation, economic and social development, and growth. It was specifically stated and we quote as follows [11]:

Technological entrepreneurship is a key source of economic and social progress. It refers to the creation of new firms by independent entrepreneurs and corporations to exploit technological discoveries. These new firms create jobs, contribute to the well-being of their communities and generate wealth for their owners. These firms are also the change makers in their respective industries as they bring in new technological paradigms that alter the dynamics of competition and rules of rivalry.

Basically, both incremental and radical innovations are important not only for the positive economic impact they typically create, but also because they fundamentally change the behavior of consumers, often in ways that improve their lives. More specifically, the following are the roles of technological entrepreneurship in socio-economic development:

- Technological entrepreneurship is needed to propel technological innovation efforts into the market. Whenever there is a breakthrough in research and development. It is the place of technological entrepreneurship to commercialize the achievements of technological efforts otherwise, it remains in the laboratory without making any impact. One of the reasons why many research breakthroughs never leave the laboratory is due to short fall of technological entrepreneurs. And unless technological innovation or the output of research and development efforts reaches the market or are commercialized, industrialization would be elusive.

- Technological entrepreneurship has the potential of improving state of technological capability in a country. This is because as technological efforts are being made, learning takes place. This occurs either by doing or observation, thus improving technological capability in the efforts in question.

- Because technological entrepreneurship would necessarily involve the commercialization of a research output, more patents are generated and patents are a well known indicator and measure of technological development and industrialization in countries all over the world.

- Technological entrepreneurship is the platform that accelerates the diffusion of successful technological innovation in an economy. For instance in Nigeria, and in most African countries, the rate of diffusion of Information Communication Technology (ICT) is on the increase. This is made possible by the private firms that saw an opportunity and decided to market ICT products and services thereby increasing the pace of diffusion. The diffusion in turn has greatly enhanced the quality of life of the citizenries.

- For a technological entrepreneur to be relevant, he must of necessity meet market needs and be a problem solver. In a bid to meet market need, research and development as well as science and technology efforts must be well coordinated. Science and technology as well as industrialization policies are tailored towards meeting the needs of the market. This, we believe, will invariably bring about socio-economic development.

5. Technological Entrepreneurship Development in Nigeria

The literature on technological entrepreneurship is sparse in Nigeria and technological entrepreneurs are very few. For instance, in a study of technological and non-technological women entrepreneurs in South-Western Nigeria, the women in non-technological businesses were about twice as many as those in technological businesses [5]. Entrepreneurs are catalysts of change in a market economy. They spur efficient use of resources and facilitate transactions between parties with different preferences and endowments [12]. Central to entrepreneurial behaviour is the acceleration, generation, dissemination and application of innovative ideas. In the developing countries such as Nigeria, high level of entrepreneurship is important in reducing the adverse socioeconomic impacts by creating new employment. A society with a strong entrepreneurial culture have a positive influence on the rate at which new firms are created and their chances of survival and growth as well as the fate of already existing firms [12]. In a more specific sense, entrepreneurship is the vehicle on which innovation, which is the application of knowledge in production, rides. Indeed, innovation is at the heart of entrepreneurship. Within this context, entrepreneurs are considered as “champions” of some sort who convert ideas into products and services and ultimately create wealth and reduce unemployment [13]. In this section, we consider some critical issues and current research regarding technological entrepreneurship in Nigeria.

5.1. Current Status of Technological Entrepreneurial Interest among Students and Women

Technology-based entrepreneurship, or simply technological entrepreneurship, in particular, is a strong driving...
force for socio-economic growth in the global economy. Technological entrepreneurship is a vital ingredient in any effective National or Regional Innovation System. A recent research on the status of Technological Entrepreneurial Attitude in Nigerian Tertiary Institutions revealed that majority of undergraduates in Nigeria indicated a preference for technological entrepreneurship but much fewer of them has actually practiced entrepreneurship (see Table 1). The major constraints identified are poor funding, inadequate preparation through training and institutional weaknesses expressed in the inadequacy of government support to young and aspiring entrepreneurs [14]. More detailed analysis revealed that 1.4% of them showed interest in both technological and non-technological entrepreneurship (Figure 1). While there might be those with unclear preferences, these results imply that most of the students have a preference for entrepreneurship and for technology-based businesses but the expression of these interests in practice is rather low. Ensuring, first and foremost, that this high level of interest is sustained and that it is actually expressed in business start-ups, should be the target of any entrepreneurship-related policy intervention.

