



## OPPORTUNITIES FOR THE NIGERIAN ENGINEERING GRADUATE IN A GLOBALIZED ECONOMY: BAUCHI STATE AS A CASE STUDY

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### Abstract:

Globalization has brought about several changes in the manner which human beings interact with each other and even with their environment. Interpersonal relationship involves businesses and social interaction. This brought about several opportunities that can be explored to address the industries, security, business, and social engagements. These enormous opportunities can be explored by the engineer to address social, security, and economic challenges through the application of his knowledge of problem-solving. This paper highlights the opportunities that exist in Bauchi State in the areas of communication, business, construction, transportation, and entertainment industries with the view of sensitizing the engineering graduate to explore them and become self-reliant. The paper recommends that engineering graduates should key into the paradigm shift brought about by globalization by transforming the knowledge acquired in their studies to engage in developing their skills.

**Keywords:** Globalization, Opportunities, Skills, Engineering, Graduate

### 1.0.INTRODUCTION

By simple definition, engineering can be defined as the discipline that optimally converts the natural resources for the benefit of mankind. The basic needs of the mankind (such as water, housing, transport, electricity, communication, manufacturing, entertainment, security, medical equipment, etc) provide the stimulus for emergence of engineering. Engineer is therefore the professional that employs creative application of scientific principles to design, develop and construct the infrastructure necessary for the survival and comfort of man and the society at large.

Engineering has also been defined as the science, skill, and profession of acquiring and applying scientific, *social, economic, and practical knowledge*, in order to design and build structures, machines, devices, systems, materials, and processes. An engineer is a professional practitioner of engineering, concerned with applying scientific knowledge, mathematics, and ingenuity to develop solutions for technical, *social, and economic problems* ([www.wiki.answers.com](http://www.wiki.answers.com), 2014).

The above definition clearly shows that the responsibility of the engineer is not only limited to the conversion of natural resources to the design and development of infrastructure but also to use his ingenuity to solve social and economic challenges of the society. In Nigeria, there are abundant human and material resources. However, these resources

continue to be underutilized and in some cases mismanaged, the consequence is the manifestation of the various social vices in our society today. Engineers could transform these resources in order to solve Nigeria's social and economic problems.

### 2.0.GLOBALIZATION AND ENGINEERING TRAINING IN NIGERIA

Globalization as a concept is a multi-dimensional and is a continuous process involving information revolution, technological innovation, and organizational change. These structural changes are as a result of increased application and integration of advanced information and communication Technologies (ICTs). Through the application of Information and communication technologies, organizations have the ability to diminish the impact of time, space, and distance. Opportunities in business functions that were previously thought to be best confined to the same geographical area are now being spread across the globe in a globally disarticulated labor and production process (Ikeyi, 1998).

The concept of Globalization for the Nigeria engineering graduate training is a complex problem for the curriculum designers and policymakers, hence the continuous agitation to improve and increase funding of engineering programmes in higher institutions and better implementation and monitoring of policies that govern the establishment of such institutions.



Globalization will involve the introduction of advanced information and communication technology facilities in the classrooms, introduction of robotics laboratories and numerically controlled equipment in workshops, etc; thereby changing the nature of delivering education to the students and the entire teaching and learning process, to a new form of electronic literacy. More programmes, instructional and educational materials will be made available in electronic form. Teachers will prepare their lectures in electronic form, while students will generate papers, assignments, and projects in electronic form. Online digital libraries will replace traditional libraries. Video projection screens, books with storage devices, CD ROMs will replace blackboards, laptops will replace notebooks, tutorials and examination will be conducted online through computer systems rather than classrooms.

Internet, Virtual, and video conferencing will replace traditional classrooms, thereby breaking the barrier of space, time, and distance.

The objective of globalization of education is no longer just to convey knowledge, but to teach how to learn, relearn, unlearn and solve problem. It enhances the ability of the learners to access and assess information, adopt, and apply knowledge, to think independently, and to collaborate with others to make sense of a new situation (Kelvin, 2015).

The Globalization has brought about rapid development in Technology and communication across the world. It has changed the ideas, values, Knowledge, and roles of teachers and students, industrialist, medical profession, banking industries, and even the common man in the street, thereby a shifting the society to information based.

The effect of Globalization on education has reflected externally on entrepreneurship which has resulted in calls for a shift from engineering graduates holding a paper qualification to skilled graduates, demand for more skilled workers, and workers with deep understanding and knowledge of language, culture, and business methods all over the world. Globalization is also gradually shifting entrepreneurship from industrial-based to knowledge-based hence the need for all stakeholders in the education sector to key in for the paradigm shift.

It is therefore important for Nigeria, Nigerians in the academia, social scientists, national and state governments, non-governmental bodies, regional and international organizations, the private sector, and Individuals to collectively help in creating a globally competitive educational system that can increase our chances to attract international partnership and promote technological development (Kelvin, 2015).

