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VALUE OF SOLID-STATE DEVICES AND ELECTRONIC TECHNOLOGY IN ENHANCEMENT OF ENTREPRENEURSHIP IN NIGERIA

[1]Nwosu, Frederick Chukwuebuka [2]Nnabuenyi, Helen Okwuoma &
[3]Igwe, Nwamaka Ngozi
[1]Department of Electrical/Electronic Engineering
Federal Polytechnic Oko, Anambra State
[2&3]Department of Science Laboratory Technology
Federal Polytechnic Oko, Anambra State

Abstract
Unemployment situation in Nigeria demands strong orientation towards entrepreneurship for Nigerians to focus on being 'job creators' than being 'job seekers'. To foster entrepreneurship in this modern era utilization of solid state devices, which are made using semi-conductor materials, is useful. However, solid-state devices are greatly employed in electronic technology because electronic systems are built using semiconductor materials. The paper discussed how solid-state devices and electronic technology is needed to encourage and foster entrepreneurship. In other words, the paper focused on utilization of electronic technology, which requires solid-state devices, in enhancing job-creation for development in Nigeria. Issues discussed in the paper are: solid-state devices as basis for electronic technology, entrepreneurship and Nigeria society, and application of solid-state devices and electronic technology in promotion of entrepreneurship. It is pointed out that solid-state devices have enabled production of electronic systems employed in enhancement of entrepreneurship through creation of job opportunities, increased job productivity, intellectual enhancement of entrepreneurs, and business communication among entrepreneurs and people.

Keywords: *Solid-State Devices, Electronic Technology, Semi-Conductor, Electronic Systems and Entrepreneurship*

Background to the Study

For personal comfort and national development, opportunities should be created for people to engage in jobs for income generation. It is an axiom that a lot of people in Nigeria are suffering due to unemployment. Time has come for Nigerians to focus on being 'job creators' than being 'job seekers'. That can be done by building strong orientation towards entrepreneurship. Encouraging entrepreneurship is a means of empowerment because entrepreneurship brings about self-reliance, which is essential for development.

To foster entrepreneurship, technology should be employed. Usually, man engages in various technological activities to make his environment more pleasant and comfortable for living. Actually, various technological products existing in society are mostly for the wellbeing of the populace. However, a lot of technological products in this modern era consist of solid-state devices. Solid-state devices can be termed electronic devices.

The paper discussed how solid-state devices can be applied to encourage and foster entrepreneurship in Nigeria. In other words, the paper is on the utilization of solid-state devices and electronic technology in promoting job-creation for development in Nigeria. For explicit understanding issues the paper looked at are solid-state devices as basis for electronic technology, entrepreneurship and Nigeria Society, and application of solid-state devices and electronic technology in promotion of entrepreneurship.

Objective of the Study

The paper points out those solid-state devices have enabled emergence of electronic technology. Electronic technology aims at production of electronic systems which can be employed in enhancement of entrepreneurship. The paper discuss that solid state devices and electronic technology is useful in entrepreneurship by being applied in creation of job opportunities, increased job productivity, intellectual enhancement of entrepreneurs, and business communication among entrepreneurs and people.

Literature Review

Solid-State Devices as Basis for Electronic Technology

Solid-state devices are made using solid-state materials; and familiar solid-state devices are diodes, transistors and integrated circuits. Solid-state materials are usually semiconductor materials. It can be said that solid-state devices are products made using semiconductor materials. Some examples of semiconductor materials are silicon, germanium, gallium arsenide, selenium, cadmium sulphide. A semi-conductor has electrical conductivity that lies between that of conductors (metals)

and insulators. Pitt (1977) defined semiconductor as "a material having a resistivity between that of conductors and insulators and having a negative temperature coefficient of resistance". Semi-conductors materials (eg silicon and germanium) are almost insulators, but become conductors if free electrons are made available, for example, when exposed to light or heat, or when impurities are added (Ijomah, 1992). Sinclair (2004) asserted that a semiconductor is a material whose conductivity can be controlled by the presence of impurities; and in their pure state, semi-conductors are reasonably good insulators, but they have a negative temperature coefficient of resistivity, unlike metals. A wide range of materials acts as semiconductors but the best known and most widely used material is silicon, followed to a lesser extent by germanium. The majority of solid-state devices - diodes, transistors, and integrated circuits- are now made from silicon. Germanium is used to make diodes and transistors; and other materials - particularly gallium arsenide - are now used for more specialized applications (Meadows, 1978).

