

THE INDONESIAN GOVERNMENT POLICIES IN THE KNOWLEDGE ECONOMY

Diah Setiari Suhodo

Pusat Penelitian Ekonomi LIPI
Gedung Widya Graha, Jl. Gatot Subroto No.10 Jakarta
e-mail: diahsuhodo2@yahoo.com

ABSTRAK

Peranan ilmu pengetahuan dalam pembangunan ekonomi sebuah negara dewasa ini menjadi sangat penting dan menjadi faktor utama dalam pembangunan ekonomi. Penggunaan ilmu pengetahuan dalam proses produksi akan meningkatkan kapasitas, efisiensi, dan efektivitas produksi. Lebih dari 50% pembentuk PDB di negara maju adalah kegiatan ekonomi yang berbasis produksi dan distribusi ilmu pengetahuan. Indonesia menyadari pentingnya ilmu pengetahuan dalam pembangunan ekonominya dengan menetapkan visi dan misi “Terwujudnya Masyarakat Telematika Nusantara Berbasis Pengetahuan di Tahun 2020”. Tetapi, visi dan misi itu sendiri tidak cukup tanpa diikuti pelaksanaan dan komitmen yang kuat yang tercermin di dalam kebijakan pemerintah. Tulisan ini bermaksud mereview kebijakan pemerintah terkait dengan pemanfaatan ilmu pengetahuan untuk pembangunan ekonomi, utamanya dalam hal teknologi dan inovasi serta pendidikan dan pembagunan sumber daya manusia dengan menggunakan analisis kualitatif berdasarkan data sekunder. Pembangunan teknologi dan inovasi di Indonesia berada pada posisi yang terendah dibandingkan negara lain di Asia. Kebijakan yang telah dijalankan rezim pemerintahan terdahulu bisa dikatakan tidak berhasil karena terlalu berfokus pada pembangunan teknologi tinggi, padahal, tidak sepenuhnya benar bahwa semakin tinggi teknologi maka semakin tinggi pula dampak ekonomi yang dihasilkan, hal ini akan tergantung pada sektor apa teknologi tersebut diterapkan.

Kata kunci: Pengetahuan; Pembangunan Ekonomi; Inovasi; Teknologi

INTRODUCTION

Background

At present, the knowledge discourse has become the mainstream of economic development and the single most important resource that enables an economic entity to grow and create beneficial economic value. Knowledge is also embodied in all aspects of human life; it is indivisible from human activity of every kind.¹ The ability to invent and innovate, that creates new knowledge and new ideas that are embodied in social structure, culture, organization, production, process and other areas, has taken a fruitful role in accelerating the development of countries or even organizations. We have to deeply understand the roles of social structure and culture if we want to understand knowledge and how it contributes

to better living conditions. This view shows that investment in education, innovation, culture and all that relates to knowledge discourse would have the impact of stimulating the improved prosperity of a country.

Nowadays, the knowledge economy has fundamentally changed the world view, particularly in the framework of economic theory. For many years, labor, capital, materials and energy have been the main factor of production. But those are now changing; knowledge, information and technology are augmenting those factors as the key factors of production and are recognized as the key drivers of productivity and economic growth. Many believed that knowledge investment will create higher productive capacity in other factors of production, as well as transform them into new products. It is also the key to long-term economic growth, since investments

in knowledge are distinguished by increasing return rather than decreasing return. Studies by the OECD² stated that more than 50% of Gross Domestic Product (GDP) in the major OECD economies is now based on the production and distribution of knowledge.

This imminent issue of the knowledge economy also challenges Indonesia as one of the developing countries in a changing world. Indonesia has followed suit where it has pronounced “vision and mission” as a first step in the national and local planning process. “Terwujudnya Masyarakat Telematika Nusantara Berbasis Pengetahuan di Tahun 2020” is the vision statement of the KTIN (Kerangka Teknologi Informasi Nasional). The document is broad-based, extending from support for e-business to good governance and e-democracy.

