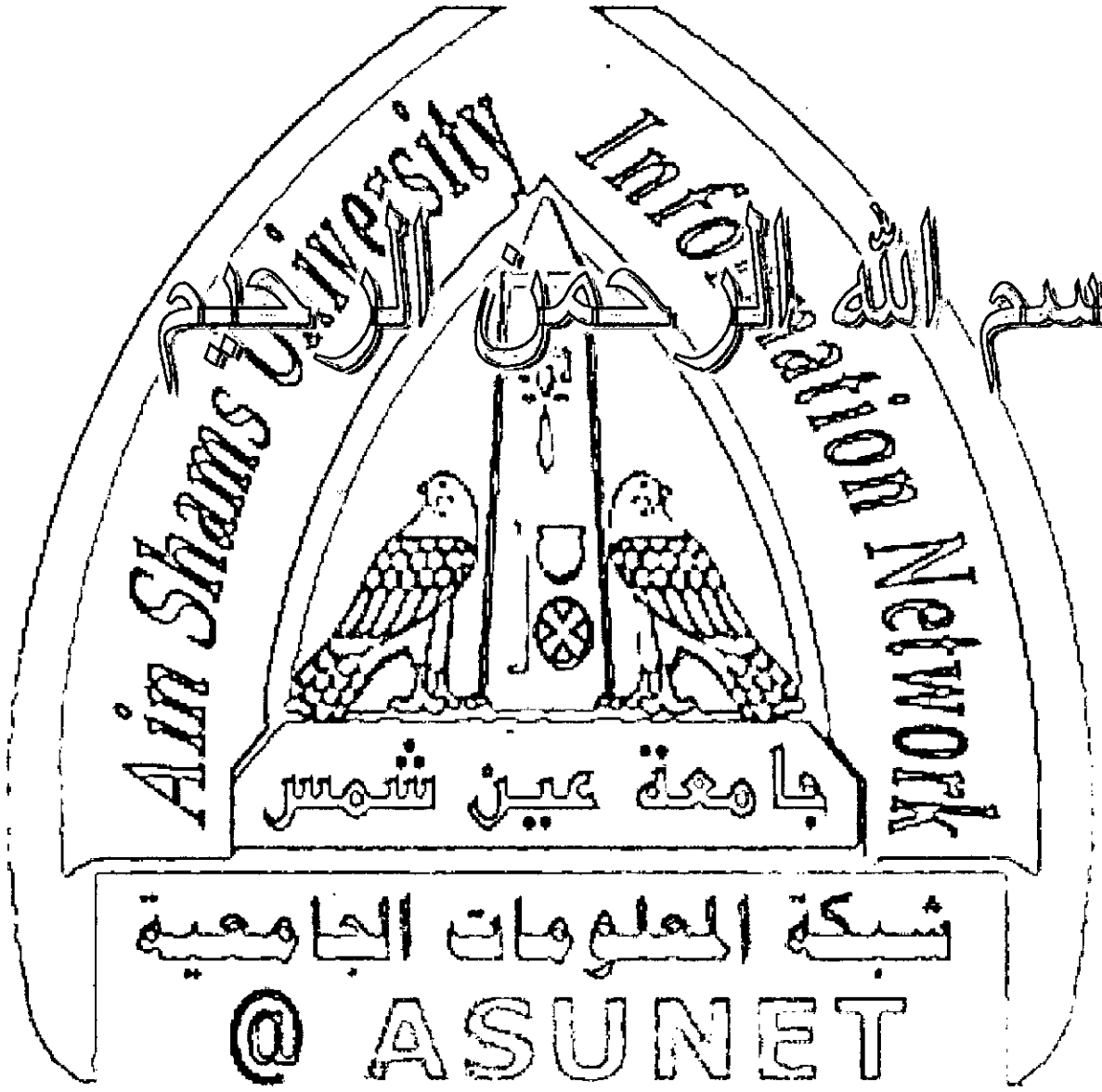
شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

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Cairo University
Faculty of Economics and Political Science

THE KNOWLEDGE-BASED ECONOMY AND ECONOMIC GROWTH: A COMPARATIVE STUDY WITH SPECIAL EMPHASIS ON THE ROLE OF R&D

Ph.D. Dissertation

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April 2010

Ahmed Ghoneim
احمد غنيم

بسم الله الرحمن الرحيم

" سبحانك لا علم لنا إلا ما
علمتنا إنك أنت العليم الحكيم"

صدق الله العظيم

(سورة البقرة الاية 32)

ACKNOWLEDGEMENTS

I am deeply indebted to Dr. Ahmad Ghoneim, associate professor of economics at the faculty of economics and political science - Cairo University for superwising this research and for his patience and help all over the course of my work.

I owe profound thanks to my colleague Dr. Alaa ElShazly, professor of economics at the faculty of economics and political science - Cairo University, for his continuous encouragement and endless support all through my academic career.

And to my beloved mother, I am as usual grateful for her never ending support for my career through her continuous care and encouragement. It is for her and through her that I was able to accomplish my work. ...I love you.

