Developing Country Studies
ISSN 2224-607X (Paper) ISSN 2225-0565 (Online)
Vol.4, No.24, 2014

Knowledge Generation for National Development: Issues and Challenges

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Abstract
Some of the major issues and challenges involved in the process of knowledge generation for national development are discussed in this paper. The purpose of knowledge generation for national development is highlighted as well as the group of professionals involved in knowledge generation. The role of Research Institutions in knowledge generation is brought to the fore, with a particular focus on the Nigerian Institute of Social and Economic Research (NISER). The challenges of the attainment of an improved state of knowledge generation for national development in Nigeria are also discussed.
Keywords: Knowledge generation; National development; Research Institutions, NISER

1. Introduction

The modern economy of a typical developed country is knowledge-based, and, this has become the norm for the achievement of national development by almost all countries of the world. To this extent, national development requires a very broad range of knowledge, including technical knowledge of productive processes, commercial knowledge of markets and business practices, personal knowledge of human health and nutrition, knowledge of laws and legal processes, knowledge of political and administrative processes and public policies, knowledge of organization and management, knowledge of emerging fields of science and, perhaps most important of all, a conceptual knowledge of the nature of the development process itself (Jacobs & Asokan, 2000). Knowledge is therefore recognized as a main input that is required for national development, and the concept “knowledge driven economy" (KDE) or "the new economy" is used to describe an economy in which knowledge generation and the exploitation of knowledge has come to play the predominant part in national development (Mansell & Wehn, 1998).

Several scholars in the field of information science {Aiyepeku, 1985; Nonata & Takeuch, 1995; and Zack, 1998} define knowledge as a product of processed information. It is therefore important we start this discussion with the interrelationship that exists between data, information and knowledge. While, data represent observations or facts out of context, and therefore not directly meaningful, information results from placing data within some meaningful context, often in the form of a message, and becomes knowledge once it gets into the interdependent/public domain. Knowledge can be classified as tacit or explicit. While, tacit knowledge is subconsciously understood and applied, difficult to articulate, developed from direct experience and action, and usually shared through highly interactive conversation, story-telling and shared experience, explicit knowledge, can be more precisely and formally articulated. Explicit knowledge is expressed formally using a system of symbols or language, and can therefore be easily stored, communicated and shared. Explicit knowledge includes published materials and manuals of rules, routines and procedures. Since explicit knowledge has been codified, it remains a tangible product even after (Choo, 2000). On the other hand, tacit knowledge resides in the brains of the people, unstructured, and intangible (Davenport *et al.*, 1998). Thus, explicit knowledge is what is usually generated, codified, documented and disseminated.

Beijerse (1999) defines knowledge generation as an activity that falls within a newly emergent discipline known as Knowledge Management (KM). This discipline is in practice, the application of both classical and creative management principles to the development, gathering, utilization, processing, and preservation and sharing of a knowledge base in such a way as to efficiently achieve results that match strategic objectives. Knowledge Management is an emerging, new discipline to assist organizations to change and adapt to a knowledge driven world. Knowledge Management involves activities of knowledge generation and knowledge transfer, and it is an old practice inside traditional knowledge organizations. Knowledge generation involves creating and sustaining a knowledge culture as a natural and instinctive part of business process" (TFPL, 1999). Knowledge generation can be achieved in many forms such as feedback to the worst or best practices, quality assurance team, meeting, forum, conference call, study groups, documented result in books, magazine, research results etc.

2. Purpose of Knowledge Generation in National Development

There has been a remarkable shift in emphasis from the primary, to the secondary and tertiary sectors of the economy in knowledge-based economies. The World Development Report (WDR, 2000) highlights attributes of knowledge and differentiates the developing countries from the developed ones in this respect. It is observed

that the OECD countries in particular have their high level of national development attributable to the investments made in knowledge generation activities in key industrial and productive activities. These economies were also observed to record a change in per capita income, which increased ten fold in about two centuries. Accompanying this quantitative change are other collective benefits, which include longer life and eradication of deadly diseases; lower infant mortality; higher level of education; rapid means of communications etc.

