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A FRAMEWORK FOR THE DEVELOPMENT OF KNOWLEDGE ECONOMY MODEL IN NIGERIA

Uduak D. George
Department of Computer Science, University of Uyo, Uyo, Nigeria.
udwack@gmail.com

&

Mfreke J. Umoh
Department of Computer Science,
Akwa Ibom State Polytechnic, Ikot Osurua, Nigeria
Mfreke_u@yahoo.com

&

Okure U. Obot
Department of Computer Science, University of Uyo, Uyo, Nigeria.
abatakure@yahoo.com

Abstract

This paper proposes a framework for developing a knowledge economy model for Nigeria's economic development. Top-notch economies in the world are technologically driven due to knowledge creation, communication and utilization. Several artisan workshops (such as auto mechanics, welders, carpenters and furniture makers) in the city of Ikot Ekpene in Akwa Ibom State, Nigeria, were visited and the workers interviewed to establish their awareness of the extent which current Information and Communication Technology (ICT) tools can assist in their business activities. Results reveal their educational attainment at primary schools (50%), secondary schools (32%) while about 16% did not complete primary education. About 90% was unaware of the use of ICT tools in perfecting and learning current skills in their chosen craft. This necessitates the development of a triangular knowledge economy model where majority of the people at the base of the triangle are introduced to the use of ICT tools at the early stage of their entrepreneurship. Next up the ladder are those in secondary education who are to be given more training on the tools. Others can on their choice, engage themselves on further advanced ICT tools. The paper therefore recommends rigorous ICT education investment at the primary, secondary and technical education levels. Also, government should embark on compulsory free ICT training of the existing artisans with the plan of building separate centres for key artisans which are identified as areas of strengths in major cities in the state. These will help boost the attainment of a robust knowledge economy in Nigeria.

Keywords: Knowledge economy model, ICT, artisans, skills, triangular, education, knowledge-base.

Introduction

Economies in the world are undergoing phased transformations to improve socioeconomic development. The world has undergone several industrial revolutions from the first to the fourth, where the fourth industrial revolution is basically that of Internet of Things (IoT) and Cyber-Physical Systems (CPS) (Liao, 2017). Currently

there is a global drift towards the development of knowledge economy (Adekemi, 2015) which seeks to introduce another industrial revolution. Knowledge Economy (KE) is the economy where the stakeholders create, disseminate and utilize knowledge aggressively for effective economic and social growth. Several developed countries have effectively developed and applied the KE principles to improve their economies and therefore stay ahead of many others. According to African Development Bank (2020), the fourth industrial revolution will shift jobs toward automation and knowledge-intensive activities with serious improvement on basic literacy as well as expansion of higher education. However, Nigeria is paying little or no attention towards efforts to unravel the connection between knowledge and wealth creation which is the current trend in the emerging new world economy. For instance, public education investment in the country is currently at the low ebb, evident on the incessant industrial actions by higher educational institutions.

As knowledge is a super factor in every successful endeavour, it is pertinent therefore to place enormous emphasis on its adoption and use. Majority of growths recorded in several economies are attributed to knowledge accumulation rather than on the traditional factors of production, implying that such economies are now driven by technologies based on knowledge and information production, dissemination and use (Ogundende & Ejohwomu, 2016). Knowledge levels of young people in Nigeria are low as proper investment in education at the primary, secondary and tertiary levels is lacking. Considering the emerging global economy which requires innovation, flexibility and adaptability by workers, Nigeria urgently needs to be more responsible to the citizens by bridging the existing inadequacy in skills acquisition since one third of the working class population in low and middle income countries do not have the basic skills required to get quality jobs (The World Bank, 2017). Assisting the youths to develop skills can be an economically sensible venture. It is important to note that the nature of work is being reshaped by technological advancement and the demand for additional skills is inevitable (The World Bank Annual Report, 2020).

Information and Communication Technology (ICT) helps a country to benefit from the KE as it plays a central role in boosting productivity, higher economic growth and encouraging innovation through adoption and adaptation of new technology (Anyira & Idubor, 2020). ICT is the basis for development of knowledge and it needs to be supported by government. Boljanovic *et al*. (2014) corroborates the precondition of information technology for survival, generation, advancement, sharing and dissemination of existing and new knowledge.

To this end, this study seeks to answer the following Research Questions (RQs):

RQ1: What are the basic academic qualifications of artisans in Ikot Ekpene town?

