



CHALLENGES OF TEACHER PREPARATION IN A KNOWLEDGE ECONOMY IN THE E-ERA

Okute, Agnes Lawrence, Ph.D

Department of Vocational Education,
University of Calabar, Calabar
Agnesokute@gmail.com

Abstract

This paper focused on Challenges of Teacher Preparation in a Knowledge Economy in the E-Era. Knowledge economy is an emerging economy powered by the use of knowledge to produce goods and services, as well as wealth creation. The paper viewed knowledge economy as an evolutionary trend in technological advancement, information and communication technologies as well as globalization. The paper discussed the concept of knowledge economy, the importance of knowledge economy, characteristics of knowledge economy, teacher preparation in a knowledge economy and the challenges of higher education, knowledge economy and the Nigerian position- the global perspective, pillars of knowledge economy, and proffered a way forward in the advancement of knowledge economy. The paper concluded that the emergence of knowledge economy has created new work-place demand for new skills based on intellectual capabilities and the ability to work with ideas rather than obsolete tools. Thus higher education is faced with the challenge of producing graduates who will be intellectually competent and flexible enough to compete favourably in the knowledge economy. The paper recommended among others that governments of developing countries particularly Nigeria should pay greater attention to, and invest more in providing functional education to the citizenry through improved funding, provision of infrastructure and functional facilities that enhance educational access to the generality of youth at affordable cost.

Keywords: Knowledge economy, teacher preparation, professional development, higher education, globalization, e-era

Introduction

Knowledge is increasingly becoming more and more recognized as the key driver of productivity and economic growth, giving rise to what is now referred to as knowledge-based economy. Knowledge-based economy is an economy powered by knowledge. The society has developed from industrial era when machines replaced manual labour. There is a growing codification of knowledge and its transmission through communication and computer networks. The appearance of electronic computer has brought about changes that have transformed the way everything is done, including the preparation of teachers to equip them for the 21st century.

The 21st century world is characterized by electronic encounter, culminating in what is termed as the electronic era or e-era. The e-era has the features of the predominance of Information and Communications Technology (ICT), accelerated pace of globalization, exponentially developing into a knowledge economy. Electronic era (e-era) refers to an era when electronic systems permeate every nook and cranny of human endeavours. Agomuo (2008) described the e-era as an era where the development of integrated circuits has revolutionized the field of communication, information handling and computing. The e-era evolved as a result of information explosion, high-tech revolution and above all, the micro computer contributions. It is an era of information technologies, hence can also be referred to as an information era or information age.



The electronic era brings with it new terminologies. Such new terminologies include e-learning defined by Okute and Agomuo (2009) as the process of delivering instruction electronically, using the computer and multimedia facilities via inter; e-mail which is described as the surface mail that use computer as the post office via internet (Okute, 2010); e-library representing electronic library; e-banking or electronic banking, e-marketing representing electronic marketing (Agomuo, 2008); information and communication technologies, described as a combination of hardware, software, media and delivery systems (Ugwu and Oboegbulem, 2011). These phenomena require high-level knowledge and skills by individuals, institutions/organizations and nations to remain afloat in the globalized society.

Globalization is another concept, in fact, one of the key foundations behind the idea of new and vibrant economy which is knowledge-based. Ominiya (2008) defined globalization as the integration of economies throughout the world through trade, financial flows, the exchange of technologies, information and the movement of people. Globalization is characterized by liberalization of competition and free market policies. All of these pose survival challenge in today's society which is now propelled by knowledge, and the capabilities of individuals, organizations or nations to use knowledge in the production of goods and services. The training process and the inculcation of core skills and knowledge into individuals for the survival of the society begin in schools, and higher education is the key to the development of such skills and knowledge.

Higher education covers the post-secondary level of the Nigerian national education system which is provided at the universities, polytechnics, monotechnics and colleges of technology including those courses as are offered in colleges of education (FRN, 2013). Okute and Chukwurah (2011) described Universities as the key to providing training in an ever-increasing number of specializations that are important for the development of modern societies. Higher education plays a vital role in inculcating knowledge and skills as well as developing talents in individuals for the emerging knowledge economy. This implies that teacher preparation and continuous professional development must be given prominence. Therefore, there is greater demand on higher education to pay particular attention, not only to the development of such programmes that will equip their products with transversal skills such as ability to think critically, take initiative, solve problems and work collaboratively, but also the professional development of teachers to facilitate the acquisition of such knowledge and skills. These skills will prepare the individuals for the various unpredictable career paths charted by the knowledge economy.

Concept of Knowledge and Knowledge Economy

Knowledge is simply the perception of ideas, expressions, thoughts as deduced by an individual or group of individuals as basis for action. Knowledge is also conceptualized as the full use of information and the potential of people's skills, competencies, ideas, intuitions, commitments and motivation.

