

FOUNDING A MODERN STATE: THE ROLE OF SCIENCE AND TECHNOLOGY IN SOUTH KOREA

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Abstract

Accelerated societal transformation and advancement cannot be conceived and achieved without a functional and well articulated public policy on science and technology. And for such policy to bear the much expected fruit of rapid and sustained modernization and industrial development, it must be carried out under the environment of a strong and nationalistic state, disciplined and patriotic leadership, well informed and educated citizenry as well as the sectoral marriage between public policy, private interest and research institutions. These are the fundamentals the paper identified in its examination of the success story of South Korea in the area of science, technology and industrial advancement. The paper therefore opines that the South Korea experience provides a very rich example which other developing societies can emulate.

Introduction

South Korea represents a typical example of an industrializing modern society, which carefully engages sciences and technology as objective policy foundation for development and in its interactions with its natural environment (Juan, 1987:17)

One of the immediate consequences of the division of the North and South Korea into separate socio-political units was the establishment of separate republics under different ideological regimes. The nascent South Korean republic, at inception, was faced with immediate problems of development with all its attendant negative multiplier effects. By 1900, it was clear that a credible-regime that would embrace revolutionary public policies for radical departure from the existing social experiences was immediately necessary. The Park regime (Kuang, 1992), was to offer this rare leadership, which was uncommon in developing societies (Nzongola, 2000:8), except in a few cases. How possible is it to build an industrial state on the foundation of science and technology? Was synergy between public policy and science and technology in the South Korea development process possible? Was education pivotal? Must a state scientifically interrogate its past for development? These and other questions we might be raising later inform the necessity of this intellectual excursion.

This paper therefore takes a look at how South Korea engages the service of science and technology for modernization and industrial development for rapid growth and status amongst the comity of industrial societies. This work is however divided into four parts: Part one is the introduction; while the second aspect takes a look at the development policy of the Korean State. It also examines how this policy marked the departure from the past and ensures a new agenda for industrial triumph - a policy built on education, science and technology; the third aspect is on the major science and technology institutes and how they positively impacted on the Korean society to facilitate development without necessarily ensuring cultural alienation, social disharmony, and spiritual chaos as being witnessed in some third world countries, like Nigeria. This is because its adoption for the Korean development was carefully related to the society in which it develops and flourishes, that is, to its cultural and world view (Emmanuel, 1978:20); The fourth aspect is the conclusion. It takes a look at the lesson from the Korean experience.

The South Korean State: Setting The Foundation

Before early 1960s, South Korea was a poor developing country. In fact, it came out of the Korean war, devastated in terms of her economy, infrastructures and human resources (Chang Wuang, 1995:78). Following the seizure of political power in 1961, "General Park Chung Hee and his military associates clearly recognized the importance of rapid economic progress and committed themselves to bring it about (Donald, 1988:187). How would this regime begin the process of industrialization and the creation of a modern society? It soon realized quickly (that it needed a radical departure from the past dependent economy, subsistence farming and spiritism (Roy, 1989:17). This therefore called for

the engagement of well-defined public policies in education and science and technology. This decision, according to General Park Chung Hee, was that:

A transforming society must interrogate its past, define its present problem and create conditions for the realization of its vision... nothing is fundamentally wrong- with our culture and society but our attitudes to education must change and we must in the tradition of the developed environment confront our problem with enduring policies having science and technology as its cornerstone (Yu, 2001 ;79).

The above vision of the Park regime underscores the policy option embraced by this regime. This in turn set the basis for socio-economic development of South Korea and its enviable emergence as a new industrialized country. South Korea is currently a respectable country amongst industrial nations. Its policies on education, science and technology transformed other segments of the South Korean society. Its economy has not only been transformed, its per capita income increased more than three-fold between 1961 and 1980 and today, it has one of the rapidly growing economies of the world (Williams, 2004: 148). However, more instructive has been the fact that:

Since 1961, the economic structure of the republic has gone through major changes. The most dramatic change occurred in manufacturing, which has become the leading sector of the economy. In 1961 manufacturing accounted for 13.5% of Gross National Product (GNP), whereas agriculture, forestry and fishery accounted 13.9%. By 1981, however, these shares had changed to 30% and 18% respectively... In less than 20 years, the Republic of Korea had transformed itself from a relatively closed to an open economy (Encyclopedia Americana, 1988:555-56).