RQ2: What is the level of ICT knowledge of an average artisan in Ikot Ekpene town?

RQ3: How can the basic knowledge of ICT be instilled into an artisan in Ikot Ekpene town to help improve their creativity in business?

RQ4: How can this instilled knowledge of ICT be harnessed to create and distribute wealth?

Review of Related Literature

Adekemi (2015) presented the challenges and opportunities towards a knowledge-based economy for Nigeria. The global drift towards the development of

knowledge economy and Nigeria's low knowledge readiness status necessitated this for urgent development of the economy. The work aimed at carrying out a descriptive analysis of the challenges and opportunities of metamorphosing Nigeria into a knowledge-based economy. Four pillars of knowledge economy were used to discuss the possibility of transforming Nigeria. Nations with higher knowledge ratings than Nigeria were studied to elicit lessons from them.

Also, using available data and information, Nigeria knowledge status was examined. It recommended the deployment of ICT to drive the other pillars of knowledge economy. Asongu and Nwachukwu (2017) carried out a survey of policies and strategies for building knowledge economies in Africa. The study aimed at highlighting the policies and strategies which could be of assistance to African countries to fast track their drive towards knowledge economy. The discussion focused on the four pillars of knowledge economy put up by the World Bank. The policies and strategies examined concentrated on education/skilled population, ICT, economic incentives/institutional regime and innovation systems. The study recommended empirical investigation of the contributions of knowledge economies towards job creation and poverty reduction.

In Adedamola and Obuks (2016), knowledge economy as a panacea for sustainable development in Nigeria was presented. Lack of empirical studies to help establish the link between knowledge, health and wealth in an emerging economy in Nigeria was observed. The paper examined the contribution of individual knowledge and creativity as a vital production value and panacea for economic growth and global repositioning. It also examined the readiness of Nigerian government towards knowledge economy and the type of social arrangement that is available to impact on knowledge generation and its diffusion. The interpretive paradigm was used for analysis of some knowledge-based economies as well as using the Burrell and Morgan's typology of sociological paradigms to develop a Knowledge-Based Economy framework based on a case study of four economies in the world. Aliu and Aigbavboa (2017) examined the roles of Higher Education Institutions (HEI) in the process of transformation to a knowledge-based society. It was observed that there was a gap between the construction industries expectations and the actual students' capabilities. The paper aimed at examining the major roles played by HEIs to ensure a knowledge-based Nigerian society and also suggest policies that could help to achieve this status.

A desk research approach which involved the out-sourcing of data from various existing sources such as academic publications, the press, internet and statistical publications was employed, where cross-referencing and eventual collection of relevant data took place. The following suggestions were offered: formulation of effective practical educational policies, periodic review of curriculum, adequate funding for infrastructures in HEIs, encouragement of more industry collaborations and encouraging honest educational activities devoid of political influence. It was recommended that huge investment in science, technology and innovation in HEIs should be made by government as well as ensuring the protection of intellectual property of researchers. Anyira and Idubor (2020) presented the role of education and libraries in developing Nigeria's knowledge economy. The disconnect between education and library was observed as an aspect bedevilling proper dissemination and use of knowledge in Nigeria. This work aimed to highlight the role played by education and libraries towards Nigeria's knowledge economy development.

The characteristics of knowledge economy as well as roles of education and library of knowledge economy were discussed. Increase in ICT investment, enabling private sector participation in ICT deployment and formation of national/sub-national knowledge economy committees were the major recommendations for attaining a knowledge economy in Nigeria. Ekanem and Okon (2015) examined the transformation of university knowledge production towards the promotion of inclusive development in Nigeria. Nigeria had been observed not to have joined the current global change in terms of the post-industrial revolution. The study aimed at harnessing university knowledge production to promote inclusive development in Nigeria. Descriptive survey design was studied in order to provide basic information to support university knowledge-driven inclusive economic growth. Simple descriptive statistics from the National Bureau of Statistics as well as National Economic Review of the National Planning Commission were used to carry out the research. Results showed low capacity in university knowledge production which eventually led to low Gross Domestic Product (GDP) per capita as well as low Knowledge Economy Index (KEI). Several recommendations were offered which centered on overall improvement of the quality of university education in Nigeria.