Davenport and Prusak (2008) defined knowledge as a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information. It can be deduced from the definition of Davenport and Prusak that there are two parts to their definition, namely: (a) the content of knowledge expressed as a fluid mix of framed experience, contextual information, values and expert insight. The content part of knowledge can be viewed from intrinsic standpoint as those things that emanate from within an



individual. It includes such things as experiences, values, beliefs, feelings, motivation and information that can be applied to take a decision. (b) the function of purpose of knowledge expressed as that which provides a framework for evaluating and incorporating new experiences and information. This means that produced together, there is a basic idea within the individual, that is, a framework that forms the basis for accepting and applying new experiences.

In the same vein, Lucey (2005) described knowledge as information produced together with information already within the head, used to plan, control, make decisions or to modify the produced information so as to share the new knowledge with others. Lucey's perception of knowledge corroborates the concept of knowledge as viewed by Davenport and Prusak (2008). This implies that knowledge emanating from within the individual in form of experience, value, or motivation is applied in decision making. This results in the production of new knowledge which is shared with others. On the other hand, knowledge management refers to the tools and techniques for collecting, managing and disseminating knowledge/within an organization. Thus, knowledge and knowledge management has become a great asset in today's world of work, with knowledge workers operating from anywhere using the computer to carry out businesses, attend conferences, study in any part of the world. Therefore, the use of knowledge and knowledge management is of increasing importance in an era in which business environment is characterized by high technology and electronic marvels.

The concept of knowledge economy was first popularized by Peter Drucker in 1969 in his book 'The age of discontinuity'. Drucker envisaged a knowledge society where knowledge would be the key resource and knowledge workers would dominate the work force (Lingenfelter,2012). Knowledge economy has been conceived differently by various schools of thought. Among the experts, arguments on the appropriate definition of knowledge economy are still raging. It is evident however, that the knowledge economy is everywhere clear. The global economy is directly based on the production, distribution and use of knowledge and information. Mba (2011) conceptualized knowledge economy as the economy of knowledge focused on the production and management of knowledge in the frame of economic constraints on the one hand, and a knowledge based economy on the other. The latter refers to the use of knowledge technologies such as knowledge engineering and knowledge management to produce economic benefits and job creation. Mba further described knowledge economy as one where organizations and people acquire, create, disseminate and use knowledge more effectively for greater economic and social development. Furthermore, knowledge economy has been defined by Obanya (2013) as:

The production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advancement as well as rapid obsolesce, with greater reliance on intellectual capabilities than on physical inputs or natural resources.

One in which the generation and exploitation of knowledge has come to play the pre dominant part in the creation of wealth. It is not simply about pushing back the frontiers of knowledge, it is also in all manner of economic activity.

An economy that is primarily on the use of ideas rather than physical activities and the application of technology rather than the transformation of raw materials, or the exploitation of cheap labour; an economy in which knowledge is created, acquired, transmitted and used more effectively by individuals, enterprises, organizations and communities to promote economic and social development (Obanya,2013:50).



In the context of this work, knowledge economy is an economic system where knowledge is prudently utilized to create wealth, solve economic problems and pave way for economic and social developments. In a knowledge economy, knowledge is a vital resource and is increasingly important as it provides greater potentials for countries to strengthen their economic and social progress. This can be done by providing more efficient ways of producing goods and services, and delivering such goods at a lower cost to a great number of people. Knowledge economy can be conceived as innovative economy.

The Importance of Knowledge in a Knowledge Economy

Knowledge accumulation and utilization across borders confers economic power on the individual, institution, organization or nation that possesses this vital resource called knowledge. Knowledge economy is for those with vibrant ideas and can adapt these innovative ideas to conquer the competitiveness in the global market. Citing the International Labour Organization (ILO), Okute and Chukwurah (2011) pointed out that employers are looking out for employees who are flexible enough to adapt, apply and transfer knowledge to different contexts in the performance of their duties under varying technological conditions, and respond independently and creatively to changing work demands for more highly skilled workers with a range of skills that can continuously be adapted to changing work environment.

Knowledge economy is powered by knowledge, and requires a pool of knowledgeable and skillful people to propel it. The jobs of the present and the future will no longer be found in the factories alone but in offices occupied by knowledge workers such as designers, engineers, information technology specialist, logistics experts, marketing staff and so on. These workers deploy knowledge in their productive services. Therefore, the capability of individuals, organizations and nations to harness knowledge and use it in the production of goods and services is the key enabler for such individuals, organizations and nations to remain relevant and highly competitive in the global market. Obanya (2013), citing Peter Drucker, noted that the manual worker works with his hand and produces goods and services, but the knowledge worker works with his head and produces ideas, knowledge and information. As can be deduced from the foregoing, the importance knowledge economy is evidenced from the fact that:

The problem of location is overcome as globalization has removed the boundary created by distance among nations; thus knowledge can travel more easily and less costly; educational and innovative intellectual products and services can be exported for a higher return than for physical goods.