Furthermore, we note that studies on women technological entrepreneurship in Nigeria is concentrated on the informal sector. For instance, informal economic activities by women in Nigeria encompass a wide range of small-scale, largely self-employment businesses [5]. The study reported that 37% of the respondents were engaged in technology-based ventures including food, beverage and tobacco production, water processing and packaging, mining and quarrying (excluding petroleum), building and construction, wood-work and furniture making, garment making, metal fabrication and iron works, among others. On the other hand, 63% of the respondents had non-technological businesses including education services, health services, counseling services, retail trade, transport, restaurant, financial outfits, among others. This suggests a higher prevalence of non-technology-based entrepreneurship among women, and indicates the need for interventions directed at the development of technology-based entrepreneurship in the country.

### 5.2. Entrepreneurial Motivation and Challenges

Among students, common influence on entrepreneurship in Western countries is family background, where family origin in general was found to offer positive role models [15]. A stylized fact emerging from research shows individuals whose parents were either self employed or business owners to be more likely to become entrepreneurs than those from families without such entrepreneurial experience [16,17]. Such a family background is said to transport knowledge, skills, self-confidence and also positive attitudes towards entrepreneurship, thus facilitating entry of their children into entrepreneurship. Interestingly, findings from the study on undergraduates’ entrepreneurial propensity in Nigeria revealed that most students who are already involved in entrepreneurship were motivated by personal interest and parental influence (Table 2).

About 1 in every 3 students who reported that they were already involved in business cited their personal interest as the most important motivating factor [14]. The influence of parents and desire to make money, which could be due to survival pressure, genuine needs or sheer curiosity, are the next most important motivating factors. Obviously, entrepreneurial interest among Nigerian students is already high. Thus, government policies on entrepreneurship should also pay attention to other factors that could promote entrepreneurial behavior among the youths. These factors include the presence of highly influential mentors and finding means of encouraging personal savings.

**Table 1. Entrepreneurial preference of Nigerian undergraduates***.

<table>
<thead>
<tr>
<th>Entrepreneurial Disposition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interested in starting own business</td>
<td>83.6</td>
</tr>
<tr>
<td>Interested in starting a technology-based business</td>
<td>69.9</td>
</tr>
<tr>
<td>Presently engaged in a business</td>
<td>26.9</td>
</tr>
</tbody>
</table>

*The proportions are based on 5898 student respondents.

![Figure 1. Specific classification of students’ preferred business type.](image)

\( n = 4842 \)

\( T = \text{Technological} \quad \text{NT} = \text{Non-technological} \)

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s cantly with the choice of enterprise by women entre-
preneurs in south-western Nigeria (Table 3) [5]. These re-
results present issues on education, information and ena-
bling environment that has to be addressed in the devel-
opment of technological entrepreneurship.

5.3. The Role of Education

In nurturing potential entrepreneurs, education plays a vital role. Entrepreneurial education has been recognised as one of the crucial factors that help the youth to under-
stand and cultivate entrepreneurial attitudes [18,19]. While there might be some people with inherent entre-
preneurial drive and inclinations from other non-technical sources, the tertiary education system presents one of the best and most viable sources to recruit new technological entrepreneurs. Thus, there is a need to understand how to develop entrepreneurial skills among students while still in school. Their knowledge of and attitude towards entre-
preneurship do influence their inclination to start their own business in the future.

In Nigeria, government’s approach to solving the problem of unemployment has historically been un-
mindful of the potential role of entrepreneurial education despite many attempts to formulate useful policies and/or programmes to support employment generation in the country. The high unemployment rate in Nigeria which was put at about 37% as at 2004 may well be a con-
sequence of the foregoing [20]. For example, statistics show that during the 1994-1997 periods, there were about 260,000 finalists in the nation’s tertiary institutions, with a total of 100,000 registered unemployed persons already in the labor market. During the same period, only a total of about 20,000 registered senior level and professional va-
cancies existed in the labor market to take care of the potentially unemployed graduates. By 2000-2003, the total number of finalists in tertiary institutions was about 420,000; by which time total registered unemployment had increased to about 150,000. However, total Regis-
ter senior level and professional vacancies marginally increased to approximately 24,000 [21]. From the fore-
going, it is indicated that between 1994 and 2003, the labor market grew by about 58% while employment oppor-
tunities increased by only 20% between the same pe-
riod. The existence of such a huge gap could be an indi-
cation that propensity for entrepreneurship is rather low.