Indonesia was one of the East Asian countries that had enjoyed the “miracle of rapid economic growth” until the 1997–98 financial and economic collapses. From 1966, over the next three decades, the new order government compiled what can only be classified as an extraordinary record of economic rehabilitation, growth and transformation. National income increased six fold in real terms, the growth rate was 7% or more per year, and by 1996 Indonesia’s GDP was over US \$200 billion³. This was the norm for East Asian countries, and was substantially higher than the average growth rate of 3.7% for all developing countries. At the same time, Indonesia’s poverty level fell from 28% in the mid 1980s. By 1990 the poverty rate had fallen to 16% or 29 million people, and as of the mid-1990s was estimated at 11% or 21 million people. Referring to this period of stable economic growth, the World Bank Report speaks of an ‘East Asian Miracle’, emphasizing the macroeconomic stability and the investments in human capital.⁴

Education improved greatly from the late 1960s to the late 1990s, and as a result the proportion of the population over ten-years old which was illiterate fell from 39% in 1971 to only 8.1% in 2005. By 1990 the number of primary schools had vastly increased, from 65,910 in 1973 to 146,558. During the same period, the number of pupils enrolled doubled, from 13.1 million to

26.5 million. In the early 1970s gross enrolment was 75%, but it increased to about 90% by the end of that decade. By the mid-1980s, gross enrolment rates exceeded 100% and by 1994 had reached 112%. In 1993-94 gross enrolment rates were 111%, 54%, 34%, and 11% in elementary school, junior high school, senior high school, and higher education, respectively.

Knowledge in terms of strategic technology and information has become an important key development area to be addressed by Indonesia. Some Indonesian figures provide an unsatisfactory basis for the readiness to accept a knowledge-based era. For example, only 3% tele-density (3 telephones for 100 people) of fixed telephone lines is available for the people to use telecommunications; unfortunately most of them reside in the big cities. Some of Indonesian students have excelled in various international science competitions such as in the International Physics Olympiad. However, the nation as a whole lags behind in educational attainment and in mastery of technology. The cost for education is still high for most students in Indonesia, while the average quality is still stumpy.

This paper wants to review the policies in relation to the knowledge economy issued by the Indonesian government, particularly policies in terms of technology and innovation capabilities and in terms of education and human resources development in the knowledge economy era. To achieve this objective, this paper will begin with a general discussion of the main concept and key features of knowledge and the knowledge economy, then go on to explore the impact of knowledge economy on growth, innovation and policy implication.

Research Question

This paper wants to find out:

- 1) How are the Indonesian government policies in terms of technology and innovation capabilities in the knowledge economy era?
- 2) How are the Indonesian government policies in terms of education and human resources development in the knowledge economy era?

Objectives

The aims of this paper are:

- 1) To analyze the Indonesian government policies in terms of technology and innovation capabilities in the knowledge economy era.
- 2) To analyze the Indonesian government policies in terms of education and human resources development in the knowledge economy era.

Methodology

This study is using qualitative analysis based on secondary resources. A literature review will be used to acknowledge the concept of the knowledge economy and how the Indonesian government commences to apply this concept. Data were collected from various resources, particularly from books, journals, newspaper articles and reports.

THEORETICAL FRAMEWORK

What is knowledge? There are other terms which are similar, like data, information, and actions; can we use the terms interchangeably? And at which level the knowledge discourse can take a role in the economy?

In principal, data has its own characteristic which differs from information or knowledge. Data can be defined as unorganized 'bits'. The form might be in numbers, words, sounds and images. As data is the basic building blocks of information, data can be referred to as being raw, that is, relatively un-manipulated, unanalyzed or uninterrupted.¹ Meanwhile, information is in the form of organized data which might be in text, on the internet or statistical. In this definition, there is a process and a method to change data to become information, in which the process and the method are dependent upon the need and the form of information we need. It means the process to change data is diverse and develops in regards to the development of knowledge. Knowledge is neither data nor information. Rooney *et al.*¹ recognize knowledge as a more than organized data.

Dealing with the types of knowledge, knowledge is the sum stock of information and skills derived from use of information by the

recipient⁵. He distinguishes knowledge from data and from information. Knowledge from data is a signal that is able to be sent by the sender to communicants, and knowledge acquired from information is data which are able to make the recipient intelligent. So here, the degree of the usefulness of those kinds of knowledge has a different meaning, that knowledge obtained from information is valuable.

Beside the definition above, the other determination regarding types of knowledge centers upon the contrast of codified and tacit knowledge. Codified knowledge is dealing about the know-what which means that it can be reduced to information⁶. On the contrary, tacit knowledge deals with skills such as insight, creativity and judgment (the know-how). This categorization of knowledge has been extended. At least there are four kinds of knowledge which are know-what, know-why, know-how, and know-who. The determination of kinds of knowledge is centered on the factor of how to get the knowledge easily.

