

# **TRANSFER OF TECHNOLOGY AND NATION BUILDING: ANY WAY FORWARD FOR NIGERIA?**

*Dr. Onu, Francis. M.*

## **Abstract**

It is quite obvious (that over the years, transfer of technology has been taking place between the developed and the developing countries as well as within each of the groups, but there is as yet no unique approach identified as the most appropriate for enhancing the acquisition of technology for the nations- The paper has attempted to suggest ways of making the transfer of technology feasible for rapid development and industrialization of the country.

## **Introduction**

The underdeveloped nations of the world are those primarily deficient in the appropriate technologies necessary for the efficient harnessing of the available natural resources for the provision of the basic human needs (i.e. food, shelter, health services, water supplies, energy, roads and transportation) for the generality of their citizens. Thus the development or the acquisition of technology readily comes to the mind as the panacea to the poverty and backwardness of developing nations. Judging from the experiences of the industrialized nations, the independent development of technology though highly rewarding, generally consumes lots of time and resources (both human and material) and realising that time, money and abundant skilled human resources are not on their side, any government in the developing world focus attention on acquisition of foreign technology as a short cut to the eradication of their poverty and under development. Unfortunately, the acquisition of technology from the developed countries to the developing countries has not been very successful even though lots of technological equipment have been transferred to developing countries.

Nigeria like most developing countries is faced with the problems of the acquisition of technological know-how as distinct from the procurement of technological equipment. The Nigerian approach to the issue of the acquisition or the transfer of technology has been largely limited to two main areas - viz - the inclusion of training programmes for Nigerians in the contract agreements with foreign business associates for the supply and installation of technological equipment and the supply of Nigerians to various educational and or industrial training organisations in the developed countries to undergo conventional and or crash training programmes of study in various disciplines. These trainings intended to facilitate the transfer of various technologies have not yielded much dividend judging from the level of technological development in the country thus far. These approaches to the transfer of technology to Nigeria have failed due to the absence of effective monitoring of the training programmes by sponsors of the trainees, the unwillingness of the developed countries to permit the effective transfer of their technologies so as not to lose the capabilities to maximise the returns derivable from their innovations as well as the passive attitude of the trainees who did not realise that very determined effort must be made to wrench technological know-how out of the firm grips of the developed world.

This paper does not pretend to offer the final solution to the problems inherent in the transfer of technology to Nigeria but rather aims at drawing attention to an alternative approach to the issue of developing Nigerian technology which could yield appreciable results for national development.

## **What Is Technology?**

According to Iloduba (1997) technology is the ability to do work with tools, processing materials they are accustomed with and perhaps faster still, since there may be electricity or some other facilitating device for enhancing the production process. Technology strictly speaking according to Aguokogbuo (1997) is the application of scientific knowledge in solving human problems. For the purpose of this write up, the operational definition appears most appropriate- ie-that technology is the systematic method or techniques for doing something. In other to use a method (technology) effectively,

three elements according to Udeagwu (1987) are very vital and they are information about the method, the means of carrying it out and the appropriate understanding of it. Lot of the confusion about what technology transfer is, arises from the erroneous identification of one of these vital elements as technology.

Udeagwu (1987) had emphasized that information and means can be transferred from one place to the other easily as a person can purchase and take home a radio receiver with the circuit diagram, and

operational manuals from a radio shop, but the understanding of the principles of operation, design and construction of a radio receiver can be acquired only by determined study, painstaking work experience in the appropriate organisation. Thus both physical means and information are worthless for the utilization of a technology's potential and most importantly, thorough experience in its use. The transfer of information and or means is therefore not the same as the acquisition of technological capability. The ability to use technology effectively is derived from a thorough understanding of the principles and practices of the technology.

### **Can Transfer Of Technology Make Nigeria Truly A Developed Ant! An Industrialised Nation?**

The question on whether technology transfer can make Nigeria belong to the developed and industrialized Nations of the world needs to be clarified before progress can be made in discussing the issue of ascertaining the most appropriate strategy or approach to the acquisition of technology. If the transfer of technology were not possible of making Nigeria a developed nation as often posited by many, there would have been little or no justification for the sustained effort by many developing nations to acquire technology. Udeagwu (1987) had argued that it would have been difficult to explain why such rapidly developing countries as India, Singapore, South Korea, Taiwan and Brazil are developing almost in the same pattern as the old industrialized nations of the world. On the other hand, if transfer of technology were possible to make Nigeria an industrialized nation, the determination of the factors militating against its acquisition in Nigeria becomes most relevant.

Nigeria is grappling with problems of underdevelopment resulting from an under utilization of science and technology. This is because Nigerian culture is often a stumbling block in the assimilation and enhanced application of science and technology;- essential tools for socio-economic development, in the words of Soodursun (1991). "It is recognized that efforts to industrialize African states (Through transfer of technology have met with dismal failure because little or no attempt was made to consider the cultural prerequisites of such development imposed from outside.