Last but certainly not least, I am indebted to my husband, Mohamed Adel for being a source of hope and enlightenment and for his understanding during hardships. And also, to my sons, who are the incentive of my success, and who helped me by sparing me the time to work on this thesis to finish on time.

It is with all your support that I was able to achieve my objective.

List of Abbreviations:

BRIC	Brazil, Russia, India, and China
CAPES	Committee for Post Graduate Courses
CNPq	The national Council for Scientific and Technological Development
EA	East Asian
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Agricultural Research Corporation)
EMBRAER	Empresa Brasileira de Aeronáutica (Brazilian Aerospace Conglomerate).
ETRI	Electronics and Telecommunications Research Institute
FDI	Foreign Direct Investment
FUNDCT	National Science and Technology Development Fund
GDP	Gross Domestic Product
GERD	Gross Expenditure on R&D
GNP	Gross National Product
GRIs	Government Research Institutes
HDI	Human Development Index
IBR	International Business Report
IBGS	Institute of Geography and Statistics
ICCP	Information, Computer and Communications Policy
ICT	Information and Communication Technology
IAEP	International Assessment of Educational Progress
IEA	International Association for Educational Achievement
IMF	International Monetary Fund
IP	Intellectual property
IPEA	International Pharmaceutical Excipients Auditing
IPR	Intellectual Property Rights
IT	Information Technology
KAM	Knowledge Assessment Methodology
KBE	Knowledge Based Economy
KEI	Knowledge Economy Index
KI	Knowledge Index
K4D	Knowledge for Development
KIMM	Korea Institute of Machinery and Metals
KIS	Korea Innovative System
LA	Latin American
LAC	Latin American Countries

MIT	Massachusetts Institute of Technology
NIS	National Innovation System
NIC	Newly Industrialized Country
NIE's	Newly Industrialized Economies
MNC	Multinational Companies
OECD	Organization of Economic Cooperation and Development
PISA	Program for International Student Assessment
S&T	Science and Technology
TFPG	Total Factor Productivity Growth
TFP	Total Factor Productivity
UNDP	United Nations Development Program
USD	United States Dollar
US$	United States Currency
USPTO	United States Patent Trade Organization
R&D	Research and Development
WB	World Bank
WBDI	World Bank Development Indicators

Abstract

In the past, it was usually a unique combination of land, labor, and capital that gave a nation its comparative advantage, but today the formula has been reversed. As an ever-increasing percentage of economic growth arises from the burgeoning knowledge sector, therefore, any nations' comparative advantage comes instead from its collective ability to leverage what its citizens know. Traditional factors of economic growth seem less relevant, if not obsolete, when seen in the context of the global knowledge-based economy where the foundations of wealth creating have shifted from physical assets such as land and oil to knowledge; and radical technological changes fasten such disequilibrium conditions (Thurow, 1999). And it is now commonplace that the knowledge gap,[1] rather than the income gap, determines the prospects of countries in today's world economy. The gap between developing countries and developed countries in the capacity to produce knowledge is wider than the knowledge gap itself. This calls for serious efforts to regenerate knowledge

[1] The knowledge gap theory was first proposed by Tichenor, Donohue and Olien at the University of Minnesota in the 70s. They believe that the increase of information in society is not evenly acquired by every member of society: people with higher socioeconomic status tend to have better ability to acquire information. This leads to a division of two groups: a group of better-educated people who know more about most things, and those with low education who know less. Lower socio-economic status people, defined partly by educational level, have little or no knowledge about public affairs issues, are disconnected from news events and important new discoveries, and usually aren't concerned about their lack of knowledge.

The knowledge gap can result in an increased gap between people of lower and higher socioeconomic status. Media presenting information should realize that people of higher socioeconomic status get their information in a different way than lower educated people. Furthermore, this hypothesis of the knowledge gap might help in understanding the increased gap between people of higher socioeconomic status and people of lower socioeconomic status.

production in the developing world.

Moreover, in today's global knowledge economy high value added comes from technology and knowledge-intensive sectors of the global value chains. Knowledge and technology became interdependent to form the key factors of production and together they form the key sources of competitive advantage for countries. Investment is now being made in intellectual capital, in knowledge and human skills upgrading that lead to new innovations, as drivers of economic growth and sustained development. And these are the most highly profitable assets in a knowledge society. Therefore, developing countries need to move up the global value chain by responding flexibly and rapidly to absorb and utilize existing knowledge which may be more important at early stages of development. And in the twenty first century where globalization is taking place and competition is increasing all over the world, access to knowledge becomes crucial and investment in human capacity becomes essential, and in this, disseminating knowledge through different channels plays a pivotal role in the socioeconomic development of countries and the success of nations (Kamel, 2010).