Semiconductor materials are greatly used in electronic technology as a solid state material in building of electronic systems such as computer, television, radio, telephone, video machine, and calculator. Semiconductors act as solid state materials in design and construction of electronic systems because they serve or behave as a non-moving solid material in place of thermionic valves and mechanical components such as relays. Meadows (1978) asserted that thermionic values have now be replaced by solid state diodes, transistors, and integrated circuits as the basic electronic building block in the majority of electronic equipment; and all solid state electronic devices depend for their operation on controlling the flow of charge carriers in semi-conductor materials. It can be deduced that discussion on solid state devices greatly pertains to electronic technology.

Technology deals with a task/problem to be solved and it is the use of scientific knowledge and ideas to embark on practical tasks in production of materials and devices in reducing human suffering and enhancing productivity for man to enjoy his environment better (Nwosu, 2005; Obianwu and Azubike, 1994). Modern technology involves electronics. Electronics is concerned with passage of electricity through semi-conductor materials or valves (vacuum and gas-filled devices); however, modern electronics is principally concerned with semi-conductor devices (Pitt, 1977). It can be asserted that electronic technology is practical application of knowledge of semiconductor materials/solid state devices in embarking on designs, construction and utilization of products/systems for the wellbeing and comfort of man in his environment. An activity that can require electronic technology for the wellbeing of Nigeria society is entrepreneurship.

Entrepreneurship and Nigeria Society

Nigeria is a developing nation with poor level in scientific activities (Mogbo, 2004). Usually, existence of scientific-based society will lead to production of people who are equipped in technology. It appears that the value system in Nigeria is not gearing towards the development of science and technology. Adedeji (2004) pointed out that developing countries need employment of technological skills, technical training and technical education in order to catch up with the current trends of the global economy and development. A lot of activities in Nigeria are characterized by immoral and corruptive acts that retard development. If Nigerians have strong focus on a value system that promotes effective study and application of science and technology, there will be fostering of socio-economic activities, which includes entrepreneurship. Actually, adequate exposure to technology can make people be creative and innovative, thereby become equipped for entrepreneurship.

Entrepreneurship is establishment of business in which one works as self-employed person for the purpose of making a living and solving people's needs. Thus, entrepreneurship signifies self reliance. Okenwa (2005) viewed entrepreneurship as the willingness and ability of an individual to seek out investment opportunities, establish and run an enterprise successfully. Osuwa (2005) asserted that entrepreneurship demands the ability that should be acquired to set up a business enterprise which differs in some aspect from the ability acquired to enable a person obtain paid employment. A person who engages in entrepreneurship is called an entrepreneur.

An entrepreneur is expected to acquire skills, ideas and managerial abilities needed for effective and efficient running of the business enterprise. An entrepreneur can act as a "job creator" because he/she can set up business that can provide job (work employment) for people to earn a living. It is unfortunate that a lot of people in Nigeria, especially the youths, are unemployed. Therefore, entrepreneurship should be of great value in Nigeria, especially among the Nigerian youths. Getting involved in entrepreneurship enables the youths not to be "job seekers" but "job creators". In fact, entrepreneurship is a means of encouraging self-reliance which is essential for sustainable development in a nation. Ojo (2003) acknowledged that with self-reliance, a high level of employment, improved productivity, better living conditions for the Nigeria populace will be achieved.

It is an axiom that entrepreneurship creates employment opportunities. With focus on technology for self-reliance, various enterprise and organizations can be created and then Nigerians can partake in various works for socio-economic development. Nwosu (2005) averred that employment helps to generate income for a happy and

healthy living as well as prevention of idleness that is associated with social vices. Unemployment leads to emotional (psychological) disturbances and distress; and social vices inhibit socio-economic development. To enhance entrepreneurial activities in this modern era, solid state devices/electronic systems need to be employed through the application of electronic technology.

Application of Solid-State Devices and Electronic Technology in Promotion of Entrepreneurship

Electronic technology is applied in construction/manufacturing of electrical circuits that makes use of solid state (electronic) devices like diode and transistor. Diode acts as a rectifier by allowing current to flow in one direction in an electric circuit. Transistor is usually used for amplification of electrical signals, and switching actions in logic circuits. As solid state devices, diode and transistor are greatly used in production of electronic systems. Apart from use of discrete elements like diode and transistor, electronic technology has brought about the use of integrated circuit (IC) in electronic systems. Thereja and Theraja (1999) stated that an integrated circuit is a complete and packaged electronic circuit in which both the active and passive components are fabricated on an extremely tiny single chip of silicon. Botkar (2005) pointed out that an integrated circuit is a collection of discrete elements (diodes, resistors, capacitors and transistors) created by means of a single construction process in which all elements are formed. Examples of electronic systems usually encountered that makes use of solid state devices are radio, television, calculator, telephone, computer, video machine, audio amplifier (public address system), transmitter, satellite.