"Know-what and know-why is able to acquired by reading books, attending lectures and accessing databases, the other two kinds of knowledge are rooted primarily in practical experience. Know-who is learned in social practice and sometimes in specialized-educational environments. Know-how will typically be learned in situations where an apprentice follows a master and relies upon him as the authority".²

The degree of difficulty to apply tacit knowledge is more difficult compared to that of codified knowledge, because the application of the tacit knowledge needs experiences.⁷

The knowledge discourse plays a role in addressing the problems of firms, countries or the world as a whole. This explains why firms have to keep in touch in the basic research to acquire access to networks of academic experts crucial for their innovative capability, why quality relationships between actors in a region contribute to the improvement of capabilities of a region (company or country), and so forth. It is worthwhile to conclude that an economy is becoming knowledge-based when it is able to increase productivity with the application of knowledge. Knowledge becomes the single most

important resource that enables an economic entity to grow and to create beneficial economic value.

Knowledge Economy: Concept, Features and Its Framework

Originally, it was Drucker⁸ who firstly labeled and utilized the terms of the 'knowledge worker', 'knowledge work', and 'knowledge industries'. Machlup⁹ further conducted a statistical analysis of the production and distribution of knowledge in the US economy. In his study, Machlup⁹ calculated that 29% of the GNP derived from the knowledge industries, which he categorized into five categories: education, research and development, communication media, information machines (computers), and information services including finance, insurance, and real estate.

The knowledge economy is based on the improvement of technology in recent developments, particularly ICT (Information and Communication Technology). The revolution of ICT has occurred differently in different places in the globalization era. One of the benefits is that the revolution and development of ICT is able to reduce cost significantly. However, ICT does not necessarily create knowledge or extend knowledge. ICT is only providing information resources. We have to raise an essential question in this matter: is the recent development of ICT or other technological developments enabling us to declare that the present time is the knowledge economy era? We should not take the ICT revolution as synonymous with the knowledge economy, even though both phenomena are strongly interrelated.¹⁰

So what actually is the knowledge economy? Rooney *et al.*¹ proposed a determination of the knowledge economy that it is a part of the economy that can have essential wealth creation through intellectual activity. The OECD defined knowledge economy as an economy which is 'directly based on the production, distribution and use of knowledge and information'.²

It is simply that a knowledge economy is not high technology industries for growth and wealth production, but in the knowledge economy all industry can be knowledge intensive, even it is characterized as an old industry, i.e. mining or

agriculture. As such, economies are knowledge-based when it is increasingly dependent on the effective creation, acquisition, distribution and use of knowledge which is enabled by the rapid advances of the science based and the ICT revolution.

Knowledge, Human Capital and Economic Growth

Growth theory focused the central theme of the drivers of economic growth on tangible (physical) capital accumulation, which means the factors of knowledge; productivity, education, and intellectual capital were categorized as exogenous factors which do not have essential sense in explaining how to increase economic growth. Time by time, the neo-classical view of exogenous factors of economic growth further had reformulated and reviewed in regards with the research conducted by Romer¹¹ and Lucas.¹² The endogenous growth models explain human capital - the knowledge, skills, competencies and other attributes that are relevant to economic activity, which have a role in influencing the economic growth of a country. As such, building, maintaining and developing the skills and knowledge of the labor force or individuals are regarded as the key strategy to promote national economic growth.

Human capital is another input in the production function, which is not fundamentally different from physical capital. Human capital as a new input can be accumulated by workers through certain activities – principally education or on-the-job training.¹² Knowledge has become the third factor of production in leading economies, but does not put human capital as the most important function.¹¹ Human capital plays a part in triggering innovation.

Knowledge and Innovation

Globalization and a highly competitive market are incentives for firms or nations to have the willingness to catch up or to maintain markets. Dealing with this, there is no doubt that part of the competitive strength of a region or local (firm or nation) is determined by its natural, physical condition, managerial capabilities and learning skill. Therefore, mainstream of knowledge

economy highlights knowledge and innovation as the main factors. There are five categories in conceptualization¹³, which are (1) the introduction of a new product, (2) the introduction of new method of production, (3) the opening of a new market, (4) the conquest of a new source, and (5) the implementation of new organization of industry. Presently, innovation encompasses much more than technology. Innovation is the approach that is able to create and develop new ways in order to obtain competitive advantage.

