



Towards Knowledge-based Economy in Indonesia

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Introduction

Two imminent issues facing Indonesia at the present time are globalization and the rise of knowledge-based economy. Globalization presents an immense challenge to us because our inability to respond to international competition head-to-head has rendered us incapable to achieve sustainable growth. Furthermore, the world economic landscape has shifted from being resource-based to knowledge-based where economic values are created largely by human intellectual capital utilizing technology and knowledge, rather than merely by natural resources such as agricultural and mining and low-paying human labor.

This paper is organized into three parts. The first part examines the reality of globalization and knowledge-based economy in Indonesian context and attempts to identify key developmental challenges. The second part attempts to trace the relation between knowledge-based economic development and larger socio-political aspects including social justice, learning society, and social capital. The third part discusses challenges for development particularly in the areas of human resource, ICT (information and communication technology), small and medium enterprise empowerment and public-private sector collaboration.

Part I – Economics Today

Global Free Market Economy

Globalization is not a recent phenomenon. It could be argued that the world economy was as globalized as 100 years ago because of the already international scope of the trade at that time, in which the governments controlled much of the trade. That era could perhaps be best described by a “globalization of nations”. However, globalization today is far different than the globalization of the past because today a small merchant in Malaysia might use e-commerce to buy or sell goods all over the world, 24-hours a day. In short, the globalization today is happening ubiquitously involving individuals woven together rather than merely happening on nation-to-nation level. There is no way now for any government to reverse or shutdown the flood of these global people-to-people interconnection. It is this widespread and unhindered connectedness that

ultimately made Adam Smith’s vision of free market economy a global reality.

However, this global economy came loaded with its mighty opportunities and threats. The flux of Asian currencies traded on foreign exchange market by ordinary people everywhere on the planet could adversely impact the economic-political stability of some Asian countries as was proven in recent financial crisis. The changing taste in fashion in America as well as competition from other parts of the world can either punish thousands of apparel factory workers in Indonesia with loss of jobs or reward these workers with a sustainable career and flourishing economy.

Globalization presents an immense challenge for us because our inability to respond to international competition head-to-head has rendered us incapable to achieve sustainable growth. In this era of globalization where market power looms larger than the power of government, the local industry cannot depend on governmental protective measures (i.e. trade barriers such as tariffs and quotas) any longer for the source of its competitive advantage. Local industries in Indonesia must stand up to the suddenly open competition with powerhouse countries such as China as well as other industrial countries in Southeast Asia (including the emerging ones such as Vietnam).

To understand and appreciate the effect that globalization has to our local industry, we could take a look on how our textile and garment industries respond to the global pressures.

Box 1. Case Study: Indonesian Textile and Garment Industries

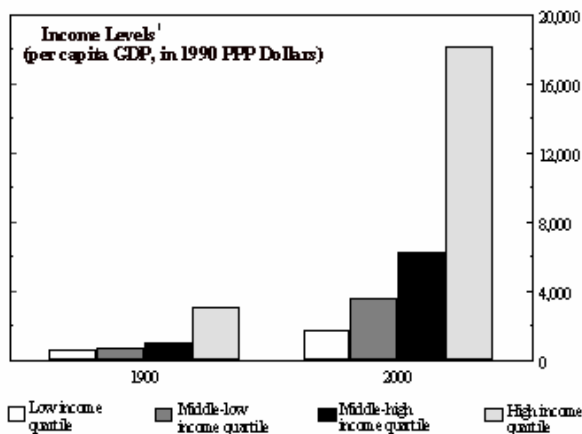
Textile and garment industries were the *prima donna* export commodities for Indonesia in the early 1990’s. Yet recent sobering news revealed the bleak future of Indonesian textile and garment industry. API¹ chairman Benny Soetrisno² was quoted in July 2004 saying that Indonesian textile and garment producers need to cut prices by 10-15% to remain competitive in international market. Indonesian textile and garment industry has so far relied on the availability of cheap labor as the primary source of competitive advantage in both local and international market. This has been proven to be

non-sustainable in the long run. API has been reporting that the difficulties faced by Indonesian textile and garment industries are mainly those of technological challenges such as the absence of adequate machinery.