The superiority of Western technology in terms of meeting basic needs and higher standard of living forces developing nations like Nigeria to depend on such technology, often with scarce attention to the development, up grading, and exploitation of indigenous science and technology. Soodursun (1991) had maintained that the indiscriminate adoption of foreign technologies, without due consideration of local culture and tradition has led to multiple problems on the development process. This is more so when it is recognised that every society is unique and different from any other society due to peculiar make up and environment.

It is to be noted tht the technologies developed in the West are meant to meet the Westerners' own needs, and are seen to be appropriate to their socio cultural norms. When transferred to the developing counties like Nigeria, these socio-cultural norms are often absent or different in the new set up and hence their assimilation is always a major problem. Thus adaptation of such foreign technologies retards technological advancement because it leads to wastage of fund, facilities and manpower, or sometimes it could lead to the production of individuals whose services are not needed. Therefore, the transfer of technology is attainable if conceived as a thorough study of the principles and practices of foreign technology with the objective of adopting same to local conditions for the solution of specific local problems utilizing available local human and material resources. What should developing nations like Nigeria then do to prepare themselves for facing the inevitable advent of such technologies necessary for their own development? What are the cultural pre-requisites for the development and application of modern science and technology? These are the questions that will be addressed in this paper while highlighting the different approaches to the integration of modern science and technology into Nigerian traditional culture.

### **A Way Forward In The Transfer Of Technology For Nigerian Development**

There is no doubt that efforts have been made and are being made to accomplish a break through in the indigenisation of Nigerian technology for national development but it can also be observed that a number of problems have been hindering the achievement of the goals of technology transfer.

The following approaches can be of help in making the assimilation of the acquired technologies more easily:

#### **(1) Integrating Changing Nigerian Cultural Scene With Modern Science And Technology**

Traditional Nigerian culture englobes not only the fine art but all human activities based on folk traditions, beliefs and rituals that affect the daily lives of the people. Whether it is eating, working or

sleeping, whether it is agricultural practice or medicinal cure, whether it is dress, dance, drama, music or sculpture, all these are part of Nigeria based on age-old wisdom and practice. This culture has necessarily been influenced by tribal movements through marriages and business connections among others. Since culture is never static, there is no reason why the advent of modern science and technology will not bring new changes necessary for the survival of the nation. How can this change be brought about so that "Nigerian culture can with minimal conflict absorb modern science and technology to its advantage, and create an indigenous scientific and technological culture? To this end, technology education curriculum in all the levels of the Nigerian educational system should be indigenous oriented to enhance availability of facilities, learn ability of skills and consumption of services.

In addition, the learning of entrepreneurial skills should be included in the technology education curriculum to minimize the incidence of mass unemployment among the graduates of technology education. By using this approach, the different segments of the society - children, women, and men. both in the rural and urban areas, have to be educated by all the possible means available to the community. The trend if changed brings the benefits of modern science and technology to the entire mass of people in the country by a process of redistribution of wealth and by the provision of adequate facilities for education in the rural areas where traditional culture tends to inhibit any change and growth.

## **(2) The Demystification Of Science And Technology.**

Basic principles of science and technology are found in many of the traditional practices in the daily life of people. These principles are however covered with a veil of mystery and magic, and few Nigerian scientists have attempted to explain their daily practices from a scientific standpoint. On the other hand, they have tried to implant Western Science in the schools from a Western approach, without linking it to the surrounding phenomena or to the activities in their daily life. This has only perpetuated the mystification of Science and therefore the associated technology, the situation has worsened with the advent of new, improved technologies. The starting point for demystification of science and technology should be the teaching at Primary and Secondary levels of traditional science and technology so that pupils can grasp the fundamental principles much faster. Then they can apply the same principles while adapting foreign technologies to be adopted at different levels of the educational process.

## **(3) Encouragement Of Nigerian Researchers To Fabricate And Produce Modified: Prototype Materials/Equipments From Other Countries For Use In Nigerian Local Conditions**

This approach yielded good results during the 1980s when the United Nations Assembly declared the 1980s as the International Water Supply and Sanitation Decade in response to the urgent need to provide potable water supplies and sanitation facilities to about three quarters of the estimated three billion people living in developing countries, who do not have access to these facilities (Soodursun. 1991).

The following illustrations support this views.

The primary purpose of the development decade is to provide adequate water supplies and sanitation facilities for all by 1990 in the developing nations. The enormity of this task is made very vivid by the fact (hat by the year 1990, some 1.8 billion people in the third world (excluding China) required new. clean water supplies and almost 1.4 billion of these people were expected to live in rural areas (Udeagwu, 1987).

Realising that one of the most important problems in rural water supply programme is the high failure rate of the imported conventional manual pumps because such pumps were not normally designed for the level of stress and abuse they routinely receive in the rural areas of the developing countries, the International Development Research Centre of Canada (IDRC) initiated a project whose objective was the development of reliable hand pumps that can be locally produced in developing countries, installed and maintained at a reasonable cost. The main thrust of the hand pump project was the development of technology and its effective transfer to the villagers for use in the provision of potable water for all.

