

# Indigenous Knowledge, Industrialization and Resource Management in the face of Globalization

Napoleon Y.D. Kurantin<sup>+</sup>

Ghana Institute of Management and Public Administration (GIMPA) \_\_ GIMPA School of Governance and Leadership (GSGL)

**Abstract.** Experience has shown that development efforts that ignore indigenous knowledge and local environment generally fail to achieve their desired objectives. As result of the rapid pace of the processes of globalization, indigenous knowledge systems are becoming extinct. This paper investigates and examines by way of comparison the relevance of indigenous knowledge systems between China and Africa as the basis of enhancing the processes of sustainable resource management and industrialization in an era of globalization. Incorporating indigenous knowledge in development initiatives is critical for achieving sound natural resource management, economic growth and development. By way of a case study, the main premise of this paper is to bring to the fore aspects of indigenous knowledge systems underpinning China's rapid industrialization process that can serve as a catalyst to Africa's socio-economic growth and development. The impetus is to draw lessons of China's innovative framework hinged on its indigenous knowledge systems that underpins sound policy decisions, support industrialization within the processes of economic growth and development in emerging economics such as Ghana, in sub-Sahara Africa.

**Keywords:** Globalization, Indigenous Knowledge, Industrialization, Natural Resource Management, and Sustainable Development.

## 1. Introduction

In today's globalized and post- industrial age, the importance of indigenous knowledge (IK) to sustainable natural resource management<sup>1</sup> particularly in developing countries cannot be overemphasized. The process of globalization is considered a worldwide system or trend that encompasses finance, international trade, and communications, politics, ideology and socio-cultural underpinnings. In reference to Mazrui (2001), Kgomotso (2007) states that here are three distinct ways that globalization is interpreted: as economic interdependency across vast distances; information availability and movement across vast distances; and reduction of the world into a global village. He further states that two forms of globalization can be identified: economic globalization and cultural globalization. Globalization is also viewed as the opening up and interconnectedness of the world. Many people including Lawrence (2005) assert that globalization is characterized by a mismatch of political and economic power, and that it is the more powerful countries in the north that benefit from globalization. It has been stated in some quarters that colonialism can be viewed as the first stage of globalization.

Yet the dramatic changes in terms of space and time being brought about by science, communications and information revolution represents both a quantitative and qualitative break with the past. Over the past two decades, world output has been expanding but many others suffer because economic regimes are inefficiently managed, and this weakness reduces their capacity to successfully compete in today's globalized knowledge economy (Schneider and Enste, 2002). Conventional development approaches more often than not, have overlooked the potential of indigenous knowledge systems, experiences and, practices that could contribute to the processes of sustainable socio-economic growth and development. The organization of this paper is as follows. In the next section, an exploration of the conceptual framework of indigenous knowledge, their implication for the processes of sustainable natural resource management and

---

<sup>+</sup> E-mail: nkurantin@gmail.com

<sup>1</sup> Sustainable Natural Resource Management \_ Natural resources support all human productivity. The sustainable management of natural resources is among the preeminent problems of the current century: Michel, L. (2008)., Sustainable Management of Natural Resource: Mathematical Models and Methods, Springer; Lynch, D.R. (2009)., Sustainable Natural Resource Management for Scientists and Engineers, New Hampshire: Dartmouth College.

industrialization in the face of globalization is undertaken. Apart from the introduction, section three provides an overview of indigenous knowledge exploitation for rural development of Baixianglin in Guizhou region of China. Section four delves into an analysis and discussion of the concept of invention within indigenous knowledge systems which is a main variable in enhancing the processes of sustainable resource management and industrialization in the face of globalization in Africa. Section five contains the concluding remarks.

## **2. Conceptual Framework**

The complex nature of sustainable natural resource management and industrialization demands policy making and research that uses a systems approach; that is interdisciplinary – combining bio-physical and socio-economic dimensions, and attempts to understand the interrelatedness of system components. It is a belief that indigenous knowledge and scientific technical knowledge can complement their strengths and weakness (Ogunbameru and Muller, 1996). According to Warren (1991/96), the term local or indigenous knowledge is used to distinguish the knowledge developed by a given community from international knowledge systems or scientific knowledge. The latter, sometimes referred to as ‘Western’ knowledge systems (WKS), are generated by universities, government research centre’s and the private sector. Indigenous knowledge can also refer to the ‘technical’ insight or wisdom gained and developed by people in a particular locality, through years of careful observation and experimentation with the natural phenomena around them. In the view of Dewes (1993), Gorjesani and Wolfensohn (2000), the knowledge of local people is an enabling component of development.