### 3.0. THE RESOURCE POTENTIALS OF NIGERIA

Among the resources of Nigeria include:

1. A population of over 160 million people which is enough to serve as a market for all products that can be locally produced, even if we do not intend to

export them. Among which 70% is youths that constitute a good source of manpower.

2. Arable land mass of 40 million hectares suitable for the production of most food/cash crops and about 30 million hectares of economically viable forest and plantations.
3. Almost 955km of coastline with a lengthy continental shelf that can provide access to the country and also provide fresh fish including other aquatic products as raw material for the food industry.
4. Large deposits of solid minerals of economic value as potential raw materials for the industrial sector. For example, Bauchi State alone has the following untapped solid mineral deposits: Iron ore, Niobium/Columbite, Molybdenum, limestone, Kaolin, Zirconium, Tantalum, Tungsten, Bauxite as well as very good silica sand for the foundry industry (Ibrahim and Biliaminu, 2010).
5. Disposed to good energy sources such as wind, solar, hydro, coal, bio-fuel, etc.
6. Oil and gas deposits with numerous downstream products.
7. Over 180 universities, over 120 polytechnics, over 200 dedicated technology-based research centers – their highly qualified personnel are mostly engaged in Research and Development activities with results in most cases kept in the shelf only to be overtaken by time.
8. Over 2 million graduates of tertiary institutions alone are thrown on annual basis into the labour market looking for jobs, including the engineering graduates that can stand as employers. The fundamental question one would like to ask is:

### 4.0. CHALLENGES OF NIGERIA AS A DEVELOPING ECONOMY

A developing country also called a less developed country, is a nation with a lower living standard, under-developed industrial base, and low human development index (HDI) relative to other countries. There is no universal, agreed-upon criterion for what makes a country developing or developed, although there are general reference points such as a nation's gross domestic product (GDP) per capita (Sullivan and Stephen, 2008).

Nigeria has recently declared itself as the biggest economy in Africa that it has added 89% to its Gross Domestic Product (GDP), now worth \$510 billion, and roared past the previous leader, South Africa, worth 370 billion though nothing has changed in the real economy, except the way the GDP is measured ([www.economist.com](http://www.economist.com), 2014).

In most developing economy such as Nigerian, it is the government that provides the legislation, the enabling conditions, and the funding to build and to maintain the infrastructure needed to train and develop the engineer. They, therefore, assume ownership, control, and management of

these assets. However, the management of these infrastructures is affected by short-term political and economic interests which sometimes become a source of hindrance to the effective training of the engineers. Some of the major challenges of a developing economy include:

1. Corruption is a serious challenge in a developing economy. It leads to poverty, unemployment, greed, and waste of resources.
2. Crime, such as armed robbery and general lack of safety of lives and properties.
3. Absence of good governance: It is a well-known sociological fact that poverty is a good weapon in the hands of a dictator.
4. Social and political unrest: Ethnic and religious violence, general labour unrest.
5. Poor quality goods and services due to non-enforcement of codes and standards where they exist. Hence, Nigeria becomes a "testing rig" for Chinese and Belgium products.

By virtue of their training Nigerian engineers if given the enabling environment, could assist government in transforming the situation in the country through more innovative approach to sociological challenges of the country.

## 5.0.OPPORTUNITIES FOR THE NIGERIAN ENGINEERING GRADUATE

There are quite a number of opportunities that engineering graduates and dwell in to be self-reliant without necessarily waiting for lucrative government jobs which are very scarce. Some of which include: Automobile Mechanics, Blacksmithing, Building Materials, Welding and fabrication, panel beaters, foundry work, Electrical installation, Auto electricity, Painting, Tiles, and Ceiling fittings, Plumbing, Radio, and Television repairs, Mobile phone and Computer maintenance, Brick-laying, Printing and sign writing, Air Conditioning, and Refrigeration, Carpenters and furniture making, etc.

Although most of the above trades are carried out by artisans, of which most of them have not undergone any formal training but have the skill to offer such services. There are a lot of such talented Nigerians without formal training but have excelled in various fields. The case of Jilani Aliyu, the designer of American Motors is a case in point. Gocibo of Maiduguri that transforms the conventional SI and CI engine-powered vehicles to solar-powered vehicles are examples among numerous cases.

The engineering graduate can equally engage in such trades and can provide the service in a more professional manner much better than the artisans. He can also set up his workshop and engage the artisans to offer service in the most professional manner.

In any engineering setup, the engineer is the team leader among members of the engineering family (engineers, technologists, technicians, and craftsmen). For example, a

typical Mechanical engineering graduate would acquire all the skills required to manage an automobile workshop in less than six months and is more likely to perform and organize the business in a more efficient and profitable manner than a novice mechanic who graduated after 6 or 7 years (Omizegba, 2004).