The collective benefits recorded in knowledge- driven economies have been due largely to the increased[1] number of skilled and educated workforce. The performance and competitive strength of a nation in a globalised world has some relationship to the quality of available knowledge as well as the effectiveness of harnessing its knowledge base to created value for its users. In addition, more and more value is placed on knowledge than on raw human power. In a similar manner, it is noted that in most hi-tech companies like computer software the value of a company or its intangible assets resides almost entirely in the knowledge and creativity embodied in its patents and its staff. The position is that controlled machines based on knowledge generation activities have taken over work that was formerly labor-intensive, making the use of cheap labor as a comparative advantage to attract foreign direct investment no more a valid position. Multinational companies are no longer locating plants in developing countries just to take advantage of cheap labor; rather, the flow of direct foreign investment is toward countries that provide cheap but skilled labor.

Countries in the developing world have taken a cue from the foregoing experiences and are investing exponentially in the generation of knowledge for better status in the global economy, and improvements in their social interests such as education, health, and entertainment. Many of these developing countries however have modest investment in research, and find it difficult to keep pace with the developed countries in knowledge generation activities. Nevertheless, access to and use of ICTs (the *Internet*, mobile phones, fax machines, email services) has been documented to accelerate knowledge generation for development purpose. ICTs provide unprecedented opportunities to developing countries to 'leapfrog' into the knowledge-driven global economy and enjoy the benefits of socio-economic development offered by the information age. Mansell &Wehn (1998), posited that the use of ICTs can help in improving the quality of life for citizens in all sectors of the economy In the agriculture sector for instance, the wide variety of tasks in crop management: (planting date selection; water utilization and management; pest and disease monitoring, harvest management amongst others), can be facilitated by information technology expert systems, to generate knowledge that can enhance the potentials of gains in smallholder farming systems in some developing countries. In the health sector, ICT applications are supporting more efficient exchange between health professionals, and the transfer of patients' record between sites, towards achieving a healthier citizenry.

3. Characteristics of Professionals involved in Knowledge Generation

Drucker (1974) made reference to the personnel in charge of knowledge activities as knowledge workers, and noted that knowledge workers put knowledge to work and make decisions to impact on performance capacity, results, and future directions. The author identified the main activities involved in knowledge generation include the following:

- Knowledge Identification: understanding the character of the needed knowledge, picking out existing relevant knowledge, and allocating the knowledge assets, which need to be learned and created;
- Knowledge Acquisition :obtaining the needed knowledge (e.g., buying / consulting, R&D, learning / self-creation);
- Knowledge Preparation: presentation of information in an easy to learn way (e.g., explicit knowledge can be turned into documents, and implicit knowledge can be reflected into contact information / human expertise);
- Knowledge Allocation: presentation of information in an easy accessible way ;
- Knowledge Dissemination: creation of a knowledge distribution infrastructure;
- Knowledge Usage: ensuring that people use the knowledge; and
- Knowledge Maintenance: keeping a knowledge management system in an up-to-date condition;

In a similar vein, professional involved in knowledge generation were identified by (ECA, 2001) to include the following:

1. Institutional and public libraries: to provide knowledge services at institutional levels and to local grassroots;
2. Professional associations: enabling knowledge generation and sharing in all areas of a professional sector

[1] For example in 1950, unskilled workers made up 60% of the American workforce, but by 2000 this portion of the workforce had fallen to 15% (ECA, 2001) .

3. Chambers of commerce and industry: linking entrepreneurs with information and best practices;
4. Government agencies: engaging in macro-level knowledge activities focused application of innovation for national economic and social development;
5. Research Councils and foundations: components of national innovation and knowledge system that foster continuous progress in research;
6. Knowledge and information networks and exchanges: formal and informal groups that provide platforms for collaboration and exchange of knowledge;
7. Virtual libraries: virtual information outfits that provide access to electronic content, services and knowledge objects over the Internet;
8. Universities, schools and research centres: the foundations of national and regional knowledge and social development. The purveyors of explicit and tacit knowledge;
9. Productivity organizations: promoters of the application of productive knowledge and best practices at national levels;
10. Small business and entrepreneurship organizations: to spread new methods and innovative ideas to grassroots of the business community;
11. Regional and international development organizations: advocates of best practices and policies on innovation and knowledge for regional development. OECD is very active in this sense.

It is important to note that the use of the Internet and other ICTs has created increased opportunities of knowledge generation, in addition to blurring the hitherto compartmentalization that exists in the core disciplines of knowlegde work. These include the discipline of librarianship, archival science, publishing and the ICT specialists. It must also be pointed out that it is not just disciplinary boundaries that are gradually disappearing, but geographical ones too. To this extent, there is a move towards collaborative working making the generation of knowledge increasingly a product of networked entities. There is now digital delivery of resources to desktops, and digital tools to allow people to come together in a virtual environment to exchange information.