*"Innovation here is defined broadly, to include both improvements in technology and better methods or ways of doing things. It can be manifested in product changes, process changes, new approaches to marketing, new forms of distribution, and new conception of scope. Much innovation, in practice, is rather mundane and incremental rather than radical. It results from organizational learning as much as from formal R&D. It always involves investment in developing skills and knowledge."*¹⁴

Innovation is not only the process of R&D, but also consists of all those scientific, technical, commercial and financial steps necessary for the successful development and marketing of new or improved manufactured products, and also the commercialization use of new or improved processes and the introduction of a new approach to a social service¹⁵. Innovation process is related to the generation of information participation, which facilitates communication flows as well as information creation, which is crucial.

There are two types of innovation:¹⁶ first, innovation as the creation of a greater variety of goods and production processes; and second, innovation as the improvement of existing goods' quality. In the context of management, innovation is defined as a new solution, which has a value added impact for its stakeholders.¹⁷ The types of innovation might be product innovation, process innovation (reengineering), organizational and market innovation. The main differentiation between innovation in manufacturing and service is that innovation in service relies more heavily on intangible resources and developments, and also it is difficult to quantify and study. In addition, half is due to formal R&D, so innovations in services appear to be non-technical and to

result from mostly small changes in processes and procedures, organizational arrangements and markets that ultimately do not require as much formal R&D or property rights protection.

THE INDONESIAN GOVERNMENT POLICIES IN THE KNOWLEDGE ECONOMY

Policies on Innovation and Technology

Developing countries that make a transition to the knowledge economy will be able to achieve unprecedented possibilities and be more competitive in improving the livelihood of their people. Technological development and capabilities are the pillars of the knowledge economy, reflecting a system of research centers, universities, think tanks, consultants, firms and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new knowledge.

In the mid-1960s, Indonesia's economy was so riddled with distortions, its international commercial channels were disrupted, and its commercial environment was uncertain that investment had virtually ceased. As a result, aside from the view that the economy was extremely poor, the technological base was markedly weak as well.

This period was the starting point for Indonesia to emphasize its economic development, achieve economic growth, and affect the pace of technological development.¹⁸ These goals were reflected by two achievements, firstly, by the rapid economic growth based on manufactured exports which raised the prospect of the economy following the path of the newly industrialized economies¹⁹ and secondly, by modern electronic and transport equipment industry taking a root, a well equipped textile industry; heavy established intermediate industries; and strong inflow of FDI.²⁰ Despite these factors, Indonesia is the poorest country in terms of technological and innovation capabilities¹⁸ compared to the East Asian Tiger countries²¹ even before and moreover after the 1997 economic collapses.²²

There are several weaknesses of Indonesian technological and innovation capabilities²⁰ such as weak domestic capabilities for absorbing and

improving upon complex imported technologies; an underdeveloped capital goods sector; and the relatively small amount of technological effort. These weaknesses, if not overcome, would have hampered Indonesia's long-term industrial growth and upgrading.

The first indicator to be assessed is the data on exports of high technology manufacturing. The definition of high technology is still not clear²², because it involves assembled product with low local value added, such as electronics; but Lall (1998) advocates the utilization of the export data of high technology as a rough indicator of the technological competence of large economies.

Indonesia's manufactured exports is at the lowest level compared to the other East Asian countries, this indicates that Indonesia is the most technologically backward even compared with Thailand. Before the period of the 2000s, a study examining the link between manufactured exports and technological capabilities in the Republic of Korea, Taipei, China, Indonesia, Thailand, and VietNam, determined Indonesia's technological capability at a relatively low level, not only in domestic-owned manufacturing, but also in foreign-owned manufacturing.²⁴

Indonesia's technology is able to produce basic capabilities only.²⁵ It is required for the smooth functioning of plants and, to a lesser extent, to adapt to minor change capabilities, specifically in regard to introduce minor changes in process or product technologies to conform with local conditions, this indicates the mismatched problem between the high requirements needed in the global market and Indonesia's technological

capability led to the inability to gain more benefits and to have sustainable development.