The above picture widely explained how the policy of science and education has succeeded in transforming the republic of South Korea. More importantly, it has earned it the respect of the hegemonic states in contemporary international politics. This transformation is by no means a factor of policy change in education.

Creating the foundation for the attainment of a modern society in South Korea. The Koreans were given a new orientation towards scientific thought and investment in education. This was enabled by restructuring of the educational policy of the republic. Prior to the 1960's, Japanese colonial policy permitted few Koreans to obtain an education (Wolfensein, 1982:18). In fact, "the Korean people place a high value on education, and parents often make great sacrifices to give their children that advantage" (Encyclopedia Americana, 1988:555).

Putting education in proper shape with right policy, the Korean State put the control of national education system under the ministry of education, which also authorizes and sets minimum standards for private institutions. To achieve maximum results and attain the objective of its vision,

"The first six years of schooling are free and compulsory and more than 98% if the children of elementary school are enrolled... More than 4 million students attend secondary schools. Emphasis in the secondary school curriculum increasingly has shifted from the liberal arts to vocational and technical training". (Thompson, 2002:191)

How would the root of a modern South Korea be built on this foundation? Would the determination of the Korean State to invest in the emergence of a technological society materialize? South Korean planners appeared to have answers to these questions. "A Great deal of money was used to lure back more than 100 top South Korean scientists and researchers who had emigrated abroad (www.country-data.com). These teachers and researchers were to blend the resources available for the realization of the South Korean development and modernization objectives. How were these done? They were achieved through a breakthrough in science and technology.

Science, Technology and Modern South Korea

The industrial development and modernization processes in South Korea have in fact been a function of well-defined and focused state-policy on science and technology. It is obvious that the most important sources of productive growth for South Korean manufacturers had traditionally been directly or indirectly related to the ability of South Korean companies to acquire new technology from abroad and adapted it to domestic condition, rather than paying the cost of research and development (Keith, 2003:18). Fortunately, for South Korea, its high level of well-educated workers who constitute a formidable brain trust for future

research and development appear to be a major asset to the practical transformation of state policy towards the evolution of higher level of technology.

The Seoul government began to invest in technology research with the establishment of a republic. The Korean Atomic Energy Commission established in 1959 was responsible for research and development, production, dissemination and management of technology for peaceful application of atomic energy. In 1960's the Ministry of Science and Technology was founded to oversee all government research and development activities. The Korean Institute of Science and Technology was made to function as an industrial research laboratory, for effectiveness, continuity and appropriate monitoring to ensure efficient result and success in science and technology policy of the state. In 1970, the Scientific Communities were established. One in Seoul, the other near Taejon (Chu Tung, 1980:141).

The Seoul complex included the Korea Institute of Science and Technology, the Korea Development Institute (affiliated with the Economic Planning Board), the Korea Advanced Institute of Science, and the Korea Atomic Energy Research Institute. Plans were equally made on a grandiose scale for the Daeduk Science Town near Taejon. This was a great ambition on the part of the South Korean State to actually transform South Korea into a formidable and prosperous society. This (Daeduk science Town) was modeled after the Isukuba Science City in Japan. By the late 1980s, this, science town accommodated laboratories specializing in ship building, nuclear fuel processing, metrology, chemistry and energy research. More enviable and interesting, at this time, was that, the Korean State founded the Korea Advanced Institute of Science and Technology to develop and offer graduate science programmes, and it also encouraged universities to develop their own undergraduate and post graduate programmes in science and technology (Albert, 1989:18). This was indeed a bold policy backed by success determination on the part of the Korean State. No wonder Kenneth, (2001:12) remarked that

"The success story of South Korea in education industrialization, electronics and military weapons are traceable to the determination of the leadership to build a modern society. Over 40% of South Korea National Budgets between 1960-1986 went into education and researches in science and technology. Government endowments and international assistance were equally sought. In 1987, Daeduk alone was having over \$7 billion for research".

