

## **Science and Technological Advancement for Economic Empowerment Through Artisanry**

Kalat I. K.  
Department Of Industrial And Technology Education,  
School of Science and Science Education  
Federal University of Technology  
Minna, Niger State.

### **Abstract.**

The objective of this paper is to examine the role which artisan technology can play in economic empowerment of the citizenry. It looked into the characteristics of technology, science and technological advancement, attempt to elucidate the concept of economic empowerment. Government policies that encourage artisanry such as: Industrial Development centers (IDCS) National Directorate of Employment (NDE), The family Economic Advancement Programme (FEAP), the National poverty Eradication Programme (NAPEP), peoples Bank Community Banks, The Nigerian Agricultural Co-operative Rural and Development Bank NACRDB/ the Nigerian Bank of Industry (BOI) and Micro – Finance Institutions were Enumerated . It was recommended among others that, governments in the country should formulate and implement the Micro – economic Policies to create the conditions for economic growth, such policies will help the development of artisanal and other small enterprises.

### **Introduction**

Artisans are skilled workers in industry or trade.

Artisanry is a source of technology in any society, essentially, it is largely based on the metal working, the mechanical engineering expertise of the peasant group. This type of technology is widely dispersed and generally consist of peasant blacksmiths who fabricate arrays of industrial and agricultural tools and equipment; Road – side metal workers, panel beaters, welders, motor mechanics and carpenters constitute important members of this class. In artisanry, simple procedures such as cutting, boring, forging and welding have been perfected. Steel, cast iron, timber, aluminium, paints are common inputs into such production processes. Artisans in most cases undertake fabrication and equipment repairs. The Artisan faces technology in the form of mechanization/automation as well as sophisticated managerial/administrative techniques. The advances in science and technology have greatly changed the way and manner the labour force is being utilized. It is also transforming education and training for work in Nigeria rapidly. This state of affairs therefore lay credence to the fact that there will be greater requirement for manpower with specialized educational qualification and diminished demand for those qualified only for heavy physical and repetitive tasks. Technology has in no small measure affected the methods of techniques of production of goods and services in industries and factories. The advent of factories and industries meant the introduction of automation, semi – automation and the utilization of the skilled manpower.

Technology has achieved a feat of integrating work processes that could have been done by many hands into a single operation done more efficiently and in a short time.

### **Characteristics of Technology.**

Technology is the systematic use of all technical knowledge, material and operations in the control of nature. The Encyclopedia Britannica (1973) also defined technology as the systematic study of techniques for making and doing things.

Technology may either be embodied or disembodied. Embodied technology is in the form of physical goods or hardware of production of machinery, equipment, intermediate products, and skilled labour with the capacity to organize and direct economic production more efficiently (Dike, 1991). While engineers call these objects "hardware" anthropologists refer to them as 'artifacts (Grubler, 2001). Disembodied technology on the other hand, comes not in the form of physical goods or even skilled labour, but in the form of recorded information such as written description of a production process, diagram, computer language, organizational charts and so no.

Technology is dynamic, and when technology is viewed in this context, we then talk about technological progress. Technological progress refers to the accumulation of improved know – how or addition of new productive techniques to the existing stock of knowledge in the form of improved tools, machine and equipments, improved intermediate goods, skilled labour, management structures and techniques.

Technical progress can also occur in the disembodied form such as improvements in the organization, planning coordination and control of economic production to maximum efficiency of resources use. Dike (1990), in line with Simon (1973), observes that much of the technical progress in the industrialized economics presently originate in what is termed "meta Technology," that is the act of running the production system.

From the economists point of view, technological progress can be viewed in conceptual terms as a 'blowing up of the production function – that is – in a shifting out from an inferior production function to a superior one reflecting in a qualitative leap in productivity. It is worthy of note to maintain here that what constitutes technological progress in Nigerian may not be so considered in a more advance economy such as the United states of America. It is a historical phenomenon and is associated with stages of development.

Technological evaluation is systemic. This means that it cannot be treated as a discrete, isolated event that concerns only one hardware or artifact. It is therefore true that a new technology needs not only to be invented and designed, but it is also needs to be produce, and this requires infrastructure, this therefore requires a host of other technologies. Take an example of a telephone, it requires a telephone network, a car needs both road network and fuel distribution system, and each of these consists of whole "bundles" of individual technologies. This interdependence of technologies causes enormous difficulties in implementing large – scale changes. But it is also what causes technological changes to have much pervasive and extensive impact once they are implemented. That is why, historically, particular periods of economic development correspond with clusters of interrelated developments in artifacts, techniques, institutions and forms of social organization. This mutually interdependent and cross – enhancing socio – technical systems of production and use can not be analyzed in terms of single technologies, but must be considered in terms of the mutual interaction among all concurrent technological, institutional and social change.

Technological change is generally cumulative. This means that technological changes build on previous experience and knowledge, and hence, technological knowledge and the stock of technologies in use grow continuously.