The IDRC research team (an organisation created by Canadian Government in 1970 to support research designed to adapt science and technology to the needs of developing countries) firstly undertook a study of the commonly available materials in developing countries that could be used in the fabrication of hand pump components and arrived at the conclusion that polyvinylchloride (PVC) widely available through-out Africa and Asia would be preferable to cast iron and steel which are not only expensive but also not readily available locally. It then commissioned the University of Waterloo. Canada to

design and fabricate a simple, low cost PVC piston and foot valve assembly for a manual, shallow well pump. The prototype pumps were then made available by (he IDRC to several research groups in Africa and Asian countries like Malaysia, Sri-Lanka and Malawi to conduct further research so as to evaluate the reliability and durability as well as maintenance requirements at the village level and the technical performance of the pump. This approach was to provide the researchers with the prototype PVC hand pump which the research team would reproduce with modifications to facilitate the maxim use of local materials and expertise. The same approach can be adapted in the Nigerian conditions.

#### **(4) University Education And Research On Traditional Science & Technology**

Once a proper foundation has been laid at the Secondary level with appropriate teaching of science and technology using environmental tools and suitable laboratory equipment, University Science Education can improve immensely. University graduates in Science and Engineering will have grasped the basic principles and will be able to apply them in their daily lives. The Chemists, the Physicists, the Biologists, Engineers and Agriculturists, should have acquired the basic know-how to find gainful employment not necessarily in government service. The private sector can employ them, and the growth of the growth of the private sector will depend on the graduates themselves taking self-employment and starting small and medium-scale enterprises and industries. This should be the primary objective of University education in Nigeria.

For those who go for post-graduate work and research, (hey should be encouraged to do research on traditional science and technology with a view to demystifying existing traditional practices. By so doing, they will upgrade traditional science and technology, and give a sense of self-confidence to their people. Ethno-medicine, ethno-psychiatry, ethno-bolany and ethno-zoology should be given high priority in University curricula and research, and results of research should be disseminated among the masses so that they realize that Science and technology are not completely foreign to Nigerians. The University should be a centre not only of learning, but also of collaboration between the local enterprises and the scientific community. Industrial parks within University campuses will encourage applied studies. 7hese industrial parks will bring together researchers, technologists, entrepreneurs, and financiers who can take any innovation and bring it onto the production line. Modern science and technology will them be integrated into the fabric of society.

#### **Conclusion**

Over the years, technology transfers have been taking place between the developed and the developing nations as well as within each of the groups, but there is as yet no unique approach identified as the appropriate strategies for the effective acquisition of technology for the country. Because all technologies are elements of longer systems, the presence or absence of other technologies has a major impact on what has to be acquired to accomplish the objective sought, and therefore, each country has to develop an effective approach for the acquisition of the technology needed depending on her circumstance.

In the Nigerian situation, Sots of theoretical knowledge about the principles of various technologies abound but the practical experience necessary for the translation of theory into practice is lacking - because Nigerian Scientists and Engineers have not been frequently challenged with specific problems by the various governments and industrial concerns. The often repeated vague calls for Scientists and Engineers to transform the technology of this country is most unhelpful. What is needed is for the various governments and industrial organizations to identity specific technology problems in the country and challenge specific groups of Scientists and Engineers to provide solutions to such problems utilizing locally available human and material resources. For example, the various Stale governments in the country could challenge the universities of technology and polytechnics in their locality to design and fabricate specific teaching aids to be mass produced for the equipment of the Junior and Senior Secondary Schools. Such assignments could stimulate the later to potentials in the Universities of Technology and polytechnics and provides practical experience which will be useful in the solution of future problems.

it will not be out of place to state that all the factors necessary for the technological development of Nigeria are already present in the country, what has been lacking is the organisation, motivation and direction to lead to the desired goals.

Finally, there are values tht "Nigeria has to preserve at any cost, and still be able to cope with improving the quality of [ife of its people, through a rational application of Science and Technology integrated into the traditional culture. Unless conscious and deliberate steps are taken to integrate modern Science and Technology into traditional Nigerian culture, there will be no progress on the technology acquisition or transfer to Nigeria.

## References

Aguokogbue, C. N. (1977) Science And Technology Integration: Issues And Prospects, in Obodo G. C. (eds): *Stress And Crisis in Science and Technology Education in Nigeria*. A publication of the Department of Science and Technical Education, University of Science and Technology (ESUT) Enugu, Rejoint publications Ltd; 65 Adelabu Street, Uwani Enugu PP. 75-86.

Iloduba, I. E. (1997) Stress and Crisis in Science and Technology Education in Nigeria in Obodo G. C. (eds) *Stress And Crisis in Science And Technology? in Nigeria*: A publication of the .Department of Science and Technical Education, University of Science and Technology (ESUT) Enugu, Rejoint Publications Lts; 65 Adeblabu Street, Uwani, Enugu. PP. 1-6.

Soodursun, Jugessur (1991): Approaches to the Integration of Modern Science and Technology into Traditional African Culture, in Kwesi Kwaa Prah (eds): *Culture. Gender, Science and Technology? in Africa*. Harp Publications, Windhoek PP. 1-13.

Udeagwu, F. C. (1987) The Effective Approach to the Transfer of Technology for the Development of Nigeria, Technical Education Review, *Journal of Polytechnic Writers Association of Nigeria* 1 ( 1 ) PP. 45-54.