The second indicator that we may utilize is the R&D capacity, R&D as a creative and systemic activity which is undertaken for increasing the stock of knowledge, leading to the application of new technology.²⁶ In the context of developing countries, the effort in R&D activity is intended to take a significant step in shifting the domestic technology frontier in order to facilitate implementation; even the strategy of investment in R&D differs considerably, depending upon the needs of the developing country itself. Governments play a key role in encouraging and facilitating R&D. Because of high risks and considerable investment commitments, operations in such endeavors are likely to remain suboptimal unless the government is actively involved.

Investment in R&D activity in Indonesia was the lowest, still far behind other countries. Indonesia classified as a 'level 2' developing country, the lower rank of which spends 0.05% of GDP on R&D.²⁷

There is little independent design and development activity because many operational capabilities are underdeveloped.²⁸ Moreover, Indonesia remains overwhelmingly dependent upon foreign sources for its primary technology and specialized skills. The public sector displays a wide range of technological capabilities, but again the lack of competitive pressure seems to hold back the intense technological effort needed to establish a sustainable export presence.²⁰

The last indicator is foreign direct investment (FDI) in Indonesia, which is not only a potential source of technological spillovers, i.e. new equipment, process, and products, but it

Table 3.1 High Technology Exports of Selected East Asian Countries, 2003

Country	High-technology exports (million of US\$)	Manufactured exports of total exports (%)
<i>Indonesia</i>	4,580	14
Malaysia	47,042	58
Singapore	71,421	59
Thailand	18,203	30
China	107,543	27
Republic of Korea	57,161	32

Source: World Development Indicators, World Bank, 2005

Table 3.2 Spending on R&D as a percentage to GDP

Country	R&D Spending as a % of GDP
Japan (2002)	3,12
Republic of Korea (2002)	2,91
Taipei, China (1999)	2,05
Singapore (2000)	1,89
PRC (2000)	1,00
Malaysia (2002)	0,69
<i>Indonesia (2001)</i>	0,05

Source: Thee (2006)

also enhances organizational and institutional capabilities thus stimulating technological enhancement in the host economy in general from abroad.²⁸ In general, many people are questioning the essentials of FDI which deals with the inconsistent result of benefiting knowledge spillover in less developed economies, FDI had a positive effect on the labor productivity of domestic firms in the Mexican and Taiwanese manufacturing industries.²⁹ Similarly, there was a positive effect of FDI in Indonesia.³⁰ However, the level of incoming FDI is an important thing as it reflects the ability of a country in attracting foreign investment due to domestic investment climate, consumer demand, macroeconomic and political stability, and comparative advantages in production which is largely facilitated by the government.²⁶

The ability of Indonesia in attracting investment net FDI inflow was remarkable before the economic crisis compared to that after the 1997 crisis, reaching US\$6,194 billion, larger than Malaysia, Thailand, and Korea. The performance of net FDI inflow after the economic meltdown was worst when it was producing a negative outcome during the period 1998 to 2001. The sign of recovery of FDI inflow came in 2004, but the amount was very small and Korea is the most advanced in this area currently. The lack of interest of foreign investors to undertake new investments after the Asian economic crisis was caused by Indonesia's poor investment climate as noted above.³¹

The Indonesian government shifted to minimize the dependence upon the oil and gas manufacturing export to the orientation of non-oil manufacturing export after the collapse of the second round of the oil shock. The export orientation is requiring high capabilities in technology and innovation to meet a highly competitive environment, but that requirement was not followed up by the government, leading to the poor performance of Indonesian technological development.

The factor driven Indonesia's technological weakness is that the Indonesian government does not have a strategy for innovation and technology policy - a coherent set of policies to encourage or remedy market failures-for technology develop-

ment. This has been related to the lack of concern of the Indonesian government for innovation and technological development, reflected by the government's expenditure in R&D, which is very small, leading to the loss of its technological competitiveness in the global market.

There are two essential aspects in the view of the allocation budget from the government to public R&D institutions. Firstly, the small government funds are not intended for research activities only, but also for regular expenses such as researchers' salary, administration and material costs, and laboratory maintenance, library and research resources expansion. The relatively low pay of government employees, including researchers, is actually lowering the quality of research, which will result in weaknesses in research capability of most R&D units. Secondly, the budget allocated shall be distributed to various Science and Technology (S&T) Institutes from department and non-department institutes. The proportion of the budget among R&D Institutions is different and depends upon the political relationship between the R&D institutes and the government. Currently, the R&D expenditure is about 3% as a percentage of GDP.

