

## Technology education and entrepreneurship for sustainable industrialization

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The paper explained technology education and entrepreneurship. It explained the role of technology education in sustaining industrialization. The challenges facing technology education in striving to achieve sustainable industrialization was discussed in the paper. The link between technology education and entrepreneurship for sustainable industrialization was thoroughly explained. Recommendations were made in the paper for enhancing technology education and entrepreneurship for sustainable industrialization. This includes technology education teachers should be trained locally and internationally to cope with the modern trends in industries. The graduates of 1980s and 1990s should endeavour to update their knowledge in the area of entrepreneurship education since it was not part of tertiary institution's curriculum in the above period.

**Keywords:** Entrepreneurship, Industrialization, Sustainability, Technology Education

**Introduction**

Embracing technology education will address the skills gap in the economy and also enhances sustainable industrialization. Technical manpower can be utilized for development of industries using improved technologies and scientific methods of production. Singal and Singal (2012) disclosed that a technical entrepreneur develops characteristics of quality consciousness, adoption of modern technology management techniques, realization of the importance of research innovation for productivity improvement. The absence of the above can lead to industrial sickness. A technical entrepreneur also develops an aptitude for objective consideration and evaluation of issues involved in the process of an enterprise. Therefore, technology education experts are very essential for sustainable industrialization. Technology education is that aspect of education that leads to acquisition of basic scientific knowledge and practical skills that enables learners to be self reliant after graduation. Technology education is taught in tertiary institutions such as College of Technology, Polytechnics, Monotechnics, and Universities etc. FRN (2013) explained that technology education is offered in Universities, Polytechnics, Monotechnics and College of Education (Technical) and other specialized institutions.

Technology education is the systematic method of exposing individuals to the practical task for developing and producing goods and services for mankind. It can be seen as systematic study of techniques for making and doing things (Ogbu and Kabiru, 2014). Technology education is recognized as the solution to the problems of technological industrial and economic development of any nation. It brings about better equipment and economic services (Daramola, 2010). While Akaninwor (2010) explained that technology education includes both general and specific education elements dealing with industry and technology. Some authors refer to technology education as industrial education while others refer to it as technical education or engineering education. FRN (2013) stated the goals of technology as follows:

- (a) Provide courses of instruction and training in engineering, other technologies, applied science. Business and management leading to the production of trained manpower,
- (b) Provide the technical knowledge and skills accessory for agricultural, industrial, commercial and economic development of Nigeria;
- (c) Give training that impart the necessary skills for the production of technicians, technologists and other skilled personnel who shall be enterprising and self-reliant;
- (d) Train people who can apply scientific knowledge to solve environmental problems for the convenience of man; and
- (e) Give exposure to professional studies in the technologies.

It is clearly seen from the goals of technology education that the programme is for agricultural, industrial, commercial and economic development. Technology education is also for imparting necessary skills for the production of technicians, technologists and other skilled personnel who shall be enterprising and self-reliant. These goals of technology education are geared towards entrepreneurship and sustainable industrialization. Gasper (2014) postulated that technical vocational education and training is for providing the much desired technical activities for industrial transformation and the promotion of local technologies and entrepreneurial activities across all regions.

Entrepreneurship is referred to an individual who has the desire for business, put it to practice and always work hard to make sure he doesn't fail. Similarly, entrepreneur is an individual who perceives needs, conceives goods or services to satisfy the needs, organizes the factor of production. The role he performs is called the entrepreneurial functional and the process is called entrepreneurship (Wale - Awe, 2010). It is obvious that industrialization can't take place without the needed manpower. Chenery in Wale-Awe (2010) defined industrialization as the set of changes in the economic structure required to sustain a continued increase in income and social welfare. Thus, industrialization is aided by good industrial policy. Some of the factors that make industrialization possible include:

- (a) Technical knowledge
- (b) Provision of human wants
- (c) Access to the same markets for imports and exports.
- (d) The accumulation of capital as the level of income increases
- (e) The increase in skills as the level of income increases.

It is important to note that industrialization for sustainable development hinges on the development of manpower that can bring about business and job creation. It is a fact to say that entrepreneurship education was introduced in Nigeria educational system to enhance self-reliance and also to boost industrialization.

### The role of technology education in sustaining industrialization

Technology education plays vital role in sustaining industrialization. Sustainable with reference to the title of this paper means things that are needed to be done in order to keep industries alive. Gasper (2014) stated that Technical vocational education and training aimed at providing the much desired technical skills for industrial transformation and promotion of local technologies. The writers of this paper disclosed that it is the duty of experts in technology education to harness the national resources and utilize it in our industries. This can boost industrialization and increases income generation for the country. The economy of Nigeria is one of the fastest growing economies in the world with 8.3 growth in 2009. Nigeria is classified as a mix economy emerging market with its abundant supply of natural resources, well developed financial, communication and legal sectors. About 60% of Nigerians are farmers and Nigeria has vast areas of land under utilized (Gasper, 2014). Accord to Economic Intelligence Unit and World Bank, Nigeria GP has nearly doubled from 170.7bn USD in 2005 to 292.6bn USD in 2007 and 374bn USD in 2010. The GDP per capital jumped from 692 USD per person in 2006 to 1.754 per person in 2007 and 2.459 per person in 2010. It is the twelfth (12<sup>th</sup>) largest producer of petroleum in the world and has one of the fastest growing telecommunication markets in the world (Gasper, 2014).