Business transactions can take place over electronic networks; goods and services can be easily developed, purchased and sold via e-commerce and other networked linkages.

Knowledge supply is abundant so the economic problems of scarcity is replaced with abundance as information and knowledge can be shared, and can increase rather than diminish through application.

Characteristics of a Knowledge Economy

In a knowledge economy, the society is characterized by information. Information industry is taking the lead in networking the world economy, with computer technology and the internet as well as globalization reducing the world into a small village. The key players in the global field are those who have access to the networked village. According to Lingenfelter (2012), the envisaged knowledge economy would be characterized by:



Borderlessness: This means that knowledge can travel freely and more freely and more freely than money.

Upward Mobility: This implies that knowledge will be more available to everyone through easy acquisition of formal education.

Potential for Success and Failure: This implies that since anyone can acquire the means of production which is knowledge, there is a potential for both success and failure. Ability to acquire and efficiently utilize knowledge confers power and success while inability to avail oneself of the knowledge availability and utilization leads to failure.

Similarly, Obanya (2013:45) outlined the following as seven major characteristics of knowledge economy:

Unlike physical goods, information is non-rival non destroyed in consumption. Its value in consumption can be enjoyed again and again.

Bridges are being built between various areas of competence, as codification tends to reduce knowledge dispersion.

Learning is increasingly becoming central to both people and organizations.

Learning involves both education and learning-by-doing, Learning-by-using, and learning-by-interacting.

Initiative, creativity, problem-solving, and openness to change are increasingly important skills.

Flexible organizations are becoming the norm. They integrate 'thinking' and 'doing' and avoid excessive specialization and compartmentalization, by emphasizing multi-task job responsibilities.

Whereas Machines replaced labour in the industrial era, information technology has become the source of codified knowledge in the knowledge economy, demanding uniquely human skills such as conceptual, interpersonal and communication skills.

Defining the characteristics of the knowledge economy, Obanya (2013) held that knowledge has replaced raw materials, natural resources, machines, and manual labor as the most valuable factors of production. In the same vein, the knowledge economy is a direct twin product of the acceleration of history, and the digital revolution, in addition to being the prime mover of globalization.

Teacher Preparation in a Knowledge Economy and the Challenges of Higher Education

The emergence of knowledge economy has changed the concept of the labour market and the relationship between employers and employees. The knowledge economy has created the demand for 'knowledge workers' and has consequently transformed the demands of the world of work (Obanya, 2013). This change also reflects the need for workplace literacy that is the flexibility of knowledge and skill with which one can adapt to any work situation and perform with maximum efficiency. In order to achieve this feat, it is imperative that teachers who are facilitators, mentors and coaches in the process of knowledge acquisition must be adequately prepared through continuous professional development. Professional development of business education teachers involves the pragmatic process of knowledge update to with a view to improving the job-related knowledge, skills and attitude of the business educators in order to make them efficient and more adaptable to changing



work environment as well as place them at par with their counterparts elsewhere in the world. The need for professional development of business educators is paramount because it is believed that teachers have the responsibility for educating students and must have the knowledge, expertise and ability to influence decisions about teaching-learning environment. According to the National Business Educators Association (2010), educating students for technological change and complexities of workplace, as well as their personal business lives, compels business educators to commit themselves to continuing professional renewal. In the same vein, Okute, Egberi and Iwowo (2018) asserted that teachers are indispensable human resource, and indeed the single most important element in the school system; more important than the quality of equipment and materials and the level of financing. The teacher is expected to be upgrade his knowledge and skills in order to harness there resources of emerging technologies and innovations in the emerging knowledge economy.

The issue of professional development of teachers is as important as the professionalization of teaching as a profession. There is no doubt that the teaching profession is universally accepted as a noble profession. Furthermore, Inyang-Abia (2018) stressed that the teaching profession is not just a noble profession, but it is also the Doyen of professions. This is because without teaching, no profession can exist, as it is the teaching profession that creates, shapes, modifies, and enriches all other professionals. This implies that, irrespective of the field of study, no one can become a professional without passing through creative fingers of the doyen professional, the teacher. According to Inyang-Abia, the professional teacher has no substitute. In spite of the development of the newest and most sophisticated technologies, such as those that focus on artificial intelligence and robotics, the professional teacher is still a vital resource at various stages of educational development and attainment. In recognition of the vital role of the teacher, the Federal Republic of Nigeria[FRN] (2013) in her National Policy on Education noted that no education system can rise above the quality of its teachers. Likewise, John F. Kennedy the 35th President of the United United States of America stated: Our progress as a nation can be no swifter than our progress in education (Inyang-Abia, 2018). Thus qualitative education is a yardstick for development.