The engineer can also engage in developing his skills by participating in a short-term skill acquisition programs to help sharpen his brain further since he has the foundation of all such trades. In addition to the above, there are a lot of other opportunities for the engineering graduate which include:

1. Mobile phone repairs, laptop repairs, printing and photography, film production installation of Information and communication equipment.
2. Tailoring services and fashion design.
3. Solid wastes recycling and management: Metallic wastes recycling, wood waste, quarry dust, plastics, and biomass.
4. Post-harvest technology: Design and fabrication of simple and efficient solar dryers, tomato blenders, milling machines, rice, groundnut, and beans threshers.
5. Engineering workshops: Setting up and managing local engineering workshops such as automobile mechanic, welding and fabrication, aluminum doors and windows, carpentry, furniture, etc.
6. Design and manufacture: Medical equipment design, simplified stone crushers, Incubators, solar panels and inverters for domestic lighting, Car bumpers, safety locks, etc.
7. Supplies and Installations: electronic and electrical appliances sales and installations of satellite receivers, inverters, solar panels, etc.
8. Research and Training: Setting up and management of proficiency and skills acquisitions centers, extramural classes, research in areas of technology simplification and adaptation to reduce cost without compromising standard, environmental management, flooding and disaster control and prevention, gully erosion control, rain harvesting technology, provision of portable water, etc.
9. Social engineering services: Conflict resolution through social innovations to solve conflicts among diverse groups in the society, clubs, and associations.

With globalization, all information regarding these opportunities can be assessed and utilized for the development of the skill of the engineering graduate. Globalization also provides access to a very unlimited range of market for all such services.

## 6.0.OPPORTUNITIES FOR CONTRIBUTION TO GOOD GOVERNANCE

Engineering graduates can equally contribute to good governance by coming together under one umbrella as is

practice globally. For instance, in many of the developed economies engineers have over the years found it challenging to influence their governments with regards to infrastructure asset planning and management. They often found that their complaints fell on deaf ears of governments, who seem to have little regard for long-term infrastructure planning and did not understand the engineering requirements and needs to militate against deteriorating infrastructure assets. The lack of concern and the impact of failed infrastructure would have on the society has always being a source of frustration to the engineers. For these reasons, the engineering professional bodies in such countries were compelled to find other forms of action to make their voices heard by the governments. They did this by carrying out an assessment of state of the nation's infrastructure and presenting a report (Onabolu, 2010).

The Institutions of Civil Engineering in a number of nations including USA, Canada, Japan, South Africa, New Zealand, and Australia have succeeded in influencing their governments with respect to management of infrastructure, by periodically producing infrastructure rating reports on the state of their nation's infrastructure. Infrastructure rating reports on water systems, roads, railways, airports, bridges, electricity generation and distribution, sanitation and wastewater, solid waste management, hospitals, and clinics, etc; have always being produced periodically (Onabolu, 2010). The infrastructure ratings are circulated to government, the legislature, policymakers and businessmen and are widely publicized to the general public, which in most cases used to raise serious debates in front pages of their popular press, since then the report has become a well-known and respected document for government, political parties, and private/public sector organizations to consider when developing their strategies. This helps put infrastructure at the top of the public agenda.

The Nigerian engineers could also adopt this strategy by sponsoring the assessment as well as reporting the state of infrastructure of the nation periodically. Individual branches of the Nigerian Society of Engineers (NSE) could equally be conducting assessments and presenting reports on the condition of the infrastructure in their various states and submitting same to their state governments. It is commendable that the NSE has identified the area of budgetary allocation to engineering infrastructure by the government as an area of concern. The attention of members is now being drawn for their inputs in that regards. It is hoped that such reports will be published and publicized on a periodical basis. For example, the Bauchi Branch of the NSE could take the lead by conducting assessment and reporting the state of infrastructure in Bauchi State in the following areas (Ningi, 2016):

1. The state of water reticulation network in Bauchi metropolis.
2. The state of electrical power distribution facilities in Bauchi State.
3. The state of drainage facilities and sanitation in Bauchi metropolis.

4. Traffic lights and accident prevention in Bauchi metropolis.
5. The condition of bridges and road networks in Bauchi State.
6. Portable water supply in Bauchi State.
7. The state of hospitals and clinics in Bauchi State.
8. Performance evaluation of the Gubi dam.

## 7.0.CONCLUSION

In conclusion, engineers should know that they are the backbone of any country's development as the level of development of any country is measured based on the level of infrastructural development. The engineering graduates should rise up to the challenge and identify areas of individual strengths to assist government in developing the nation. It is hoped that if this approach is adopted, the Nigerian engineer would tremendously assist in minimizing the developmental challenges of Nigeria and would be given due recognition in the governance of the nation. However, government should also assist by providing the enabling environment for the engineer as no nation ever develops or grows by merely gazing at the navel of opportunities, thinking only of immediate gains for an individual or a generation.

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