#### Science and Technological Advancement

Sir Isaac Newton (1642-1727) has been at the forefront in scientific discoveries. Newton developed the principles of physics that made possible further discoveries about the physical world and reduced many phenomena of life to a set of predictable natural laws. This contribution helped liberate humankind from its reliance on superstition and ignorance and encourages people to reason, inquire and discover. Galileo (1564 – 1642) on his own found out but was persecuted for saying that the earth was round and not flat, he had to recant by accepting that what he has said was either wrong or lie or both so as to save his life. Many other scientific discoveries followed by leaps and bounds. Eventually, the scientific methods were established. In the scientific methods, observations were carefully made to ensure that they are accurate, precise, systematic, objective and reproducible, in effect, it is based on verifiable evidence instead of intuition or wishful thinking.

According to Shok.(2004) Technology is the material expression of a people's life, values and attitudes, that is culture. It represents man's ways of applying scientific knowledge to specific practical uses, so that he can live more comfortably today than he did yesterday. Technology also embodies man's efforts at transforming his knowledge of specific scientific laws using his personal skill into concrete objects or thoughts, which are called artifacts. Thus while science involves the understanding of theoretical postulated entities and their interrelationships, technology is concerned with a people's understanding of specific objects and their function in relation to the people. Although science and technology may be distinguishable forms of human activities, they are so interrelated that one cannot exist without the other, each one feeds on the other. However it can be agreed that 'science is universal while technology is culture based.'

One crucial aspect of technology is inventions. Invention aims at enhancing, broadening and enriching human life. Obvious examples of inventions include the computer, and the associated information and communication technological systems, etc. Inventions span the whole sphere of human activities including machine, pharmacy agriculture, veterinary medicine, the sciences and even the arts and the social sciences.

#### **Economic Empowerment**

Science and technological advancement have made tremendous impact on all aspects of life. It has modified the range of behavioral alternatives. For some groups, it offers new ways of doing things. For others it eliminates existing options. However, except under conditions of extreme control, new technology does not determine entirely, the new set of social behaviors. It does not necessarily affect all members to the same extent.

A sphere of life in which science and technology advancement has had very visible effect is that of the economy

Economics is defined as the management of scarce resources. Economic empowerment is a process by which individual or groups are provided with the means of livelihood. Many of these activities involve, artisans, i.e. handicraftsmen. These artisans, in conjunction with other business minded individuals establish small -scale industries of various products and services.

### **The Role of Artisanry in Technological Advancement**

Artisanry, particularly, the manufacturing, and construction artisanry plays a central role in the acquisition of technological capability. This type of artisanry offers the participant the opportunity to acquire the skills necessary for production, repair, adapt and sometimes construct. Apart from acquiring these skills during artisanal apprenticeship, one also further acquires and strengthens them on the job or through the process of "learning by - doing" which artisanry makes possible. For example, the first time an artisanal blacksmith who produces an implement, let us say, a hoe or a cutlass, spend more time in producing it. However, in subsequent batches of production, he is likely to encounter less difficulties and even spend less time and materials, thus becoming more efficient in the use of resources including time, and in improving on the quality of his products. As he becomes more proficient in his production process, spending less and less materials resources and time per his product, his cost of production falls, he earns more income and makes more and more profit, thus engendering more life in the enterprise.

Similarly, artisanry plays a critical role in the development of technological entrepreneurship. Technological progress does not just depend on the availability of entrepreneurs who are willing to invest in the skill demanding or "skill - intensive" sector of the economy. Technological entrepreneurs are those who realize that industrial technology is generally embodied in hardware, which in itself is a function of the capital goods sector no matter how small. The technological entrepreneur who invests in this sector is laying a solid base for skills acquisition by artisans and other workers in the industry. Skills acquired in such an industry may lead to inventions and innovations, which in turn may lead to technological and economic development process. This means that the nation that has a pool of technologically oriented Artisanal entrepreneurs who invest in the Artisanal capital goods sector such as blacksmithing and other foundry related industries which themselves serve as incubators and repository for technical expertise has good prospects of experiencing rapid technological and industrial transformation. Artisans/entrepreneurs who move to other enterprise carry along the knowledge acquire in the form of invaluable human capital, thus, effecting their new establishments and thereby, promoting the technological frontier of the economy (Okonkwo 2004)

The Artisanal sub-sector serves as a repository for technology stripping and coping. Progressive and knowledgeable artisans possess the capability of 'stripping down' products such as machines, tools and equipment and others that are amenable to mechanical operations and copy them part by part, couple such copied products, 'perfect' them and eventually multiply them for commercial use. As they do this over time they acquire sufficient expertise in the production of such products, eventually serving the domestic market, reducing imports and saving scarce foreign exchange. Overtime, such Artisanal firms begin to engage in sub contracting productions for large firms, which operate in the formal sector. Artisanal firms that engage in this practice eventually acquire the technological, management and marketing enterprise to penetrate and produce for the export market, and thus, earn foreign exchange for the National economy. A typical case in point is the Artisanal footwear sub-sector in Ariaria International Market, Aba, Abia State. Similarly, the Artisanal equipment, motor spare parts, chemicals and household appliances producers in Nnewi, Anambra State, now not only produce for the Nigerian domestic market but have massively launched into export production.