Higher education institutions especially universities which are the key frontiers of knowledge generation and transmission are faced with the challenge of producing graduates that will respond effectively to the demand of knowledge economy. Higher education (particularly universities) has the tripartite mission of (a) knowledge generation through research, (b) Knowledge transmission through teaching and (c) knowledge application through responsive social engagement. The third leg in the tripod of the mission responsive social responsibility being the key to redirecting higher education to remain continuously relevant in the twenty-first century (Obanya, 2012).

In a knowledge economy, therefore, knowledge has become the major component of human individual, social and corporate tool for productivity, wealth creation and sustainable human development. Knowledge is therefore the most valuable resource. The implication is that all human activities would rely on knowledge for its continuous growth, while enterprises of all types and forms would have knowledge as the main feature that would confer on them any measure of competitive advantage. As a result, the traditional pledge where employees expect a stable or lifelong employment will no longer be applicable. Rather, innovative ideas or intellectual capital, more than savings or investment, are the determinants of a nation's wealth. This means that the prosperity of nations



depends on their ability to generate and apply innovative ideas. This view is buttressed by Mba (2011), who, citing the UNDP Human Development Report, stressed that the real wealth of a nation is its people. Mba further affirmed that the basic concept of human development is the expression of people's freedom to live long, healthy and creative life; to advance other goals they have reason to value, and to engage actively in shaping development equitably and sustainably on a shared planet. In the same vein, Obanya (2012) pointed out that knowledge has become the major component of human individual, social and corporate tool for productivity, wealth creation and sustainable human development. In the face of global competition, therefore, knowledge and skills are a core asset.

The key players in this global arena will be those with knowledge power and these are those who will have competitive advantage. This implies that knowledge generation, knowledge transmission and knowledge application (or sharing) and will necessarily become the prime preoccupations of institutions and organizations outside the universities and other higher institutions.

Higher education institutions are therefore faced with the challenge of how to make their graduates function, relevant and responsive to the requirements of the workforce needed to drive the knowledge economy. One of the most prevalent manifestations of these challenges is the high rate of unemployment among graduates of higher institutions. The soaring unemployment rate among youths is worrisome. Mba (2012) established that about 50 percent of Nigerian youths are unemployed. The National Bureau of Statistics (NBS) official report in Mordi (2012) reported that Nigeria unemployment figure stood at 12.44 million in 2009, rose to 13.9 million in 2010, further rose to 16.74 million in 2011. As at 2012, the figure stood at 39.28 million, which represents 23.9 percent of the country's estimated population of 164.38 million. As at September, 2018, Nigeria, with a population of 191 million and with an area of 923,768 km² has the 14th largest landmass in Africa and ranks first in terms of population. When compared with other African Countries, Nigeria's educational status established through the adult literacy rate stands at 59.6 (a rate that the Minister of Education, Alhaji Adamu described in 2017 as alarming), being the 144th out of 169 countries. When compared with other African countries such as Libya (91%), Zimbabwe (86.5), Uganda (78.4), Ghana (76%), and Cameroon (75%), it becomes obvious that the sleeping giant of Africa had long lost the glory because of high positive correlation of literacy level with life expectancy, education, per capita income, living standard and other indicators (Inyang-Abia, 2018).

This phenomenon has persistently raised the question of the preparedness of universities and other higher education institutions in Nigeria to fit into a knowledge-driven economy. This apparently calls for redefining the curricular of higher education towards transformation in the direction of what Obanya (2012) described as the desired social laboratory orientation. This is predicated on:

- Practical concerns of everyday life;
- Easy to understand procedures, accessible to the average person;
- Useable research, applicable to genuine societal challenges.
- Participatory academic processes;
- Ready acceptance of other knowledge practitioners;
- Closer link and mutual intelligibility of academic and practical language;
- Opening up to wider society;
- Working in concert with extra-academic actors.



Obanya further pointed out that these directions for higher education institutions will lead to the characterization of the social laboratory that higher education institutions should become, if they are to fit into the twenty-first century global community. It follows then higher education will take on new characteristics of being creative. This implies that higher education should produce graduates who not have the ability but also have the desire to create knowledge products that will not become worthless with the development of new technologies. Higher education should focus on exploring the curiosity, the desire and the continuously creative ability of students, that is, higher education should be creative, ensure comprehensive quality education that consists of four 'learns' such as:

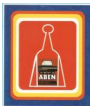
- Learn to know
- Learn to do
- Learn to be, and
- Learn to live together.

