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Security Challenges for Building Knowledge-Based Economy in Nigeria

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Abstract

The world economy is changing at an unprecedented rate. The forces of globalization and Information and Communication Technologies (ICT) progress are changing the way people all over the world living. Some countries, especially in the emerging world such as China, Malaysia, India, and Singapore among others, are using this wave of change to drive rapid growth in their economies. Nigeria yet to struggle to come to terms with these fundamental shifts in the global economic order. And for it (Nigeria) to secure its place in the global economy, it needs at least a decade to balance the growth that lays the foundation of this ongoing prosperity. This balanced growth can only come from one place, thus the knowledge based economy. Hence, to build the Knowledge-Based Economy in Nigeria, the security challenges of the phenomena (Knowledge-Based Economy) need to be identified and its possible solutions. This paper presents some of the security challenges for building Knowledge-Based Economy in Nigeria and their possible remedies.

Keywords*: Knowledge, Economy, IT, ICT, Security, Information, Challenges*

1. Concept of Knowledge Based Economy

The world economies are increasingly based on knowledge and information. The knowledge is recognized as the key driver of productivity and economic growth, leading to a new focus on the role of information technology and learning in economic performance. The term "knowledge-based economy" stems from this fuller recognition of the place of knowledge and technology in modern economies [1]. The concept of the term 'knowledge-based economy' has emerged due to the pivotal role that knowledge and technology plays in economic growth of a nation, as embodied in human capital, innovations and Information technology [5]. From an analytical perspective, a knowledge-based economy refers to an economy in which the production, exchange, distribution and use of knowledge are main drivers of economic growth, employment generation and wealth creation. [6]. The term 'knowledge-based economy' is subjective nor objective, therefore it bound to invite some criticism because knowledge virtually involves all activities of all sectors or a new phase of economic development by referring to them as being 'knowledge-based' seems presumptuous, if not actually ignorant of history. It should be noted that, the creation of a knowledge-based economy will be the key innovation facing economic and social life at least in the industrialized nations.

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2. Why Knowledge-Based Economy is Important?

The importance of knowledge based economy cannot be overemphasized because its emergent that made ideas and technologies ingredients; made intellectual property merchandise; people expect smarter products with more convenience and technology leaders fuel the innovations. Therefore is no doubt that knowledge based economy is generating opportunities across all sectors in a number of developed and developing countries. It is a new source for the creation of quality jobs, wealth generation, income redistribution and poverty alleviation, as well as rapid economy development, prosperity and a source for facilitating global competitiveness. Knowledge as the most powerful engine of production and the extraordinary progress in information and communications technology, coupled with the increased speed of scientific, technological advance and global competition along with changing demand is the reason why knowledge is becoming more important. It important to be a part of the knowledge based economy because information and knowledge are replacing capital and energy as primary wealth-creating assets. We are moving from the industrial revolution to globalization and liberalization in international trades where there is free flow movement of capital, information and workers. Major changes such as in workforce diversity, would require the human resources development strategy to meet the needs of the industries in both public and private sector. People are the ultimate resource. And they must be given the fullest emphasis possible for development towards the highest standards of skills, knowledge upgrading, competencies, work attitudes and motivation [3].

3. Building a Knowledge-Based Economy in Nigeria: The Role of IT

Information Technology plays a pivotal role towards building knowledge based economy of any nation and Nigeria is not excluded. It is a new technological, informational and communicational change we have seen in recent decades that have marked the transition from natural resources-based economy to knowledge-based economy in the developed nations. IT is a core engine of an information based economy, universalize access to social services, and create a knowledge-based online society. Therefore to build Information technology literacy and capability among the people in Nigeria will be crucial in building the knowledge based economy as well as envisage to produce transformational effects across all sectors of the economy, facilitate ongoing social and political reforms, and firmly establish Nigeria as a developed nation.