Thus, the importance of this thesis lies mainly in presenting the concept of the knowledge-based economy framework, which asserts that it is in no way purely confined to information and communication technologies (ICTs) or high-tech industries. It is defined as one where knowledge is created, acquired, transmitted, and used more effectively by enterprises, communities, and individuals for greater economic and social development. And culture is one of the most important factors in formulating knowledge through enabling sustained investments in universities, R&Ds, education and training institutions from both the public and private sectors, ICTs, in addition to a conductive economic and an institutional environment which leads to knowledge

production,[2] and consequently results in sustained economic development (OECD, 2005). Creating a culture of innovation is important as it aims at strengthening cooperation between the research which is done and industry, thus linking research to the market economy. And it is the role of the culture to develope a spirit of innovation through seminars, workshops or conferences; academic grants and training sessions to help ushering a KBE. Therefore, it is important to raise awareness on the importance of research, development and innovation in technology developments and their effects on societies. The thesis also highlights a discussion of some of the new policy challenges raised by the trend towards the knowledge-based economy from a Schumpeterian perspective on technical change recognizing the intrinsic differences in the nature of the accumulation process across sectors [3] (Howitt, 2004,2005&2007). Such an approach does, however, suggests some reconsideration of macroeconomic and competition policies designed, in the developed world, to cope with both technical change and globalization in modern economies. And because useful prescriptions depend upon accurate diagnosis, therefore, policy makers must pay much greater attention to the effectiveness of their policy tools with a focus

[2] Knowledge generation activities includes, but is not limited to: research, applied research, action research, technical services, conferences, seminars and other activities all of which feed into core long term microenterprise learning.

[3] Schumpeterian growth theory explains the basic ideas of endogenous growth theory. The first is that technological progress is the driving force behind long-run growth. This proposition follows inescapably from the fact of diminishing returns. That is, if people continued to produce the same products, of the same quality, using the same means of production and the same procedures, with no growth in knowledge, then sustained growth in per-capita output would require sustained growth in the amount of capital used per worker. But, beyond some point increases in capital per worker would eventually reduce its marginal product to zero. This force would eventually reduce a country's growth rate (that is, the growth rate of its per-capita GDP) to zero. The only force that can prevent this eventual stagnation is increasing productivity, coming from new products, processes and markets; that is, technological progress. Schumpeterian growth theory distinguishes explicitly between physical and intellectual capital, and between saving, which makes physical capital grow, and innovation, which makes intellectual capital grow.

on policy and institutional learning, rather than following a set of simple normative guidelines.

And, due to the importance of knowledge accumulation and dissemination for sustainable economic growth, the World Bank has introduced in 1999 its Knowledge Assessment Methodology to help different countries assess their readiness for being knowledge-based on relative indicative and comparative basis with each other.

In this context, this thesis helps drawing lessons from developed countries that show an increasing reliance on knowledge, science and technology (S&T), research and development (R&D) [4]and industry where globalization is central to the argument and change is essential. This thesis, therefore, provides useful insights for developing countries from successful experiences of other countries that were able to make the transition to knowledge-based economies moving away from old paradigms towards new models of development. This trend is of special concern since the newly industrialized countries of Asia as well as other countries such as Finland, which was mainly rich in resource endowments, for example, were able to make such a transition. Therefore, the thesis considers instances of technology development and knowledge industries simply through the improvement of the production process itself and technological upgrading or

[4] R&D comprise all creative work undertaken on a systematic basis in order to increase the stock of knowledge to device new applications. R&D is a term covering three activities: basic research, applied research, and experimental development. Basic research is experimental or theoretical undertaken primarily to acquire new knowledge. Applied research is original investigation undertaken in order to acquire new knowledge, however, directed towards a particular aim or objective. Most important of all is the experimental development which is directed towards producing new materials, products, devices or services or even improving those already produced. The main aggregate used for international comparisons is gross domestic expenditure on R&D (GERD). This consists of the total expenditure on R&D done by all resident companies, research institutes and universities *(www.OECD.org).*

when knowledge goods associated with resource-based activity are applied targeting areas of growing demand. And through the application of the World Bank Knowledge Assessment Methodology (KAM), two cases at different stages of economic development are analyzed. These are the East Asian recently developed South Korea and the Latin American newly industrializing developing country Brazil. These two examples are chosen in order to study two different case studies; one is for successful examples of catch-ups in the absence of resource endowments which is the case of South Korea and the other is for resource underachievers as in the case of Brazil which had problems in reconciling resource exploitation with more knowledge intensive and higher growth activities in the past.

And since, it is possible to learn from mistakes no less than from successes, this study therefore analyzes the reasons for success or failure and how best to reconcile the demands of the knowledge economy with resource-intensive endowments. Focus is on an important dimension of the patterns of expenditure on innovational R&D activities, namely the allocation of resources and the share of private to public expenditures on such sector and the development of this economic sector over time which are examined in the cases under study. And since promoting a culture of knowledge and encouraging innovation [5]in the Egyptian society is becoming important, therefore, the concept of innovation itself needs a lot of work to become an intrinsic part of the line of thinking of the youth and this should then lead to the activation phase i.e. research, and then the long journey of development.

The aim of the thesis is to pose the essential issue of whether developing countries can catch up- or alternatively through- knowledge. The argument will

[5] Here innovation relates to improvements in a pre-existing good or service which contributes to the economic growth wheel and not an invention of something unheard of as much as reaching the implementation phase with this product or service. In other words it is turning the idea into an economically and commercially viable project. So, it is not the invention of the wheel as much as it is setting a realistic vision for how to make the wheel move.