In Roztocki *et al*. (2019), the role of information and communication technologies in socioeconomic development was presented. The research sought to provide a conceptual framework that influences the socioeconomic development of a country. In developing their framework, four dimensions that impacted on socioeconomic development were considered, namely, society, business, policy and technology, where the dimensions represent the independent (or explanatory) variables. Socioeconomic development served as the dependent (or response) variable. The proposed framework, which built on existing frameworks, considered all ICT instead of specific types of ICT and also applied to all economies and regions rather than only less developed ones. Several recommendations for future research were made to include examining the contributions of international organizations and large corporations, addressing challenges of population ageing as well as alignment of ICT adoption process with the level of development of a country.

In Emmanuel *et al*. (2019), fostering a knowledge economy via ICT as a panacea to economic recession in Nigeria was presented. The authors observed a stunted economic growth and development in Nigeria despite numerous government programmes. The paper sought to find out if knowledge-driven economy could be a solution to economic recession. A total of 1320 data set was gathered in Benue State, Nigeria using questionnaire while logit regression was used for data analysis. Results show that knowledge-based economy is the solution to economic recession and that ICT is its gateway. Recommendations were diversification of economy, entrepreneurship development, skills acquisition in schools, formulation of attractive economic policies, provision of basic infrastructure, provision of national security and a stable political climate. Boljanovic *et al*. (2014) presented information technologies in knowledge economy. It was observed that in the second half of the twentieth century, industries were organized at the trans-national rather than national levels which resulted in an insufficient use of ICT in business community and in state administration in Serbia.

The paper analysed the importance of ICT in knowledge management and its impact on the competitive advantage of Serbian economy. Data was sourced from the World Economic Forum on the use of information technologies as well as data from job advertisements in Serbia, Croatia and Bosnia and Herzegovina. The findings

indicated that the utilization of ICT in the three neighbouring countries was at almost the same level and therefore called for improvement. ICT has assisted in business decision making and predictions such as in inventory control and predictions (Obot *et al*., 2019).

The use of ICT in intelligent inventory predictions for small and medium scale enterprises (SMEs), which could help in cutting down cost of inventory thereby increasing profitability and reducing wastes, the key indices to wealth creation, is also demonstrated in Obot *et al*. (2021). Another factor that inhibits creation of wealth through business activities is improper evaluation of supply of raw materials and distributions of finished products. SMEs are found wanting in evaluating their supplies and distributing of their finished products based on the technicalities of the suppliers/distributors, products and raw materials. ICT-based contract evaluation could be harnessed by SMEs to increase their efficiency, productivity and reduce wastages. In George *et al*. (2016) such a system is developed that could be learned and practiced by artisans to aid in their business thereby creating wealth.

Data Presentation and KE Framework

Attention is focused on the informal sector of the economy where majority of the young people are engaged for their livelihood. This sector represents a group of people who could not advance their education but were able to learn one skill or the other.

Data Presentation

Artisans constitute a huge population of citizens in our society who make a living from their acquired skills, train others on the skills and generate employment opportunities for the teaming youths. Since it is established that ICT is the basis and precondition for KE development, the research sought to examine how equipped the artisans are on the deployment of ICT tools towards advancement of their skills and subsequent creation of innovative products in line with the emerging global economic standard. A total of 218 artisans in 35 artisan workshops (such as carpenters, welders, fashion designers, auto mechanics, painters, brick layers and furniture makers) were visited in the city of Ikot Ekpene in Akwa Ibom State. Direct interview method was used to interact and elicit information from the available personnel in each of the workshops. Table 1 shows the responses of the artisans concerning their level of education.

Table 1: **Educational Level of Artisans**

Workshop Id	No.of Artisans	Primary School Holders	Secondary School Holders	School Dropout	Non-Responsive
W01	6	2	3	1	0
W02	3	2	1	0	0
W03	8	4	3	1	0
W04	10	5	3	2	0
W05	2	0	1	1	0
W06	5	2	2	1	0
W07	4	2	1	1	0
W08	8	5	1	2	0
W09	3	2	1	0	0

W10	7	4	2	1	0
W11	8	4	2	2	0
W12	7	3	2	2	0
W13	7	4	2	0	1
W14	8	5	2	1	0
W15	9	5	2	2	0
W16	12	7	4	0	1
W17	6	4	1	1	0
W18	9	5	2	2	0
W19	8	4	2	2	0
W20	2	1	0	1	0
W21	4	2	1	1	0
W22	6	3	2	0	1
W23	8	4	2	2	0
W24	2	0	1	1	0
W25	3	0	2	1	0
W26	1	1	0	0	0
W27	1	1	0	0	0
W28	8	3	4	0	1
W29	7	4	2	1	0
W30	8	4	3	1	0
W31	11	7	3	1	0
W32	4	1	2	1	0
W33	9	3	5	1	0
W34	6	3	2	1	0
W35	8	3	4	1	0
TOTAL	**218**	**109**	**70**	**35**	**4**

The number of available artisans (both trainers and trainees) was recorded with their level of education. However, some did not respond to the interview. In the same way, their awareness status concerning the usefulness of ICT tools to skills development in their chosen trade was also recorded as presented in Table 2.