There is empirical evidence supporting entrepreneurial education as an intervention tool for impacting adult at-
titudes towards entrepreneurship. For instance, entrepre-
nurship education has been found to be an important component of economic strategies for fostering job crea-
tion [22]. More specifically, effective youth entrepre-
neurship education prepares young people to be respon-

<table>
<thead>
<tr>
<th>Table 3. Factors responsible for the choice of enterprise by women entrepreneurs in south-western Nigeria.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Business motivation</td>
</tr>
<tr>
<td><strong>Information Sources</strong></td>
</tr>
<tr>
<td>Television</td>
</tr>
<tr>
<td>Trade fair</td>
</tr>
<tr>
<td>Community outreach programme</td>
</tr>
<tr>
<td><strong>Other Variables</strong></td>
</tr>
<tr>
<td>Educational background</td>
</tr>
<tr>
<td>Level of education</td>
</tr>
<tr>
<td>Role Model/Mentor</td>
</tr>
<tr>
<td>Social-cultural factor</td>
</tr>
<tr>
<td>Financial support</td>
</tr>
<tr>
<td>Pre-venture economic situation</td>
</tr>
<tr>
<td>Marital status</td>
</tr>
<tr>
<td>Age of children</td>
</tr>
<tr>
<td>Children occupation</td>
</tr>
<tr>
<td>Nature of business</td>
</tr>
<tr>
<td>Parent’s occupation</td>
</tr>
<tr>
<td>Respondent’ age</td>
</tr>
<tr>
<td>Prior training in venture</td>
</tr>
<tr>
<td>Starting capital</td>
</tr>
<tr>
<td>Getting the business registered</td>
</tr>
<tr>
<td>Securing a business premise</td>
</tr>
</tbody>
</table>

*Significant at the 95% level.
sible, enterprising individuals who become entrepreneurs or entrepreneurial thinkers and contribute to economic development and sustainable communities [23]. In addition, entrepreneurship education programmes assist individuals create value through the recognition of business opportunity, exercise of communication and management skills and development of personal competencies necessary to mobilize the resources that will bring the opportunity into reality. It is therefore not surprising that a recent study found a significant relationship \( r = 0.163; p < 0.01 \) between students’ exposure to entrepreneurial education and their interest in starting their own business [12]; where \( r \) is the Pearson product moment correlation coefficient and \( p \) is the statistical significance level of the result at 99% confidence level.

6. Framework for Technological Entrepreneurship Development

Entrepreneurship development has been said to focus on individuals who wishes to start or expand a business while small and medium enterprise (SME) development, on the other hand, focuses on developing the enterprise irrespective of whether the individual in charge can be considered entrepreneurial or not [24]. Furthermore, entrepreneurship development concentrates more on growth potential and innovation than SME development does. However, many of the lessons learned from experiences in both types of development are similar. The framework presented in this paper (Figure 2) is based on the premise that innovation and entrepreneurship cannot be separated in discussions about technological entrepreneurship. This is because of our adopted definition that technological entrepreneurship is the creation of new ventures to exploit technological innovations and discoveries.

Thus, the innovation process has been introduced into the framework with technological entrepreneurship as the culminating event, and policies as well as other moderating and fiscal factors like institutions, infrastructure, education and finance serving as the enabling environment to bring about the desired visible industrialisation and development. A study reported that some food companies that followed all the seven phases of the innovation process (idea generation, screening of ideas, R & D, business analysis, prototype development, test marketing and commercialization) in an integrative and overlapping manner in the development of new products succeeded in their commercialization efforts in Nigeria [25].

Essentially, the framework (Figure 2) suggests that technological entrepreneurship facilitates the innovation process by creating the impetus that drives each step in

![Figure 2. Framework for technological entrepreneurship development.](image-url)
the process, and dictating the mode and quality of value creation from those steps. In turn, technological entrepreneurship is facilitated within the context of favorable policies, institutions, financial and institutional support. A discussion of the specific steps of the innovation process through which the technological entrepreneurship makes its impact follows.