The success of Samsung electronics has largely been traced to the realization of the visions that established Daeduk. Its multiplier successes have been aptly illustrated by the world's acceptance and progress of Samsung. In fact, the tremendous success story of Samsung since the mid-1980's was a strong evidence of the high productivity in such modern industries as electronics. "The group's total sales nearly doubled (8.4 billion won to 14.6 billion won) between 1984 and 1986, while the number of employees only increased from 122,000 to 147,000. The reason for this high degree of productivity was that South Korea moves away from labour-intensive industries to those that were highly automated" (www.country-data.com). This is a clear indication of a situation in which investments in education, science and technology are worthwhile.

The government-led development policy for sustenance of continuous research, science and technology and production of more scientists found expression in the establishment of the Pohang Institute of Science and Technology. By 1988, "the institute has a faculty of 132 teachers, about 500 undergraduates and approximately 110 graduate students and by 1980's, the government sponsored the scientific and technical education of many graduate students at prestigious institutions such as Harvard University and the Massachusetts Institute of Technology (Lawrence. 2002:182).

The triumphs of the 1970's and 80's and continuous challenges posed by the ever dynamic international politics (Hangler, 1980:17) seem to have encouraged Seoul in 1990 to announce an ambitious plan to promote science and technology so that high-technological activities would dominate the economy by the year 2000 and beyond (www.country-data.com). This was to be in the areas of chemistry, computers, semi-conductors and new materials. The Ministry of Science and Technology also championed this cause and equally coordinated this corporation between government and industry.

As nature threatens and development resources are increasingly becoming scarce, South Korea is equally proposing a post 21st century technology to take care of inadequacies for the sustenance of man (Keith, op cit 71). In fact, its formidable technology alarmed the world when South Korea in the autumn of 2004 publicly revealed for the first time the extent of its highly-secretive nuclear research programs, including some experiments such as the enrichment of 200 milligrams of uranium to near weapon grade, which were conducted without reporting them to the International Atomic Energy Agency

(www.en.wikipedia.org/wiki/South_Korea_Nuclear_Research_Programs). No doubt, South Korea presented a good case of where government-led development and the dominance of Giant Corporations have worked within the vortex of a well-defined public policy (www.worldscibooks.com/economics). South Korea's development truly alarmed its observers. Its extraordinary economic performance forced scholars to begin to outline reasons for its performance. Of particular reference was the Harvard Group who sought reasons for South Korea economic magic, they affirmed that:

- "A work ethic probably derived from the Confucian tradition, comparable to the Protestant ethic of Western Europe.
 - The residue left by Japan including access to technology and management
 - « Social mobility and destruction of the traditional structure by liberation, division, social confusion, war, and the return of overseas residents.
 - Cultural homogeneity.
 - « Foreign financial and technical assistance.
 - A rapidly expanding educational system". (Anthony, 2000:18)
They however concluded that these factors produced a disciplined and well-educated work force. Additional factors were basic political stability and shift in government policies.
 - "The assurance of national security by the presence of an American shield
 - Korea's earnings from contribution of men and supplies to the United States in Vietnam
 - Improved nutrition levels
 - The precipitation drop in chronic intestinal and other infections that have for centuries drained the Korean people's energy.
- * Improvement in the quality of government administration" (Edward, 1980:28-29).

Despite the negligible differences in the two positions, it is however clear that the two positions upheld the roles of education, science and technology and the beauty of the government policy that enables the departure from the traditional ways and then set agenda for radical departure which informs the foundation of new principles upon which the modern South Korea is standing.