Table 2: **Awareness on the use of ICT Tools**

Workshop_Id	No. of Artisans	Aware	Unaware	Uninterested
W01	6	0	6	0
W02	3	1	2	0
W03	8	0	7	1
W04	10	1	9	0
W05	2	1	1	0
W06	5	0	5	0
W07	4	1	3	0
W08	8	0	8	0
W09	3	0	2	1
W10	7	0	7	0

W11	8	0	8	0
W12	7	0	6	1
W13	7	1	6	0
W14	8	1	7	0
W15	9	1	8	0
W16	12	0	11	1
W17	6	1	5	0
W18	9	0	8	1
W19	8	1	7	0
W20	2	1	1	0
W21	4	1	3	0
W22	6	0	6	0
W23	8	0	7	1
W24	2	0	2	0
W25	3	0	3	0
W26	1	1	0	0
W27	1	0	1	0
W28	8	0	8	0
W29	7	0	6	1
W30	8	1	7	0
W31	11	1	10	0
W32	4	1	3	0
W33	9	0	9	0
W34	6	0	6	0
W35	8	0	8	0
TOTAL	**218**	**15**	**196**	**7**

Some of the artisans were not interested on how useful the tools could be.

Educational level and the awareness status of the artisans are summarized in Table 3 and Table 4 respectively.

Table 3: Education Level Summary

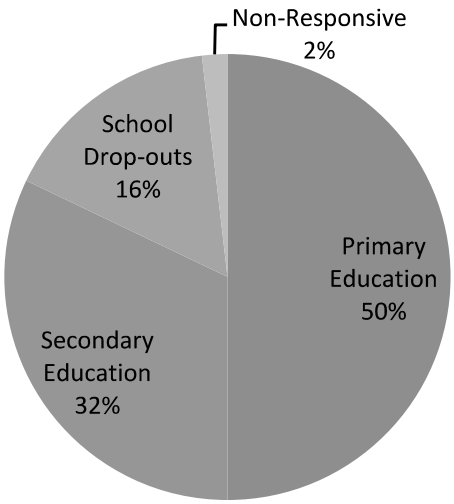
Educational Level	Frequency of Respondents	Percentage
Primary School	109	50%
Secondary School	70	32%
School drop-outs	35	16%
Non-Responsive	4	2%

Table 4: Summary of Awareness Status

Awareness Status	Frequency of Respondents	Percentage
Aware	15	7%

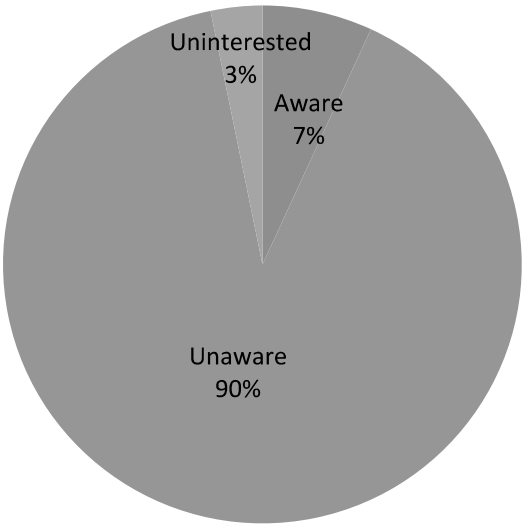
Unaware	196	90%
Uninterested	7	3%

Figure 1:The distribution of artisans according to their level of education.
Figure:Distribution of Artisans' Level of Education



The knowledge of the use of ICT tools in their business is shown in Figure 2.