Knowledge economy will require high-quality labour, with the upgrading of industrial structure; at the same time, structural unemployment will increasingly become the inevitable social menace (Zhaoxiu, n.d.). Higher education should be alert to the needs of the society in terms of high-quality labour, and should vigorously pursue lifelong education which requires people to continue to learn, to update, enrich and improve their knowledge. Higher education should no longer be restricted to study on campus. Higher education is multi-channel and open education, requiring high-level universities to engage in exchange programmes with world-class universities, and also can cultivate people who have international vision, open mind, reformed spirit, innovation and formidable intelligence (Zhiyum, 2010). The implication is that higher education institutions need to redefine their goals through effective knowledge management to produce intellectually competent graduates who can export knowledge products.

Knowledge Economy and the Nigerian Position: The Global Perspective

Knowledge economy is propelled by a pool of intellectuals with the capabilities to adapt knowledge to problem-solving situations. In order to harness this pool of highly knowledgeable human capital to drive the knowledge economy, there is urgent demand to embark on pragmatic re-ordering of educational programmes toward educating the citizens to work more with ideas and concepts than objects. The countries that lead in the knowledge economy are those whose citizens have access to qualitative education. The same cannot be said of Nigeria with a population of 191million people, but with only 4.3% of her youthful population having access to university education. For Nigeria, this percentage does not compare favourably with 37.5% for Chile, 33.7% for Singapore, 28.2% for Malaysia; and 16.5% for Brazil (Ezekwesili, 2013).

Nigeria's lag in tertiary education enrolment is quite revealing and could be interpreted as the basis of the competitiveness gap between the same set of countries. The reason is attributable to the fact that tertiary enrolment rate which is the percentage of total enrolment, regardless of age, in post-secondary institutions to the population of people within five years of the age at which students normally graduate from high school, plays a vital role in society in the creation of new knowledge, transferring knowledge to student and fostering innovation.



Research findings have shown that countries with the most highly educated citizens are also the wealthiest in the world, and they are those dominating the global market in a knowledge-based society. Ezekwesili (2013) established that countries like the United States of America, Canada, Japan, Finland, Norway, Israel, South Korea, United Kingdom, New Zealand and Australia occupy the second- and sixth-highest Gross Domestic Products (GDPs) and per capita, and this is attributable to their aggressive investment in education. It is obvious from research findings that the key variable that determines how fast nations outgrow others is the speed of accumulation of human capital especially through science and technology education. According to Ezekwesili, it is not surprising, then that South Korea with a population of 50 million people has a GDP of \$1.12 trillion; Brazil of 196 million people has \$2.48 trillion; Malaysia of 38 million people has \$278.6 billion; Chile of 17 million people has \$248.59 billion; Singapore of five million people has \$318.7 billion, while Nigeria with a population of 191 million people has a GDP of \$235.92 billion. The more advanced economies continue to dominate the global markets as they continue to intensify the knowledge economy strategies by investing more in education, ICT and innovation.

The case is different with Africa. Besides regional knowledge hubs such as South Africa, sub-Saharan Africa is faced with a myriad of problems, let alone the challenges faced to create competitive knowledge economy. With only 30% of the population having access to electricity, it is not surprising that Africa has the lowest internet penetration of only 3% compared to the world average of 14% (Sinkovec, 2012). Since knowledge is abundantly supplied on the internet, one of the key initiatives in improving the quality of life and future prospects in a knowledge economy is the provision of access to internet resources.

Pillars of Knowledge Economy

The World Bank (2003) developed a four-dimensional framework that describes the basic elements of the knowledge economy. This framework makes it possible to gauge and compare the progress of countries in becoming part of the knowledge economy. Leading economies in the knowledge economy era are anchored on four pillars. The World Bank's Knowledge Assessment Methodology (KAM) (2012), using Knowledge Economy Index (KEI), identified the four pillars of Knowledge Economy to include:

- Economic Incentive and Institutional Regime (EIR);
- Innovation and Technology Adoption (ITA);
- Education and Training (ET), and
- Information and Communications Technologies (ICT) infrastructure.

The four pillars emphasize Economic Incentive and Institutional Regime (EIIR) that promotes and encourages the efficient use of existing and new knowledge; flourishing of entrepreneurship; an educated, appropriately trained, creative and skilled population that is capable of creating, sharing and using knowledge; an efficient innovation system made up of firms, research centres, universities, think tanks, consultants, and other organizations can tap into the growing stock of global knowledge, adapt it to local needs and create new technological solutions. A modern and accessible ICT infrastructure serves to facilitate the effective communication, dissemination and processing of information to increase knowledge. This is illustrated in figure 1.