The impact under funded public R&D institutions is of course that the quality and the capability of the S&T institutes and researchers are not high. The S&T Institutions, both in the department and non-department R&D Institutes, are subject to a lack of support from the Indonesian government, since the centers are under funded. This is a cause of the negative outcome both in the performance of R&D activities conducted by these S&T Institutes, and in the innovation system in terms of the non-performing linkages between R&D institutes and the manufacturing sector. Their research staffs are generally not well trained, and are often not aware of the latest technological developments in their fields. In addition, the laboratory equipment they use is out of date.

The less-performing S&T Institutes have major consequences in the level of the innovational system. A recent study concluded that the linkages between the public R&D infrastructures and Indonesia's export-oriented manufacturing were very weak, or moreover did not exist.²⁵

Managers of some firms that had tried to establish linkages with R&D institutes generally expressed their dissatisfaction, particularly with the researchers who, in their view, had little understanding of the technological needs of the firms they were supposed to advise, and who often were not aware even of the most recent technological developments in their fields of expertise.

The cause of under-performing technological development activity through R&D from the private sector is the incentive structure in which Indonesian industry operates is not conducive to dynamic technological activity; trade and industrial policies have traditionally favored protected imported substitution, with strong government interventions in the allocation of favor and public ownership of important industries. Hence, the most impact of this condition is that these S&T institutes are unable to give and play a significant role in Indonesia's innovation and technological development, because they generally have not been able to establish mutually profitable linkages with both national and private industry.³²

Policies on Education and Human Resources

The success of innovation and technological capabilities is highly dependent upon the approach in education and human resources development, since the human capital would be a main source for a country in improving economic growth

Access to education by indigenous Indonesian people during the pre-independence era was extremely limited, except for those who were Dutch³³. Indonesia's development in education was stagnant under the Soekarno administration since the concern was on political matters, then in the mid-1960s Soeharto came to power, after which the ratio of gross enrolment started to increase again. In the early 1970s when the oil boom led to greatly expanded government funding to the educational sector, increasing the enrolment rates both in the primary and secondary levels. In the mid 1980s the gross enrolment ratio reached its peak of around 137%. Such a peak in the gross enrolment ratio above 100% takes place in many countries when they try to achieve universal primary education. It also

means that older (and possibly younger) persons receive primary education.

In the early 1990s and after the economic crisis in 1997, the gross enrolment ratio again declined as every designated child followed primary education so the need for older persons to follow this level of education disappeared. But recently, the net enrolment rates at primary level are already close to the Government's 100 percent target, even though the existing education infrastructure and the quality of instruction need to be improved. Despite the progress in expanding education, Indonesia still lags behind in educational progress compared to other East Asian countries in terms of education inputs, participation in education and education outcomes.

Even for the year 2002/03, the enrolment rate was almost close to 100%, but the government's budget is still disproportionate and in contrast, Indonesia ranks among the lowest as a share of public expenditure on education compared to that of South East Asian Countries and South Korea, at only 9.8%, caused by the low share of investment applying to almost all sectors spending in Indonesia, because of the relatively small share of the government sector itself and the large amount of current spending, particularly for subsidies. This small budget implies an inability to realize the expansion of building schools, improving infrastructures and facilities, and enhancing the quality of teaching, qualification of teachers and so on.

The implication of under financing is significantly influencing the quality of the education process in Indonesia. We may review from the infrastructure and facility provided by the government, many infrastructure facilities of schools and universities are unsuitable, meaning that the quantity and quality of learning infrastructure are very weak (such as the buildings not meeting a secure standard, out of date laboratories, poor facilities in information technology; and many schools do not have a library). Even though there are schools or universities that have proper facilities and infrastructure, their number is not many. The infrastructure and facility of schools and universities is worse if they are in a poor region.

The qualification of educational personnel in Indonesia also does not receive much attention from the government. Most of them are unprofessional and do not have the latest knowledge to carry out administration, organization, development, monitoring, and technical service to support education processes in a unit of education. The qualified lecturers from all universities in Indonesia (including public and private universities) is only around 47.4%, which means more than 50% are not appropriate to be involved in the university learning process. The appropriate teacher at the secondary level is only 60.9%, meanwhile unqualified teachers constitute almost 40% of those delivering courses in the education process. There is a statement that expresses improper understanding of educational quality by saying that the important thing is the enrolment rates and the quality of teacher is not the single important thing.