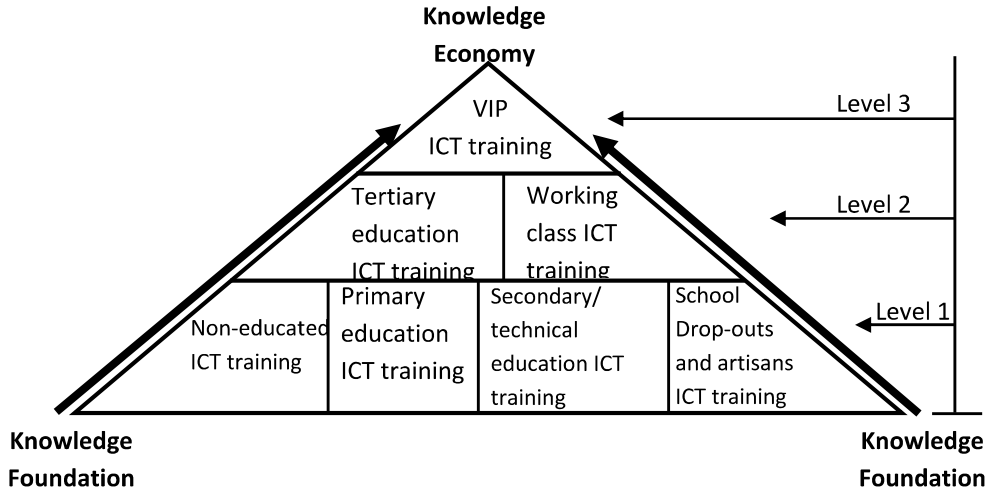
Figure 2:Level of Awareness of Artisans



3.2 **Knowledge Economy (KE) Framework**

Based on the obtained data, a triangular Knowledge Economy framework is designed with majority of the citizens who can be impacted with ICT skills at the base of the triangle. The model is as shown in Figure 3.

Figure 3: Triangular Knowledge Economy Framework



The first level at the base of the triangle comprises majority of the citizens at the grassroots who are at the foundation level of knowledge in the economy. The second level up in the triangle consists of those in the tertiary education and the working class. Finally, there is the third level at the tip of the triangle, ICT training should be administered to those considered as the Very Important Personalities (VIP) to keep them updated on the current trends in technology. The model proposes an upgrade of the UNIDO/HP Learning Initiative for Young Entrepreneurs (2021). Among others, applications like MS-Excel to generate invoices for their businesses instead of patronizing printers as their businesses are at the growing stage. Web development training can also be incorporated where they can showcase their initiatives to the world. The model envisages a society where the use of information technology, a core component of the KE pillars (Adekemi, 2015; Asongu & Nwachukwu, 2017), traverses all facets of the economy. This will expose people from the early stages of life to adequate knowledge generation, sharing and utilization.

Analysis of Data

Thirty-five (35) artisan workshops generated a total of 218 respondents for oral interview and interaction. 109 artisans obtained primary education representing 50% of the total while 70 representing 32% obtained secondary education. The number of primary/secondary school drop-outs was 35 representing 16% and 4 of them representing 2% did not respond to queries. Only 15 artisans representing 7% were aware of the use of ICT to advance their skills and improve innovation in their trade. 196 artisans representing 90% of the total number were not aware of the use of the tools for their trade while 7 (3%) of them did not show interest in ICT. On the average, every workshop had 6 artisans either learning or practicing the trade.

Conclusion

KE is a global economy driven by adequate knowledge in all sectors to drive the economic system. It is globally acknowledged that to attain the KE status, ICT as one of the four pillars of KE, is the primary driver where everyone including governments and their agents must adopt and use. Investigation using Ikot Ekpene town as a case study has shown that majority of the interviewed artisans' population is not aware of the use of ICT for business enhancement and also a greater number of people engaging in one skill or the other are primary education certificate holders

followed by secondary education certificate holders. The artisans, who are a part of the Small and Medium Scale Entrepreneurs (SMSE) in the country, with a great population can be used to build the KE status of our nation. For future research, formulation of a mathematical representation of the triangular knowledge economy model is necessary.

Recommendations

From the forgone discussion and findings, the following recommendations are provided:

1. A vigorous ICT training for the artisans as well as people in primary, secondary, tertiary institutions and school drop-outs.

2. A serious investment in ICT infrastructure in Nigeria's education sector is in order.

3. Enabling environment should be created for implementing the training by creating separate business areas for certain groups of artisans in the three senatorial districts headquarters in Akwa Ibom State for instance, where government provides a broad bandwidth for them to subscribe. This could be done through Public Private Partnership.

4. Government should identify some areas in the State that seem to specialize in a particular skill and develop the artisans through ICT. This way, wealth could be created through knowledge economy, the current trend in the world now.

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