Artisanal technologies serves the needs of small consumers and those who require custom-made products. The need of the small consumers may be too small in quantity because of the large scale at which big plants are technologically designed. The need of small consumers may be uneconomical for large firms/plants to produce, such gaps are easily filled by Artisanal firms, which are designed for custom-made products as the unit cost of such products may be very high and uneconomical for the large-scale firms to produce.

Artisanal firms constitute an important source of innovation. They provide avenues for experiment and enterprise for entrepreneurs with lot of ideas. For the purpose of experimentation, particularly, in new lines of production or techniques development, the artisanal firm may be better suited because the loss which may arise will usually be smaller than when a large firm is set up and used for purposes of experimentation.

Artisanal technologies play a critical role where the material to be worked upon is not uniform, where the processes are not amenable to quick repetition and where the products are not standardized, thus making large-scale methods unsuitable or uneconomical.

The Artisanal sub-sectoral activities tend to strengthen the technological and industrial linkages between the informal and formal sector of the economy. This it does not though the supply of raw materials and intermediates which serve as technological inputs to the formal sector enterprises. The technological/industrial linkage may take the form of transfer to formal sector after acquiring skills through on-the-job experience or "learning-by-doing". A specialized type of technological/industrial linkage could take the form sub-contracting arrangements whereby the formal sector enterprises could contact artisanal sector operators are suppliers of intermediate or final products or as implementers of particular activities in the chain of production.

In terms of factor proportions, the Artisanal sector activities tend to be more labour intensive than the formal sector activities, thus reflecting the factor endowments of the underdeveloped economies which have an abundance of labour. This means that technologically, the artisanal sector holds a good promise for the employment needs of a nation such as ours which has a high proportion of unemployed persons since such technologies in the sector have high labour absorption potentials.

#### **Government Policies That Encourages Artisanship**

Realizing the importance of artisanship, government have decided to put in place the following policies.

1. Industrial Development Centers (IDC's)
2. National Directorate of Employment (NDE)
3. The Family Economic Advancement Programme (FEAP)
4. The National Poverty Eradication Programme (NAPEP)
5. Peoples Bank
6. Community Banks
7. The National Agricultural Cooperative and Rural Development Bank (NACRDB) and the Nigerian Bank of Industry (BOI)

8. Micro-finance Institutions

**Conclusion/Policy Recommendations.**

The essence of economic empowerment is poverty reduction and the Artisanal sub-sector provides a credible base for economic growth to filter through, to the poorer sections of the population. To achieve economic growth, however, policies, projects and assistance are needed. Over time, the informal sector has become an important target group for government policies and donor support projects.

1. It is recommended that the governments in the country should formulate and implement the macro-economic policies to create the conditions and other small enterprises.
2. Technology policies of government should be directed towards developing new products, strengthening the capability of entrepreneurs to build machines that make machines, and improving the production methods of small entrepreneurs
3. Currently, multiplicity of taxes and poor infrastructural facilities make life difficult for Artisanal producers. The issues of multiple taxes and levies should be properly addressed to avoid a situation where Artisanal operators are not driven underground.
4. Education curricula in our school system should be restructured to include entrepreneurship and skills acquisition so that school leavers would always look forward towards establishing their own production outfits.
5. Artisans constitute the greater majority of workers in the informal sector. To tap the potentials of this group of labour force for the purpose of poverty reduction, they need to be organized in such a way that there will be mutual benefits occurring to various trades.
6. The arrangement of technological/industrial clusters is suggested. Artisanal cluster refers to a collection of artisans in a specified location for the purpose of making them enjoy inter-firm advantages through shared or common facilities. This type of clusters is already being practiced in some areas/professions

**References**

- Dike, E (1991). Economic Transformation in Nigeria: Growth Accumulation and Technology, Ahmadu Bello University Press
- Encyclopaedia Britannica (1973), William Benton Publishers, Vol. 18. 15<sup>th</sup> Edition (1942-1973)
- Ejo – Orusa, H.A (1997), Development Myopia < Technology and the Wealth of Nations: the Nigerian Tragedy, Zipidi Press.
- Grubler, A. (1998). Technology and Global change, Cambridge, Cambridge University Press.
- Okonkwo, E.M. (2004), Artisanship in Technology Advancement and Economic Empowerment: A Lead Paper Presented at Science and Technology Fair, Kaduna State Ministry Of Science and Technology.
- Shok, M (2004) Science and technology Advancement for Economic Empowerment Towards social security: Key Not Address at Kaduna State science Fair 2004.