6.1. Generation and Screening of Ideas

Programmes of technological development can be driven by new product concepts and ideas. A business idea is the response of individual(s) to solving an identified problem or meeting perceived needs in the environment (markets, community, nation etc.). Ideas are needed to start a new business and/or improve an old one; to respond to market needs; to respond to changing fashions and requirements; to stay ahead of competition; to address the challenge of product life cycle; to exploit technology among others. However, ideas alone are not sufficient; they must become opportunities for entrepreneurship to occur. Opportunities are created when an attractive idea provides the possibility of good returns for the investor or individual taking the risk. In other words, a genuine business opportunity for a proposed product refers to a need for the proposed product in sufficient volume at high enough price and low enough cost to enable the entrepreneur to operate at a profit. A good business idea is not necessarily a good business opportunity until it has passed the profitability and feasibility tests.

6.1.1. Typical Sources of Business Ideas

There are various sources of business ideas or opportunities:

1) Observation and being sensitive to one’s environment by making use of the five senses viz:
   - Sight—seeing not just looking
   - Hearing—listening to what people are saying
   - Smell—smelling and asking questions
   - Taste—tasting and asking questions
   - Touch—touching and asking questions

   The ability to observe the environment is not common. Most people look without seeing. A technological entrepreneur possesses observation skill to a high extent. He sees opportunity in poor delivery of a product, overpriced product, and advances in technology, failure of a product or company, a monopoly, adaptation or imitation and in a rapidly expanding market.

2) Internal sources which include suggestions from peers or family, personal hobbies and interests, creativity, personal skills and experience. It has been noted that Professional engineers due to their education, training, and work experience are well positioned to practice technological entrepreneurship [5].

3) External sources which include friends, one’s bankers, customers, suppliers, franchises, mass media, published market statistics, exhibition/market surveys, brainstorming, research institutes, trade association, universities, government agencies among others.

6.1.2. The Process of Generating, Screening and Selection of Venture Ideas

Identification and assessment of business opportunity is referred to as the “discovery” in the framework. In existing firms, ideas usually originate from the R & D Organization/department, and from specific market needs. These two sources of new technology ideas have in recent years been described as technology push and market pull respectively. Identifying and assessing business opportunities involves in essence, determining risks and returns reflecting factors such as industry and market, length of the window of opportunity, personal goals and competences of the technological entrepreneur, management team, capital, technology and other resource requirements, competition, environment and finally Feasibility report.

6.2. Feasibility Study

Feasibility study is a requirement in the development of a technology-based enterprise. It is a well researched area having practical denotation. It is usually prepared for business start-ups, expansion, modernization, restructuring and diversification. An author described it as a sine qua non for the establishment of any industrial venture and posed that one of the major challenges that investors have in promoting venture ideas is poorly packaged feasibility report because of unreliable information and faulty assumptions on which the projections are premised [26].

A feasibility study is an examination of the technical, economic and commercial viability of a proposed project. It is a multidisciplinary assignment that only consultants or technical and experienced specialists with the requisite education and training can undertake. In feasibility study, a thorough analysis and interpretation of all the basic issues relating to the project, its environment and all available alternatives are examined [27]. This step is very important for the development of technological entrepreneurship and should be taken seriously.

Once the opportunity has been discovered, feasibility study has the following roles to play in the development of the technological venture:

1) It helps in the identification and selection of resources and in avoiding investment overrun;
2) It helps in making of investment decisions;
3) It guides the entrepreneur in the allocation of resources;
4) It provides a work plan for implementation;
5) It helps in keeping the business focused and in the
determination of growth pattern;
6) It helps in securing licenses and government ap-
proval for the product or venture;
7) It is used for post audit review;
8) It helps in getting collaborators and sponsors for the
venture.

Some of the activities undertaken under feasibility
study include fact finding, research or research, analysis
and interpretation of data among others. At the end of the
feasibility study, a report would be generated that would
include the following: executive summary, introduction,
market and marketing, project engineering, materials,
production and plants, location and site, project imple-
mentation, financial and economic evaluation and conclu-
sion.

6.3. Development of Prototypes

This phase is particularly critical for innovation driven
by technology-based entrepreneurship to occur. In most
cases, the knowledge required at this stage comes from
formal R & D. In this stage, the idea on paper is trans-
lated into a physical product or process, and its produc-
tion feasibility is assessed. During this phase, standards
and requirements are met to ensure that the product is
sufficiently competitive.