Suffice it to say that while the traditional roles of knowledge workers in respective domain are still valid, they must be re-interpreted in knowledge -based environment. Knowledge workers therefore have to become agents of change, knowledge managers, and entrepreneurial thinkers in order to survive. They need to provide intellectual, physical, and long-term access to a complex mix of data, information, and knowledge. They also need to develop the skills to manage and provide navigation across this rich mixture. The future for knowledge workers is assured if only they continue to provide relevant, innovative and value-added services.

4. Research Institutions (RIs) and Knowledge Generation in Nigeria

The debate on the role of RIs for national growth and development continues to engage scholars in developed and developing countries alike, and the mandates and responsibilities of these organizations as knowledge generation entities in the society is fairly clear. These institutions play two main functions in the development and maintenance of knowledge the national R & D system. They act as primary centers of innovation in early periods of innovation, and as coordinating centers for interaction between universities and industry in several instances. Oyelaran- Oyeyinka (2005) observed that in all countries that have been successful in developing biotechnological systems of innovation, RIs (PRIs[1]) have been the centers of cutting-edge research. In this regard, the contribution of public RDIs in advances made in industry in the United States cannot be ignored. For instance in the 1993-94 period alone, 73% of scientific papers cited by US industrial patents originated from public science, while the remaining 27% came from industrial sources. Sales of inventive products from academic research that were licensed to industry was over $US 20 billion in 1996, further underlying the importance of academic science, (McMillan et al., 2000). The high economic growth rates experienced in many of developed countries are explained to a considerable extent by increased expenditure on Research and Development activities. In highly industrialized countries, an annual expenditure of 2 to 3 per cent of the gross national product GNP is considered necessary to keep the economy competitive internationally. (Oyelaran-Oyeyinka, 2005).

By way of classification, Research Institutions (RIs) are of different types and have different visions and missions towards the attainment of knowledge activities for national development. However, for the purpose of this paper, we shall define Research Institutions (RIs) in a general manner as structures established to undertake knowledge activities that are focused towards national development. RIs are an important source of boosting knowledge output and consequently the production of goods and services for national growth and development. Many countries, including the laggards in development are seeking to chart directions for future growth and development through their research and development institutions.

The Nigerian Institute of Social and Economic Research (NISER) is a leading policy research institute in Nigeria,

[1] Public Research Institutions (PRI) is used in Oyeyinka (2005), but can be used interchangeable with government RIs, which is our focus here.

with strong interactions with similar local and international organisations. Its history dates back to 1950, when the West African Institute of Social and Economic Research (WAISER) was set up to provide information on issues of vital importance to the development of the British Colonies then in West Africa. The disintegration of WAISER started with the political independence of the Gold Coast (now Ghana) in 1957. When WAISER was formally dissolved in 1960, the Nigerian Institute of Social and Economic Research was established as a national research institution and located at the University of Ibadan campus.

The mandates of the Institute as originally stated in NISER Decree of 1977 and later in the "Nigerian Institute of Social and Economic Research Act" 1990 are to:

i) provide consultancy services to the federal and state governments, their agencies and organisations in the field of economic and social development;
ii) conduct research into the economic and social problems of the country with a view to applying the result thereof;
iii) organise seminars and conferences on problems of economic and social development in the country, whether on its own accounts or on behalf of the government of Nigeria or their agencies; and
iv) cooperate with Nigerian universities, research institutes and other institutions in the mobilisation of the country's research potential for the task of national development and dissemination of research findings for the use of policy makers at all levels.

In NISER, our vision is to remain at the forefront of knowledge generation and dissemination in policy research that feed into national development. We therefore face the challenge of remaining not only remaining relevant to the needs of our knowledge users, but providing them with timely and value services. We take pride in associating with success in knowledge generation, which starts with the kind of people involved in research activities assignment. Interviewing, and screening process are designed to identify bright, intellectually curious, and knowledge seeking individuals (Davenport, 1998). NISER has proven competence to offer knowledge generation activities (specifically research and consultancy services) in agricultural, social, physical, technological, political and economic development. We have six professional departments and five specialized units. In addition, NISER has a strong support base, which enhances the achievement of its research mandates. These include:

- A state of the art library with online facility and volumes of local and international publications including; books, journals, research reports, conference proceedings and newsletters. The library also has collaborative agreement with its international counterparts which ensures regular access to current publications;
- An ICT office with reliable internet services;
- An account department and an audit unit with professionals to take care of the institute's financial transactions; and
- Ample office facility for visiting fellows/scholars and research associates.