Western knowledge systems (WKS) and indigenous knowledge systems (IKS) are distinguished on contextual, substantive, and methodological grounds. First, Western knowledge systems are universal, due to the fact that Western education is entrenched in many world cultures. And second, they have long been noted for their rigorous observation, experimentation and validation procedures, all of which are carefully documented. The same cannot be said of indigenous knowledge systems, in particular when it comes to documentation (Kolawole, 2001). By indigenous knowledge, we mean tradition-based literary, artistic or scientific works, performance, inventions, innovations, discoveries, designs, marks, names, symbols and creations resulting from intellectual activity in industrial, scientific literary or artistic fields (Nwokeabia, 2002). There is a need to mainstream indigenous knowledge into the development processes in Africa to help optimize the benefits of sustainable resource management and industrialization in the face of globalization.

## **3. Indigenous Knowledge Exploitation of Baixianglin in Guizhou Province of China**

According to Liu, Hirano Li and Liu (2009), Guizhou is the province with the highest number of minority groups on the eastern section of the Yunnan-Guizhou Plateau in southwestern China. It is a relatively poor and undeveloped province, with a nominal Gross Domestic Product (GDP) for 2007 of 254.3 billion RMB, ranking the last 6th. The GDP per capita was 6,742 RMB, rendering it the lowest in the PRC. Baixianglin has a typical karstic topography. By 1984, due to over-disafforestation as a result of steel-making in 1950s and the Great Leap Forward in 1960s, Baixianglin’s ecological environment was severely damaged. As a result of the soil erosion and desertification, grain production per capita decreased to less than 100 Kilograms and the per capita income was less than 100 RMB. To survive, community resident’s had to continue destroying the forests for land reclamation, falling into a vicious circle of poverty. To address the looming ecological disaster, the local government instituted policies to rehabilitate the ecology, but these efforts did not produce any significant result.

Realizing the short-comings of local authority policies on afforestation, a local initiative based on indigenous knowledge was formulated and implemented under the title Collective Organization Highlands Afforestation Cooperation (HAC). The initiative involved twenty-seven households of one hundred and twenty-four villagers; has now three hundred and fourteen households with one thousand and nineteen villagers covering six villages, including Han, Miao and Yi nations. During the last 20 years, HAC has converted 4090 Mu of cropland to forests and afforested other 8,000 Mu. The forest cover rate of Baixianglin

area has increased from 17.7% to 75 %. The volume of living trees reached 14,160,000 cubic meters and the total output value reached more than 80 million RMB. As a testament to the exploitation and application of indigenous knowledge of the forest, ecological environment has been improved and the local climate has changed, water resources improved and soil erosion halted. Since 1994, there have never been floods; the mouth of the spring, which had been dried up began to produce water again. Many villagers can now obtain spring water by having a pipe connected to their respective homes, while before they had to walk several Kilometers to find drinking water. Rare animals, such as the white tail pheasant, the Chinese Leopard and the clouded leopard have re-settled in the forest (Liu, Hirano Li and Liu, 2009). These impressive achievements' are attributed to local knowledge and technique of seed selection in which sumac seeds enclosed inside an oily shell, naturally germinates slowly. However, the local people knew that after burning or kneading the seeds in water, the germination rate can reach over 90%. Furthermore, the villagers knew that the germination rate of the seeds egested by birds is quiet high. The HAC members feed sumac seeds to the birds intentionally to promote the germination rate. According to Liu, Hirano Li and Liu (2009) the above authors this kind of knowledge is always embedded in the local culture.