The graduates of technology education have received quality training so it is their responsibilities to support industrial transformation in Nigeria. In the same opinion, FRN (2013) stated that it is the goal of technology education to provide technical knowledge and skills necessary for agricultural, industrial, commercial and economic development. It is expected of technology education institutions to give training that impart the necessary skills for the production of technicians, technologists and their skilled manpower who shall be enterprising and self-reliant. If technology education programme is effectively implemented, the Nigerian society would have moved in the right direction towards high level of industrial development and national security. This is because a good system of technology education provides solid manpower foundation for sustainable technological development, industrial growth and national security (Daramola, 2010).

## Challenges facing technology education in striving to achieve sustainable industrialization

There are so many challenges facing technology education which can affect in striving to achieve sustainable industrialization. Among them are:

- (1) **Training and retraining technology education teachers:** Technology education teachers need to be trained and re-trained locally and internationally to cope with the modern machines/tools use in industries. When they are trained and retrained they will be able to train the young ones to use these modern machines and tools in industries after graduation. Some of these technology education teachers also later work in industries or set up their own enterprises so training and retraining is very essential to keep abreast of latest trends in technology and industries.
- (2) **Facilities:** It is evident that most equipment such as tools and machines use for training which needs to be replaced. In developed countries most of their machines are automated. The state and federal government should strive to replace machines in our schools that are obsolete if we are to compete favourably with advanced countries and keep with the latest trends in industries.
- (3) **Power Supply:** Power supply in Nigeria now is pathetic. Many educational institutions do not have power supply from Abuja Electricity Distribution Company again. At times, it supplies power once or twice in a week. This affects practical skill acquisition by students and they later use these skills in industries. Many industries close down due to persistent power fail because they found it difficult to cope with the high cost of diesel. This hampers industrialization.
- (4) **Corruption:** Corruption is rampant in our society today. Where officers were given money to purchase modern machines/tools, the money given to them were used to buy old or fabricated machines and converted the remaining balance to their personal pockets. Some of them didn't even buy the machines at all. This kind of corruption thwart the effort of government, destroy technology education system and industrial development.
- (5) **Lack of entrepreneurial skills:** It is a fact that many technology teachers or graduates lack entrepreneurial skill to set up their own enterprises that can bring about industrialization or boost the number of industries in the country. Entrepreneurial skill is very essential for industrialization so technology teachers that do not have the skill should endeavour to acquire it.

### Technology education and entrepreneurship for sustainable industrialization

Technology education has a link with entrepreneurship. Anyone that has a trade and entrepreneurship skill can easily establish a business in his area of specialization and run it successfully based on the entrepreneurial skill and experience he has acquired in the chosen occupation. Gasper (2014) opined that the fundamental goal of technical vocational education and training is to provide entrepreneurship activities across regions. Opening entrepreneurship opportunities in technology education will enhance

sustainable industrialization. This will also enhance the establishment and growth of small and medium scale enterprises. Lazanro (2012) pointed out the rationale for entrepreneurship education in Nigeria which includes:

- (a) Help the graduates to acquire increased understanding of entrepreneurship.
- (b) Equip the graduates with entrepreneurial approach to the world of work; and
- (c) To prepare graduates to act as entrepreneur and managers of new businesses.

The authors of this paper disclosed that the major rationale behind the entrepreneurship programme in universities is the realization of the fact that the future of the Nigeria economy hinges largely on the ability of its populace to convert its natural resources into a viable wealth which graduates of technology education is known for.

Similarly, the European Union (2002) presented the objectives of entrepreneurship as follows:

1. Raising Students' awareness of self-employment as a career option;
2. Promoting the development of personal qualities that are relevant to entrepreneurship such as creativity, risk taking; and
3. Providing the technical and business skills that are needed in order to start a new business venture.

It is observed that the objectives of entrepreneurship presented with reference to self-employment and providing the technical and business skills needed are in consonance with the objectives of technology education. This means the country can be industrially sustained through technology education.

## Conclusion

It is not an over statement to say that the country can only be industrially sustained when technology education is properly embraced in Nigeria. The country can have sustainable industrialization when the desired Manager is produced for industrial transformation and promotion of local technologies. To achieve sustainable industrialization, the provision of moderation facilities and retraining of technology education teachers locally and internationally is evident. A good technology education system provides solid foundation for sustainable industrialization.

## Recommendations

1. Technology education teachers should be trained and retrained locally and internationally to cope with the modern trends in industries.
2. Modern facilities should be made available for training students of technology education. Most of these equipment needs to be automated as applied to developed countries.
3. The government should strive to improve on power supply as it affects skill acquisition by technology education students which invariably affects industrialization of this country.

4. The graduates of technology education in 1980s and 1990ss should endeavour to update their knowledge in the area of entrepreneurship education since it was not part of tertiary education curriculum in that period.
5. Technology education should place more emphasis on practical skill acquisition since it enhances on sustainable industrialization.

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