In Nigeria, there are good Information Technology infrastructures, if utilized judiciously, Nigeria, can even compete with developed countries like U.S.A., Singapore among others in terms of economic growth and prosperity. The Internet is simply a large global network created by the acceptance of standards. In practice, the Internet capabilities have the power to change both individuals and society. The next wave is the wireless access, both high-speed connections within a company and Internet access to cell phones wherever you travel. These changes offer new ways of doing. [4]. So in Nigeria vive satellites have been launched by the Nigerian government into outer space so as to provide internet accesses to all Nigerians with a view to build the knowledge based economy. The NigeriaSat-1 was the first Nigerian satellite and built by a United Kingdom-based satellite technology company, Surrey Space Technology Limited (SSTL ltd) under the Nigerian government sponsorship for $30 million. The satellite was launched by Kosmos-3M rocket from Russian Plesetsk spaceport on 27 September 2003. One of the primary objectives of the Nigeriasat-1 was to provide the technology needed to bring education to all parts of the country through distant learning. [11] NigeriaSat-2 and NigeriaSat-X, Nigeria's third and fourth satellites, were built as a high-resolution earth satellite by SSTL for DMC system also. The NigeriaSat-2/X spacecraft was built at a cost of over £35

million. This satellite was launched into orbit by Ukrainian Dnepr rocket from a Yasny military base in Russia on 17 August 2011. On 19 December 2011, a new Nigerian communications satellite was launched into orbit by China in Xichang. The satellite would have a positive impact on national development in various sectors such as communications, internet services, health, agriculture, environmental protection and national security. [11]

To build successful knowledge based economy, Nigeria should be conscious not only about building and development of the knowledge based economy but also the maintenance of the knowledge base.

4. Security Challenges for Building Knowledge-Based Economy in Nigeria

To build security challenges hitch free knowledge-based economy in Nigeria, those challenges must to be identified. Knowledge based Economy, perhaps faces two levels of security challenges issues. Security challenges at Critical IT infrastructure level and at information level.

4.1. Security Challenges at IT Infrastructural Level

IT infrastructure used to process, store and disseminate information and knowledge thus Knowledge based economy. These infrastructures include computers, media, storage and backup devices, network communication facilities and educational institutions among others. These infrastructures have become highly interconnected, and interdependent. Intrusions and disruptions in one infrastructure might provoke unexpected failures to others. However, how to handle interdependencies becomes an important problem. The potential security challenges of knowledge based economy at critical IT infrastructure level include the following:-

i. Terrorism: this is a main infrastructural potential security challenge to knowledge based economy where a person or groups deliberately targeting critical infrastructure for political or extremism gain. For example what is happening in North East in Nigeria where telecommunication antennas and educational institutions were deliberately targeted by insurgents for extremism gains.
ii. Sabotage: sometime a person or groups such as ex-employee, political groups against governments may sabotage the government efforts towards building the effective knowledge based economy by destroying the infrastructures which are critical for building knowledge based economy.
iii. Information warfare: hackers might hack the knowledge based economy' infrastructures for private gain or countries initiating attacks to glean information and also damage a country's infrastructure. For example cyber-attacks on Estonia and cyber-attacks during the 2008 South Ossetia war.
iv. Natural disaster - hurricane or natural events which could damage critical infrastructure such as oil pipelines, water and power grids.

The above mentioned potential infrastructural security challenges could be addressed by establishing the government agency, which will be responsible for managing the security of critical IT infrastructure. The agency should be committed on critical IT infrastructural security and protection. Fiber optic perimeter intrusion detection security systems, should be utilized because it will enable to detect the location of intrusions over many miles of deployed fiber.

Critical Infrastructure laws should be in place. Even though in Nigeria, Critical Infrastructure bill will soon be submitted to the national assembly for passage into law after due stakeholders' consultations. As a matter of urgency, national assembly should pass the bill

into law for building effective and efficient knowledge based economy. The bill will address the designation of ICT infrastructure as Critical National Information Infrastructure because having such as law in place will certainly serve as a major deterrent to individuals who are perpetrating atrocious crimes in cyber space.

4.2. Security Challenges at Information Level

Knowledge based economy heavily depends on the information. Without information security, the knowledge based economy could be at stake. On the other hand, information security depends on technology development. Developed and least developed countries like Nigeria faces significant challenges in meeting the requirements of the Knowledge based economy without information security. The lack of technology development in information security, therefore, may constitute a serious infrastructure deficiency that is enlarging the digital divide.