It is actually stating the obvious by saying that Research Institutions, such as NISER must continue to demonstrate their commitment to staff development to be successful in knowledge generation. This means not only providing practical support in terms of budget and staff time, but also making learning and development an integral part of the organisational culture. Even though NISER has been hindered by inadequate funds in past few years, the institute is committed to investing in training for our staff and is currently piloting training modules for middle-level research staff on leadership skills. Programmes for senior management are also in development, as well as for the support staff. As part of a new performance management system, there is in place a library committee to help embed the values and new face for the library, which is the powerhouse of knowledge generated within the institute.

The use of the Internet has opened the doors of opportunity to the ability to be in touch with other research, academic and public sector communities within and outside the country. NISER has a homepage http://www.niseronline.org , and also an indigenous knowledge database. We are proud to be part of what Dutton (2004) calls the access revolution, that is described as "of profound significance to all organizations because the new forms of access enabled by information and communication technologies (ICTs) challenge many conventional management organisational, and business structures and practices." .

In NISER, output as input into policy reforms and institutional changes are processes that require collective effort of knowledge generation and information dissemination. To this end, knowledge workers in NISER are defined as inclusive of every member of staff. This is because important roles of the research staff, the librarian, the ICT specialists, and other support staff in the knowledge generation process cannot be underestimated. We are all important in the execution of the NISER mandates and tasks, nevertheless there is a need to become agents of change, knowledge managers, and entrepreneurial thinkers to remain relevant in this context. The overall goal is to be productive and continue to generate knowledge to be made readily available for reuse.

5. Challenges for knowledge workers towards improving Knowledge Generation for National Development in Nigeria

The knowledge generation revolution in Nigeria brings with it new opportunities but it also infuses new challenges, particularly for knowledge workers which, includes the researcher, librarians; archivists, publishers and ICT vendors in the public and private sectors of the economy. Some of these challenges are as follows:

1. Forging a new spirit of Enterprise

Knowledge workers must develop a culture that requires a strong vision that appreciates information sharing culture, collaborative teamwork culture; problem-solving rather than rule-based operation; alliances, partnerships and co-competition. By facilitating collaboration teamwork with other knowledge workers, there will be opportunities for collective individual experiences and insights to find innovative solutions applicable to knowledge generation activities. Knowledge workers will thereby come together to form a network of practice within hitherto different functions in a convergent manner.

2. Remaining relevant to users of knowledge

Knowledge workers face the challenge of keeping pace with the changing requirements of their users, in order to provide them with relevant, value-adding services. The introduction of survey methodologies to ensure that services align with the needs of identified key users is recommended to gather information on a regular basis to better understand how uses are satisfied with the knowledge available; existing services and resources, and what improvements they would like to see.

3. Compilation of On-line Development specific Databases

The advent of the World Wide Web now makes it possible to create a compendium of development knowledge, information and experience, a well documented and continuously updated source of knowledge and practical experience on all fields of national development. This on-line development specific database could view every subject from the perspective of social development. It could catalog proven technologies, successful strategies and best practices in different fields, so that the information is readily accessible to people all over the country. Compilation of the encyclopedia would need to be managed by a central team of knowledge workers, but the actual generation of material could be contributed by thousands of experts located around the country. The online database could also become a virtual forum for national and international debate on policies, priorities and strategies for national and international development. It must be mentioned that content of these databases must be put together in an integrated system for access and retrieval.

4. Conversion of "tacit" knowledge to "explicit" knowledge

Much of the country's "indigenous knowledge" have been preserved in oral form and as such inaccurately transmitted from generation to generation. There is therefore an urgent need for knowledge workers to get involved in knowledge generation on indigenous activities. *NISER's* Africa Regional Centre for Indigenous Knowledge (ARCIK) has a growing pool of indigenous literature, but it is not exhaustive.

5. Development of Local Software to support Knowledge Generation

The development of locally developed software to support generated databases need to be taken up by knowledge workers in Nigeria. This underscores the importance of collaboration that should exist among knowledge workers, as well as the importance to be given to the innovative products and services of endogenous ICT vendors in the country. New software and capabilities need to be introduced repeatedly, especially to assist in creating intranet portals.

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