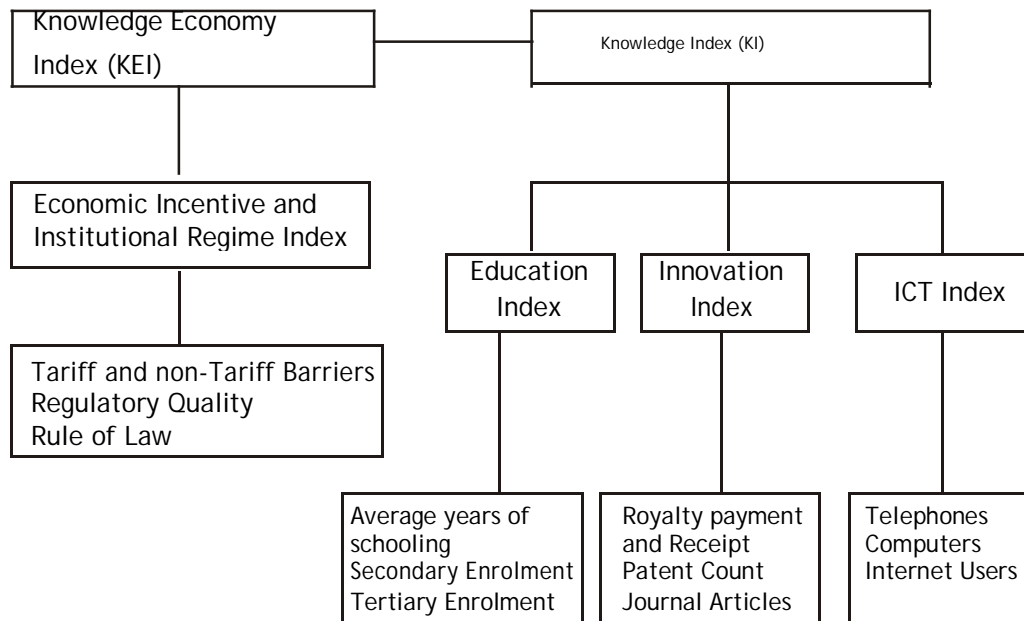


Figure 1: Knowledge Indexes
 Source: KAM (2012)

Using the Knowledge Economy Index (KEI) based on four identified pillar indexes, the World Bank Knowledge Assessment Methodology (KAM) identified top ten economies as shown in Table 1.

Table 1: The Top 10 Economies in Each Pillar

Rank	EIIR	Innovation	Education	ICT
1.	Singapore	Switzerland	New Zealand	Bahrain
2.	Finland	Sweden	Australia	Sweden
3.	Denmark	Finland	Norway	Luxembourg
4.	Sweden	Singapore	Korea, Rep	United Kingdom
5.	Hong Kong,	China	Denmark	Greece ,Netherlands
6.	Switzerland	United States	Sweden	Finland
7.	Canada	Netherlands	Iceland	Switzerland
8.	Norway	Israel	Taiwan, China	Germany
9.	Luxembourg	Taiwan, China	Ireland, Taiwan	China
10.	Austria	Canada	Spain	Hong Kong, China

Source: KAM (2012)

As can be seen in Table 1, Singapore came first under Economic and Institutional Regime Pillar and came fourth under Innovation Pillar. Thus, Singapore has strong performance in two of the indicators of knowledge. Under Innovation Pillar Index, Switzerland ranked first, came sixth in Economic Incentive and Institutional Regime and seventh in ICT adoption. In Education, New



Zealand tops the list. Sweden came second in Innovation and in ICT adoption, fourth in EIIR and sixth in Education. Thus, Sweden has a strong performance in all the four pillar indicators of the knowledge economy. Similarly, Finland took second in EIIR, third in Innovation, and sixth position in ICT pillars. Bahrain tops the list in ICT pillar. Denmark came third in EIIR, and fifth in Innovation pillars. Australia came second in Education; Luxembourg came third in ICT and ninth in EIIR. Norway came third in Education; United Kingdom occupied fourth position in ICT, while Korea Republic came fourth in Education. Hong Kong, China came fifth in EIIR but occupied tenth position in ICT. Greece came fifth in Education while Netherlands came fifth in ICT and seventh in Innovation. United States took the sixth position in Innovation. In the same vein, Canada came seventh in EIIR, and tenth in Innovation. Iceland came seventh in Education. Israel and Germany came second in Education, while Ireland came ninth in Education. Austria and Spain took tenth position in EIIR and Education respectively.