#### 4. Analysis and Discussion

Knowledge, as is well known is bound up with action and, throughout history risks have presented a challenge to human survival. Traditional knowledge and the related innovations have been a valuable source of knowledge and technology for responding to these risks. As suggested by Aghion and Howitt (1998) technology is knowledge applied to the production process. In this sense, indigenous knowledge is a valuable source of knowledge and technology for responding to risks, ever-changing supply scenarios and sustained development in Africa. Traditional knowledge is a central component for the daily life of millions of people in the region. It plays an important role in vital areas such as food security, the development of agriculture and medical treatment for up to eighty percent of Africa's rural economy. It is mostly protected by a traditional customary law system. Some of the laws have well defined rights and benefit-sharing systems. In today's world, even where these knowledge systems have sustained the indigenous societies, they have not produced the same type of industrial revolution as exists in Europe, and China as exemplified by the above case study for instance. The case of Britain illustrates this point. According to Hobsbawm (1964), Britain's industrialization in the eighteenth century began for a number of reasons. Britain possessed at virtually all levels of society a hard-working, innovative, risk-taking private sector that received strong support from the government (Chapman, 1970; Crafts, 1977/85/2004; Crafts and Harley, 1992/2000; Nwokeabia, 2002).

In China, the development of medicine for instance, took an entirely different route compared to countries in the West. To a large degree, instead of looking to science for inspirations' it involved indigenous knowledge and philosophies creating a medicine based on concepts of qi and yin yang<sup>2</sup> and practices of acupuncture and herbal medicine (Kohn, 2005).

In a world revolutionized by science and technology, China inevitably adopts modern evidence – based medicine. On the other hand, unwilling to give up traditional wisdom, Chinese endorses a health system that intends to incorporate the best of both worlds (Hong, 2004). Hence, we must recognize that both those who use and develop indigenous knowledge systems (mutable in-mobiles) and those who develop and apply scientific knowledge systems (immutable mobiles) are constrained by the way in which they have been trained to think and the contexts in which they live. The key is to provide both knowledge systems with more opportunities in which they can inform and stimulate one another (DeWalt, 19940).

---

<sup>2</sup> Yin yang \_ In Asian philosophy the concept of **yin yang** (simplified Chinese: 阴阳; traditional Chinese: 陰陽; pinyin: *yīnyáng*), which is often referred to in the West as "yin and yang", is used to describe how polar opposites or seemingly contrary forces are interconnected and interdependent in the natural world, and how they give rise to each other in turn. Opposites thus only exist in relation to each other. The concept lies at the origins of many branches of classical Chinese science and philosophy, as well as being a primary guideline of traditional Chinese medicine and a central principle of different forms of Chinese martial arts and exercise, such as baguazhang, taijiquan (t'ai chi), and gigong (Chi Kung) and of I Ching divination. Many natural dualities—e.g. dark and light, female and male, low and high, cold and hot— are thought of as manifestations of yin and yang respectively, Wikipedia: [http://en.wikipedia.org/wiki/Yin\\_and\\_yang](http://en.wikipedia.org/wiki/Yin_and_yang), Accessed on November 24, 2011.

## 5. Conclusion

The analysis in this paper leads to a few summations. Knowledge, generally, can be a communal property. The same does not apply to innovation as a component of knowledge. Putting innovation, however, as a public good, at least in the medium-term of 10–15 years, without special compensation to the innovator, is unambiguously bad for sustained economic growth and welfare promotion (Nwokeabia, 2002). In line with this reasoning, we single out innovation as the single most important aspect of knowledge. The term innovation is usually used to describe the process whereby creative ideas and knowledge are developed into something tangible, like a new product or practice. The act of innovation begins with recognizing the pungent scent of strategy decay. Any aggregate theory or analysis that fails to distinguish between the different activities is potentially misleading. Whether growth is enhanced might depend on the quantity of innovation an economy is able to generate. In the words of Van Den Berg (2001), the process of economic growth is not simply a process of doing more of the same thing. It is a process of structural change that allows almost all aspects of production and consumption, hence innovation. The integration of indigenous knowledge systems within the processes of industrialization in China, serve as a great lesson and catalyst for Africa's own quest for an enhanced process of resource management, economic growth and development.