6.4. Patenting and Approval

Patenting is a critical but optional\(^\text{1}\) aspect of technology
innovation entrepreneurship development. It is the right
granted an inventor by the state (government), which
allows the inventor to exclude anyone else from com-
mmercially exploiting his invention for a limited period,
usually 20 years. This period would allow the inventor
(innovator) to have made maximum returns on his in-
vestment and idea. There are four basic ways the pat-
enatee (the owner of the patent, or the patent owner) may
exploit the patent. These are by commercialization th-
ough:

1) Start-ups: further development of invention or inno-
vation in incubators at science and technology parks, etc.
2) Spin-outs (or spin-offs): These are direct exploita-
tions through the formation of business entities (or tech-
nological enterprises) to commercialize the invention or
innovation.
3) Assignment/sale of patent: the patentee may sell or
assign his rights to the invention to someone else or an
organisation, who will then become the new owner of the
patent.
4) Licensing: a license is an authorization given by a
\(^{\text{1}}\)Patenting is required to maximize the returns from a technology that is
novel. As this is not always the case, the patenting step does not always
have to occur.

\(^{\text{2}}\)For instance, government funding of S & T is still below the UNE
SCO-recommended 1% of GDP.

patentee or a government authority to other parties to use
the invention. These could be either through voluntary or
compulsory license.
- Voluntary license: this is an authorization given by a
patentee to other parties to use the invention based on
mutually-agreed terms.
- Compulsory license.

6.5. Production and Marketing

When all necessary approvals have been obtained, full-
scale production and marketing programmes are per-
fected and the product is launched into the market.

6.6. Adoption

After launching into the market, the product enters its life
cycle, and the external competitive environment becomes
a major determinant of its survival.

7. Policy Requirements for Technological
Entrepreneurship Development in Nigeria

Many policies covering different sectors of the Nigerian
economy have been put in place to guide the develop-
ment of entrepreneurship in Nigeria; but without a con-
cise and effective Science & Technology (S & T) policy,
the industrial and other related policies will only promote
commerce [8]. As noted, the Nigerian S & T policy, to-
gether with most other related ones is defective in either
formation or implementation [25]. For instance, the Na-
tional Economic Empowerment and Development Strat-
egy (NEEDS) emphasized the development of an Indus-
trial sector that will be internationally competitive but in
the NEEDS document, there was no mention of the role
of S & T. The realization of this deficiency led to the
development of NEEDS-II which was still in its infancy
when the government of the day handed over to the pre-
 sent one. Today, despite the extent of advocacy and in-
tellectual support in favor of the role of S & T in realis-
ing the administration’s 7-point Agenda, Vision 20-2020
and the current transformation agenda, government
commitment to S & T is still demonstrably low\(^2\).

It is important to note also, that entrepreneurial interest
among Nigerian students is quite high but the expression
of this interest in practice is rather low. The main factors
found to be responsible for this are poor funding and
inadequate preparation through training. A particularly
key institutional weaknesses identified was expressed in
the inadequacy of government support to young and as-
piring entrepreneurs. In fact, until recently when the
NUC directed all universities in the country to establish
entrepreneurship centers, youth entrepreneurship has
been left in the domain of agencies and non-govern-

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mental organizations.

Much has been said about entrepreneurial education and its importance in stimulating and sustaining entrepreneurship, especially among students. In implementing this, however, it is important to note that a uniform curriculum might not yield optimal results across different disciplines or levels. The design of these curricula should, therefore, consider the peculiarities of each discipline when issues and resource persons are being selected. As a necessity, entrepreneurial training initiatives should include a standardized monitoring and evaluation structure which ensures strict conformance with quality.

Besides the strictly formal training, entrepreneurial advocacy is also very beneficial. Institutions, of their own volition should seek to organize seminars, workshops, symposia and other similar forums where students could be brought in contact with state-of-the-art knowledge in the practice of entrepreneurship. These forums also hold the benefit of motivating the students by bringing them in contact with excelling nascent entrepreneurs.

In implementing all of the foregoing recommendations, the place of a stable political atmosphere, strong institutions and sustainable funding cannot be over-emphasized. Few, if any, policies and programmes would ever work in situations of chaos and scarcity of resources. It then rests on the government of the day to work assiduously at creating a crime-free and peaceful environment without which entrepreneurship, which is the vehicle of innovation, cannot succeed.

8. Acknowledgements

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