From the foregoing, it is obvious that leading economies in the knowledge economy are anchored on the four identified pillars. Obviously, too, Nigeria has no place in the economy, judging by the four pillar indices. Nigeria must give priority attention to education, innovation and technology adoption. Education is the nucleus of development and the pivot on which all other pillars of knowledge economy revolve. Incentives that promote efficient use of existing and new knowledge must be based on the awareness of the needs of the society. This awareness is based on education and training an understanding of what society requires for sustainable growth. Similarly, innovation and technological adoption are predicated on the level of know-how and skills acquired through education and training as well quality of research anchored on good education. Furthermore, information and communication technology (ICT) infrastructure cannot be provided and utilized if the stakeholders are not well- educated or schooled on the inestimable value of such provision and the skills needed to maximize the utilization of such infrastructural provision. Investment in education and training for skills development is therefore critical to boost growth and competitiveness. This is further accentuated by the European Commission Euro.Com (2012) which stressed that investment in education and training is key to increasing productivity and economic growth.

China is a giant nation that has risen to the challenge of the knowledge economy. As reported by Sinkoves (2012) under the auspices of the Knowledge Economy Network, Haidian, a lesser-known district in Beijing, is now home to 40 universities, 138 science research institutes and 810 engineers. With these, China is competing favourably in the knowledge economy. Chinese products now dominate the world market. This is because China invests heavily in the education and training of its citizens. The more educated a nation's citizens are, the more likely and more rapidly its economy will be able to catch up with innovation and technological adoption.

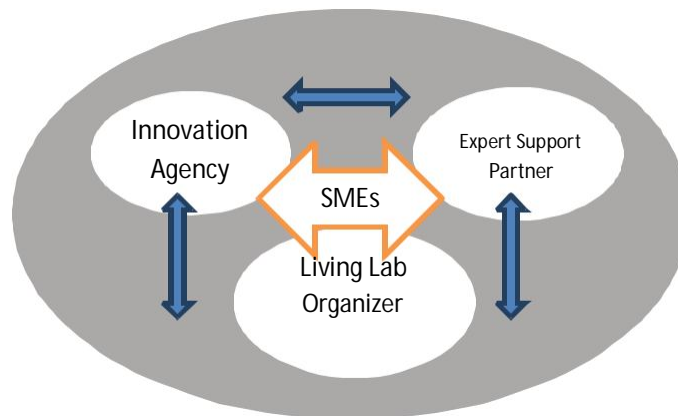
Supporting the Knowledge Economy Growth: The way Forward

Knowledge economy is powered by a pool of intellectuals with ability to think critically and apply knowledge creatively to bring about innovations in the production, distribution and utilization of resources. In the face of the challenges of catching up with this new voyage of development, more emphasis should be placed on investing more in education.

Another way forward in overcoming the challenges of higher education in a knowledge economy is to create a network of living laboratory (NOLL). A living laboratory is a research concept

that is user centred, open-innovation ecosystem. A living laboratory can be operated on a territorial or regional context, while integrating concurrent research and innovation processes within a public-private-people partnership (Alpher, n.d.). Living laboratory focuses on experience sharing and user acceptance of innovative solutions provided by stakeholders and experienced research centres . Living laboratories are fundamental to the implementation open, innovative business models geared toward Small- and Medium-scale Enterprises (SMEs) needs, and to create user-experience. The European Network of Living Labs (ENoLL) is an example of Network of Living Lab.

Figure 2: Regional Living Labs Environment for Open Innovation



Source: Adapted from Alpher (n.d)

Higher education institutions can create Living Laboratories that bring together innovation agents, expert support partners and Living Lab Organizers, with SMEs as the centre of focus.

Conclusion

The emergence of knowledge economy is an upsurge of technological advancement, globalization and exponential growth of information. This has created a new work-place demand for new skills intellectual capabilities ability to work with ideas rather than with tools. The job market of the knowledge economy requires knowledge workers who can adapt their skills and work elsewhere from anywhere. The ability to rise up to these challenges confers economic power and wealth creation while failure or inability to join the voyage of knowledge economy creates structural unemployment and poverty, particularly for developing nations.

Higher education institutions are faced with the challenge of producing graduates who will be intellectually competent and flexible enough to compete favourably in the knowledge economy. There is therefore a great demand for teachers in higher education institutions to be systematically exposed to knowledge and skills update through continuing professional development to equip them with the teaching competence with which they can exert positive influence on students for quality learning. More advanced nations are more responsive and adaptable to knowledge economy because of their technological diversity, vibrant educational policies and innovative approaches. Developing countries are faced with competitiveness pressure as a result of poverty, limited access to qualitative



education and poor technological adaptation. However, all hope is not lost. Government of developing nations need to re-strategize their educational goals, vision and mission toward qualitative education for global competitiveness.