The potential security challenges of knowledge based economy at information level include the following:-

i. Disclosure of Information to non-entity or entities
ii. Alteration of the critical information for illegal gain,
iii. Unauthorized access of the critical information,
iv. Unavailability of the critical information to stakeholders whenever the need arise.

The above mentioned potential information security challenges could be addressed by establishing the government agency, which will be responsible for managing the security of critical information. The agency should be committed on critical information security and protection. The measures to address above mentioned potential information security challenges include the following:-

i. Confidentiality: information related or associated with the knowledge based economy in Nigeria should be prevented from disclosure to unauthorized individuals or systems. So the systems that will be used to process, store and disseminate will enforce confidentiality by encrypting the critical information during transmission, by limiting the places where it might appear (in databases, log files, backups, printed receipts, and so on), and by restricting access to the places where it is stored.
ii. Integrity: to build effective and effective knowledge based economy in Nigeria, critical information associate with the knowledge based economy should be maintained and assured with accuracy and consistency throughout its entire life-cycle. This means that data cannot be modified in an unauthorized or undetected manner. This is not the same thing as referential integrity in databases, although it can be viewed as a special case of consistency as understood in the classic ACID model of transaction processing. Integrity is violated when a message is actively modified in transit. Information security systems typically provide message integrity in addition to data confidentiality.
iii. Availability: For any information system to serve its purpose, the information must be available when it is needed. This means that the computing systems that will used to store and process the information related to knowledge based economy knowledge based economy in Nigeria, the security controls used to protect it, and the communication channels used to access it must be functioning correctly. High availability systems aim to remain available at all times, preventing service disruptions due to power outages, hardware failures, and system upgrades. Ensuring availability also involves preventing denial-of-service attacks, such as a flood of incoming messages to the target system essentially forcing it to shut down.

iv. Authenticity: for effective knowledge based economy in Nigeria, it is necessary to ensure that the data, transactions, communications or documents (electronic or physical) are genuine. It is also important for authenticity to validate that both parties involved are who they claim to be. The security systems to be used incorporate authentication features such as "digital signatures", which give evidence that the message data is genuine and was sent by someone possessing the proper signing key.

v. Non-repudiation: In law, non-repudiation implies one's intention to fulfill their obligations to a contract. It also implies that one party of a transaction cannot deny having received a transaction nor can the other party deny having sent a transaction. It is important to note that while technology such as cryptographic systems can assist in non-repudiation efforts, the concept is at its core a legal concept transcending the realm of technology. It is not, for instance, sufficient to show that the message matches a digital signature signed with the sender's private key, and thus only the sender could have sent the message and nobody else could have altered it in transit. The alleged sender could in return demonstrate that the digital signature algorithm is vulnerable or flawed, or allege or prove that his signing key has been compromised. The fault for these violations may or may not lie with the sender himself, and such assertions may or may not relieve the sender of liability, but the assertion would invalidate the claim that the signature necessarily proves authenticity and integrity and thus prevents repudiation. Therefore, system that would implement the concept of non-repudiation should be installed do as to tackle the issue of potential security challenges for efficient knowledge based economy building in Nigeria [8].

In addition to the above mentioned possible measure to address the potential information security challenges of the knowledge based economy in Nigeria. The Nigerian government should as matter of emergency pass much waited bills into laws thus cyber security bill and privacy bill into laws. When passed these bills into, would attract high punitive measures and as such, violation of the laws by any individual or corporate entity, would be met with very stiff sanctions.

5. Conclusion

Knowledge based economy security is critical not just to organization, or individuals, but also the issues of preserving the massive knowledge from a nation’s civilization and cultural heritage perspective. Knowledge based economy security requires a secure Cyberspace, a Cyberspace that operates on network in which its growth, reliability, maintenance, and security are accorded with national level coordination and protection, as preserving knowledge of a nation’s culture and civilization is a national issue. The paper has discussed some of the security challenges for building Knowledge-Based Economy in Nigeria and their possible remedies.

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