In this modern era, revolution of human activities has occurred through electronic technology for they deal with the use of scientific knowledge of electronics to solve human and environmental needs to achieve good economy in a society. Electronic technology is greatly utilized in the field of computing and communication. As rightly observed by Ibenta (2004), the once very rigid and unbreakable boundaries of national and regional market have been turned into global electronic village on the eve of twenty-first century as a result of existence of computers and telecommunication. An aspect of human endeavour that demands electronic technology for national development is entrepreneurship/job-creation.

There are some job opportunities which education in electronic technology can provide. Generally, electronic technology brings intellectual and technical exposure on electronic instrumentation and control, computer technology, communication technology, and engineering management. With the knowledge and skills in electronic technology, people (especially the youths) can become entrepreneurs working as operators of electronic-based system, computer

programmers, electronic engineers/technologists, consultants in electronic-based activities, vendors of electronic products, and personnel resource in electronic-based organizations. It should be bear in the mind that engaging in jobs provides income for satisfactory living and prevention of idleness that can lead to social vices which jeopardize socio-economic and sustainable development. Nwosu and Nnabuenyi (2005) acknowledged that jobs for income provision offer socio-economic and psychological satisfaction to people and so helps in minimizing social vices, associated with unemployment, which can retard or hinder development in society.

Electronic technology is employed in production of computer, which usually serves as a useful electronic device for making works/jobs easier for man. Important features of computer that make it serves as a useful electronic device are high operational speed, generation of accurate result, high storage capacity, reliability in performance of functions, flexibility in adjustment of data, and provision of neat/nice product. So, computer can serve as an essential electronic product that can make jobs easier for entrepreneurs and ensure increased productivity in entrepreneurship. Ekemezie (2003) asserted that the purpose of computer system is to speed up problem solving and increase productivity. Computer can be employed in fostering entrepreneurship through provision of intellectual enhancement on principles and practice of entrepreneurship. Exposure on the use of computer and software can propel entrepreneurs slot educative software containing information that pertains to entrepreneurship into the computer and then obtain certain knowledge and skills that can enable them advance in entrepreneurship. Enhancement of knowledge and skills in entrepreneurship can be achieved using electronic systems such as radio, television and video machine. For example, an entrepreneurial activities or experiences can be broadcasted in radio and television for proper exposure to real-life issues and occurrences in job-creation and job-management. Also practical entrepreneurial activity can be videotaped and watched in a video machine for a clearer and deeper understanding that can foster entrepreneurship. Electronic technology has made the existence modern communication systems possible. It is known that the major purpose of communication is to transmit information. Information enables meaningful and productive interactions in human activities/endeavours. Thus, information is highly needed to achieve effective and efficient entrepreneurship. The existence of electronic systems like telephone (hand-set), satellite dish, fax machine enables communication of information that can boost entrepreneurship.

In this modern era, electronic technology has brought about the emergence of the Internet that has made the world a global village. Internet has facilities that enables people communicate with one another from any part of the world. For instance, facility like electronic mail (e-mail) provides a fast, economic convenient means of sending message to people and receiving messages from them. Also, Internet makes it possible to have business communication activities such as E-commerce, E-conferencing which can be used to enhance entrepreneurship.

Conclusion

Unemployment leads to psychological and sociological state that can inhibit or retard socio-economic development. It is unfortunate that a lot of Nigerians (youths being in greater number) are unemployed and so jobless. Unemployment issue in Nigeria calls for spirit of being a job-creator and less concentration on being job-seeker. Thus, it is essential to encourage entrepreneurship in Nigeria. Focusing on self-reliance, by being job-creators (entrepreneurs), will enable entrepreneurs contribute to the sustainable development of Nigeria. Enhancement of entrepreneurship in this modern era demands the use of electronic systems such as computer, video machine, telephone, internet, television, and radio. Electronic systems are products of electronic technology.

The basis for electronic technology is production and use of solid state devices such as diode, transistor and integrated circuit (IC). Solid state devices have made the production and use of computer and communication systems, necessary for fostering entrepreneurship, possible. It be deduced that solid state devices, as basis for electronic technology, are valuable in enhancement of entrepreneurship. Actually, electronic technology is vital in enhancing entrepreneurship because it has enabled production of electronic systems that have brought about creation of job opportunities, increased job productivity, intellectual enhancement, and business communication.

Recommendations

In other to appreciate the role of solid-state devices and electronic technology in enhancement of entrepreneurship it is recommended that:

1. Individuals, organizations and government should have strong focus on electronic technology.
2. Effective teaching and learning on solid-state devices and electronic technology should be ensured in schools by all stakeholders in technological education.
3. The general public should be enlightened through public lectures and mass media on the relevance of employing of electronic technology in job-creation and job-management.

4. Ethical conducts should be valued and maintained by Nigerian populace in the use of electronic systems in entrepreneurship.

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