Suggestions

Knowledge economy is already here with us and its impact is made visible in the society. The only option is to adapt and align with the trend. It is therefore recommended:

Government of developing countries, especially that of Nigeria, should pay greater attention to, and invest more in education through improved funding, provision of infrastructure and structures that enhance educational access to the generality of youth at affordable cost.

The curricula of higher education should be constantly reviewed and made flexible enough to accommodate changes in the global market place.

National Universities Commission (NUC) should encourage universities which are the highest level of higher education to strengthen and support knowledge alliance to implement a comprehensive set of activities that stimulate the sharing, exchange and flow of knowledge between higher education institutions and enterprises.

NUC, NBTE, NCCE and other supervisory agencies/stakeholders should emphasize quality assurance in education by ensuring that the right caliber of personnel are recruited and retained, availability of adequate and functional equipment and instructional facilities, conducive work environment for staff and students.

At the policy implementation level, stakeholders should have the will power to condemn corrupt practices and invoke the instrument of discipline to sanction those engaged in such obnoxious acts to serve as deterrent to others, while those committed to quality assurance in education should be motivated.

Greater attention should be paid to research and development.

Reward and promote excellence by encouraging young innovative and creative graduates with potentials, knowledge and skills to invest their wealth of potentials in Nigeria for the transformation of the nation's economy without political bias.

References

- Agomuo, E. E. (2008). Business education in the 'e' era: Implication for national education reforms. *Association of Business Educators of Nigeria (ABEN) Book of Readings, 1(8), 241-254.*
- Davinport, T. & Prusak, L. (2008). *Working knowledge*. Boston: Harvard School Press, MA.
- EuroCom (2012). Rethinking education: Investing skills for better socio economic outcomes. Retrieved from http://ec.europa.eu/euroaccess/pdf/research_policies/Toward_European_Framework_for_Research_Careers_final_pdf 22nd November, 2017.
- Ezekwesili, O. (2012). The wealth and poverty of a nation: Who shall restore the dignity of Nigeria? University of Nigeria, Nsukka 42nd Convocation Lecture 24th November, 2012.
- Federal Republic of Nigeria[FRN] (2013). *National policy on education*. Abuja:NERDC.
- Inyang-Abia, M. E. (2018). Survival of the teaching profession in contemporary Nigeria. A Paper presented during the Faculty of Education 5th induction ceremony teachers into the Teachers Registration Council of Nigeria, held at University of Calabar, on 20th September, 2018.



- Lingerfelter, P. E. (2012). The knowledge economy: Challenges and opportunities for American higher education. Educause Publication. Retrieved from <http://www.radix-net/'-ash2jam/welcome,htm>.
- Lucey, T. (2005). *Management information system (9th edition)*. United Kingdom: BookPower/Cengage Learning.
- Mba, C. C. (2011). Globalization and knowledge economy: Implication for Africa's economic development. *International Journal of research*, 11 (1), 111-129.
- Mordi, R. (2012). "The unemployment time bomb". *Tell (Broadstreet Journal)* 12, 32 -35. Retrieved from www.bsjournal.com.
- Obanya, P A I (2012). 21st Century higher education in Nigeria and skills acquisition: The issue of curriculum. Convocation Lected delivered at the 26th convocation ceremony of the University of Calabar, Nigeria 1st March.
- Obanya, P A I (2013). *Workbook and complementary reader on: Quality teaching for quality learning in higher education*. A programme of Centre for Teaching and Learning Excellence, Unical with assistance from Step B Centre of Excellence for Infectiojs Disease, Unical.
- Okute, A. L. & Chukwurah, C. C. (2011). Rethinking teacher quality at the higher education level: Need for ethical re-orientation towards teacher effectiveness in business education. *Analns of Modern Education*, 3 (1), 98 107.=
- Okute, A. L., Egbri, J. N. & Iwowo, S. E. (2018). Quality assurance in Vocational/Technology Education and sustainable development in Cross River State. *International Journal of Educational Development*, 22 (2), 74 87
- Sinkoves, B> (2012). *Knowledge ecooydevelopents, general trends and the KEN country ranking. Knowledge Economy Network (KEN) Brief No. 21, June, 2012.*
- Zhaoxius, L. I. (n.d.). *Innovation of higher education in knowledge economy era*. 454000-lizhaoxius@hpu.edu.cn.
- Zhiym, L. (2010). *Thought on achieving modernization in higher education*. Chinese Higher Education, 2010 (10), 29.