At the implementation level, the government is not committed to implementing an evaluation based process, because recently the government pursued a system of *Ujian Akhir Nasional* (UAN). The definition of UAN is that of a totally final examination system. Students can be awarded graduation and continue to the next level of study if they are able to meet the points required for certain subjects. What about the evaluation when students do their learning process? The answer is negative, since learner's achievement is not based upon the process of learning, but totally on the final examination only. It means that every achievement performed by learners during the learning process is nothing. There are many problems in this system. Take one case for instance; a learner becomes unwell facing the final examination, causing him to perform badly, and causing him to fail and so he cannot continue to the next level of study, even if such a learner has attended all classes, submitted all assignments, and obtained a high achievement during the learning process. Also, a learner may graduate as long as he can perform in the final examination, even if he never attended classes and submitted assignments.

To sum up, Indonesia as a rich-natural resources country is in deep crisis regarding quality of education, because of the inability

to manage education and human resources development as the main economic engine for the future. It is really in crisis since the indicator of Human Development Index (HDI) of Indonesia, according to the Human Development Report 1997, issued by the UNDP, ranked Indonesia 99 among 177 countries around the world, but the rank has decreased to 110 in 2005.

CONCLUSION AND RECOMMENDATION

The knowledge economy has been a main frame of economic development recently, which focused on the frame of how to produce, manage and re-new knowledge human resources development, innovation, good governance, and ICT. The framework of the knowledge economy promotes sustainable economic growth and development, since economies are becoming increasingly dependent on the effective creation, acquisition, distribution and use of knowledge which is enabled by the rapid advances of the science-based technology and the ICT revolution.

Indonesia has constructed its national vision and mission in the framework of education, technology, good governance, and ICT, reflecting an open-minded approach and a transformation of the government for bringing the Indonesian people to be knowledge-based. However, the successful implementation needs a high commitment from the government. The vision and mission itself are not enough to bring Indonesia to be a knowledge-based society, since it needs to be combined with a strong commitment from leadership and policies.

Technology and Innovation Capabilities

The performance of Indonesian technological development is on the lowest position compared to other countries among the region. The strategy and policies chosen by several regimes focusing on an advanced technological policy was unsuccessful. This was due to several factors such as programs have often lacked coordination among ministers; small budget allocation for R&D institutions, and unsupported human resources capabilities.

The advanced technological strategy was also making the government only focused on the

eight vehicle strategic industries. The government spent funding very much on those industries. The consequence was that the government did not realize that other industries (i.e. textile, agriculture, and tourism) need to setting up the strategies, approaches and policies to step forward its capabilities, managerial, product development, R&D activities. Moreover, Indonesia declared its involvement in the global world competition which forced all Indonesia industries to have a competitive advantage.

Therefore, due to the main frame of the knowledge economy, the government does not have to utilize an advanced technological strategy for achieving a knowledge-based society, since high technology does not always mean a knowledge economy. The mind set of the knowledge economy is the utilization of knowledge in all sectors to improve capabilities to generate value added through optimizing human resources capabilities, good governance, innovation, and ICT. The Indonesian government might be utilizing knowledge for 'old-fashioned' industries (i.e. agriculture, mining, or tourism) to improve the capabilities in generating and creating innovations and value added.

Another important point is that in setting up Indonesia's technological development, a national framework of linkage between government, university and industry is urgently required, in which this collaboration proves to be an effective way to attain technology transfer that will bring mutual benefit by sharing knowledge and pursuing strategic research to boost economic development.

Education and Human Resources Development

Commitment and consistency problems occurred at the level of implementation this sector. For instance, the lack of financial support, school infrastructure, libraries and laboratories and quality of educational personnel addressed the lack quality of learning process. Since the characteristic of the knowledge era is continuously creating and renewing existing knowledge, mismatched problems would occur in the future both at the national and individual level.

Putting an emphasis on education, both formal and informal training, to continually replenish human capability is not a simple task. Therefore besides addressing all the bottlenecks of Indonesian educational development, building the capabilities of Indonesian human resources is not solely the government's role. It means that the government should pursue a policy affecting all parties (include both in the level of domestic and international community) to involve them in providing a contribution to address this problem.

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