## 6. References

- [1] Aghion, P. and Howitt, P. (1998), *Endogenous Growth Theory*, Cambridge Massachusetts, the MIT Press.
- [2] Chapman, S.D. (1970). "Fixed Capital Formation in the British Cotton Industry 1770-1815," *Economic History Review*, Vol. 23.
- [3] Crafts, N.F.R. (1977). "Industrial Revolution in England and France: Some Thoughts on the Question: 'Why was England First?'" *Economic History Review*, Vol. 30, pp. 429-41.
- [4] Crafts, N.F.R. (1985). *British Economic Growth During the Industrial Revolution*, Oxford, Clarendon Press.
- [5] Crafts, N.F.R. (2004). "Steam as a General Purpose Technology: A Growth Accounting Perspective," *Economic Journal*, Vol. 114 (495), pp. 338-51.
- [6] Crafts, N.F.R. and Harley, C.K. (1992). 'Output Growth and the British Industrial Revolution: A Restatement of the Crafts-Harley View,' *Economic History Review*, 2nd series, Vol. 45, pp. 703-30.
- [7] Crafts, N.F.R. and Harley, C.K. (2000). 'Simulating the Two Views of the Industrial Revolution,' *Journal of Economic History*, Vol. 60, pp. 819-841.
- [8] Dewes, W. (1993) 'Introduction', p.3 in 'Traditional knowledge and sustainable development', in S.H. Davis and K. Ebbe (eds) *Proceedings of a Conference held at The World Bank Washington, D.C., Sept. 27 – 28*. Environmentally Sustainable Development Proceeding Series No. 4.
- [9] DeWalt, B.R., (1994). *Using Indigenous Knowledge to Improve Agriculture and Natural Resource Management*, Human Organization: Vol. 53. No. 2.
- [10] Gorjestani, N., and Wolfensohn, J. D., (2000). "Indigenous Knowledge for Development: Opportunities and Challenges" in *Indigenous Knowledge for Development Programme - The World Bank*: [http://knowledgebase.terrafrica.org/fileadmin/user\\_upload/terrafrica/docs/multipage8.pdf](http://knowledgebase.terrafrica.org/fileadmin/user_upload/terrafrica/docs/multipage8.pdf), Accessed on November 20, 2011.
- [11] Hobsbawm, E. J., (1964). *The Age of Revolution, 1789 -1848*, New York: American Library.
- [12] Hong, F.F. (2004), *History of Medicine in China When Medicine Took an Alternative Path*, *McGill Journal of Medicine*: Vol. 8: 79 – 84.
- [13] Kgomotso, H. M., (2007). "Knowledge Economy and the implication for Indigenous Knowledge" in *International Review of Information Ethics*: Vol.7.
- [14] Kohn, L. (2005). *Health and Long Life: The Chinese Way*, Dunedin, Florida: Three Pines Press.
- [15] Kolawole, O. D., (2001). "Local knowledge utilization and sustainable rural development in the 21st century" in *Indigenous Knowledge Development Monitor*: Vol. 9, Issue 3, November, 2001.
- [16] Lawrence, J. (2005). *The Political Economy of Globalization*, <http://weber.ucsd.edu/~jlbroz/Courses/Lund/index.html>, Accessed on July 2, 2012.

- [17] Liu, F., Hirano, M. Li, L. and Liu, P., (2009). Indigenous Knowledge Exploitation for Rural Regional Development: Case of Baixinglin in Guizhou China.
- [18] Mazrui, A., (2001). Pan-Africanism and the Origins of Globalization: [Http://igcs.binghamton.edu/igcs\\_site/diton12.htm](http://igcs.binghamton.edu/igcs_site/diton12.htm), Accessed on November 20, 2011.
- [19] Nwokeabia, H., (2002). Why Industrial Revolution Missed Africa: A traditional knowledge perspective, Economic Commission for Africa.
- [20] Ogunbameru, B.O. and Muller, R.A.E., (1996). Integration of Indigenous Knowledge and Scientific Knowledge Systems for Agricultural Development, Changing Agricultural Opportunities: The Roles of Farming Systems Approaches, Proceedings of the 14<sup>th</sup> International Symposium on Sustainable Farming Systems, Colombo, Sri Lanka, 11-16, November.
- [21] Schneider, F. and D. Enste., (2002). Hiding in Shadows: The Growth of the Underground Economy, Washington: International Monetary Fund.
- [22] Warren, D.M., (1991). 'Using indigenous knowledge in agricultural development', *World Bank Discussion Papers*. The World Bank, Washington, D.C.
- [23] Warren, D.M., (1996). 'The Role of indigenous knowledge and biotechnology in sustainable agricultural development', *A Keynote Address Presented at the Southwestern Nigerian Regional Workshop on Indigenous Knowledge and Biotechnology*, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria 30 July.