Conclusion

The Republic of South Korea is one of the East Asian tigers that has successfully transformed itself into a modern society using the opportunities provided through the engagement of science and technology. The division of Korea Peninsula into the North and South Korea and the foundation of the separate republics appear to have paid off. From the 1960's, a period which most of the still-crawling countries of Africa got their independence, South Korea took its destiny in its own hands, articulated a well-defined policy for modernization, confronted the challenges of development, set priorities for the attainment of a lofty technological height to sustain its ever growing industrial activities which, today has become the envy of other developing societies.

The contribution of various factors: cultural homogeneity, visionary leadership, right, public-development policy on education, science and technology, political stability and the willing citizenry, worked together to ensure the emergence of a modern industrial South Korea.

The lessons which the third world or developing states could learn from the Korean experience are many. The right environment and policy should be encouraged for the creation of the foundation for a modern society. Government spending on education which is a sine-qua-non lo technological development and manpower requirements for development should, as a matter of policy, be a priority. How would a Nigerian State which spent less than 5% of her annual budgets in 2005 on Education (ASSU, 2005) hope to achieve the height attained by South Korea which gave education the largest vole from her budget since 1960's, or a South Korean State which has a special vote for science and technology?

Deliberate efforts at building and inculcating a sense of national consciousness should be encouraged and an aggressive state policy to attract Nigerian experts in science and technology should be encouraged. Schools and towns of science and technology should be established with government pioneering these efforts. Modern development and the logic of modernization are founded on the principle of science and technology. For a state lo chart a genuine and an enduring development path, such a desiring state must restructure its education, place high priority on science, and also, fund development research programmes. Modern development, in its entire ramification is largely based on the eternal principles of technological automation

and innovations.

References

Albert Enshaw (1989). State and education in South Korea. New York Prentice-Hall Inc.

Anthony Pearse (2000) South Korea: What magic for development. Boston. Browns-Well inc. ASSU

*Publication on Government funding of Education in Nigeria since 1999. ChangWuang(1995). South
Koreas Since 1960. Seoul. Rex Publishers.*

*Chu Tung (1986). National Institutes and Atomic Research in Seoul: Toward a soft militarization. Seoul.
Kuang Tao Inc.*

*Donald Stone Macclonald (1988/ The Koreans contemporary politics and society. Colorado Westview
Press,, United States of America.*

*Edward. S. Mason (1980). The economic and social modernization of the Republic of Korea: Studies in the
modernization of the Republic of Korea. 1954-1970 Harvard East Asian Monograph. 92, Harvard
University.*

Emmanuel G. Merthene (1973). Technological change. Cambridge. Harvard Press. Eric Thompson

(2002) South Korea: When reforms matter. Budapest. Caperolle Inc. Nzongola Ntalaja (2000). Leadership

and development in Zaire. Kampala. Avris Press, Hangler Smith (1980). International politics and the

changing dynamics. Scotland. The Petals Inc. Juan Kolil (1989). South Korea: The emerging industrial

power. New York. Hillerests Inc. Keith Wang (2003). Politics and economy in South Korea. New York

Aliens and Associates.

*Kenneth Stroll (2001) South Korea: The political economy of science and technology.
Education, Australia.*

Kuang Tsao (1992). The park regime: An analysis of leadership and transformation. South Korea. Rex Inc.

*Lawrence Hills (2002). Leadership, education and development in South Korea. Melbourne. Bluecrest
Publishers.*

*Li Weng Yu (2001). Politics and transformation: The park regime: Boston, USA The Image
Foundation Press.*

Robert Wolfensein (1982). Colonial rule In Korea. Addison-Welch Inc.

Roy Williams (1989). The South Korean method. Colorado, USA. Willbrough Inc, Australia.

*William Svernson (2004). The world economy: Growth, development and problems. Ltd. Buffalo,
USA. Iris World Press*