Indonesia's Minister of Trade and Industry, Rini Soewandi, also conceded that while textile industry in Indonesia remains vibrant, large sectors of the industry still continue to compete in relatively low-value and low-technology segments of the market. Therefore, most Indonesian companies are operating with very low margins³. With this already low profit margin, whether Indonesian textile and garment producers can cut their selling price by 10-15% remains to be seen. The reality is that it will be a very hard thing to do. But one thing is clear: the industry needs to start moving into higher-value segment of the textile and garment market and therefore realizing a better profit margin. And most importantly, these profits should better be directed to improve the condition and training of the factory bottom-class workers.

Melba Maggay⁴ aptly called globalization as the rapid and uneven diffusion of modernizing influences from societies which have the power to project and extend themselves globally, made possible by transnational institutions and communication technologies, which create the illusion of a global community⁵.

Figure 1 Per-capita GDP Growth in the 20th Century in PPP⁶ dollars.



Sources: Angus Maddison, *Measuring the World Economy*, and IMF staff estimates, reproduced in IMF, *World Economic Outlook* May 2000.
⁶Countries' populations have been assigned to income quartiles according to GDP per capita in each country; each quartile contains 25 percent of world population.

Globalization can be seen as the dominant force that further widens the prosperity gap between the rich and poor nations in the world or, alternatively, it can be seen as amalgamating force that gives all countries the same access to opportunity to develop themselves. Nations or societies who can take ownership of this newfound

freedom (and perils associated with it) are the ones who could reap the benefits of globalization. Those who are mired in self-pity, over-protectionism, and victim-mentalities will be spiraling down and experiencing deconstruction not only in economics realm but also percolating down to decadence in politics, society, culture and education. Once the education sector is hit by this negative effect, it can then easily become a vicious cycle that traps everyone into a degenerating culture.

The Rise of Knowledge-Based Economy

... We began to receive intimations of a gathering third wave, based not on muscle but on mind. It is what we variously call the information or the knowledge age, and while it is powerfully driven by information technology, it has co-drivers as well, among them social demands worldwide for greater freedom and individuation.

Alvin Toffler – *The Third Wave*

We are experiencing what I think historians of the future will call the Third Industrial Revolution, a transition to a knowledge-based economy. We are witnessing big changes, a leapfrogging and interaction between technologies in six related areas: telecommunications, microelectronics, computers, new materials, robotics and biotechnology.

Lester Thurow

For countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living - more than land, than tools, than labor. Today's most technologically advanced economies are truly knowledge-based.

World Development Report, 1999

Over the past quarter of century the world economy has become increasingly knowledge-based. OECD defines knowledge-based economy as *those which are directly based on the production, distribution and use of knowledge and information*⁷. According to this definition, knowledge industries then include: services to the business and financial sector, capital-intensive manufacturing, education and health services, scientific research, and the telecommunications sector. However, if one takes this definition to its broadest terms, one could say that all sectors of the economy become knowledge-based when strategies are adopted to increase productivity via the application of knowledge, rather than via increased inputs of capital or labor.

What this means to Indonesia is that in order to sustain our textile and garment industry, for example, we can no longer rely on the abundance of low-paying uneducated labor for the textile production nor can we depend any more on plentiful supply of raw cotton. According to Rini Soewandi, our textile industry has been plagued with the problem of not being able to capture higher profit from the market because of our technologically backward orientation and human resources. This fact has rendered us unable to fill the gap in the textile-garment industry product/service chain and pitted us into unsustainable dependency on foreign technology products.

Knowledge and technology have become the major factors of growth

[Source: OECD]

The same facts also apply in most other industries in Indonesia. Therefore, it has become an absolute necessity for Indonesia to muster its national will to develop capability for making knowledge product (including productized technology and know-how expertise) of endogenous origin.

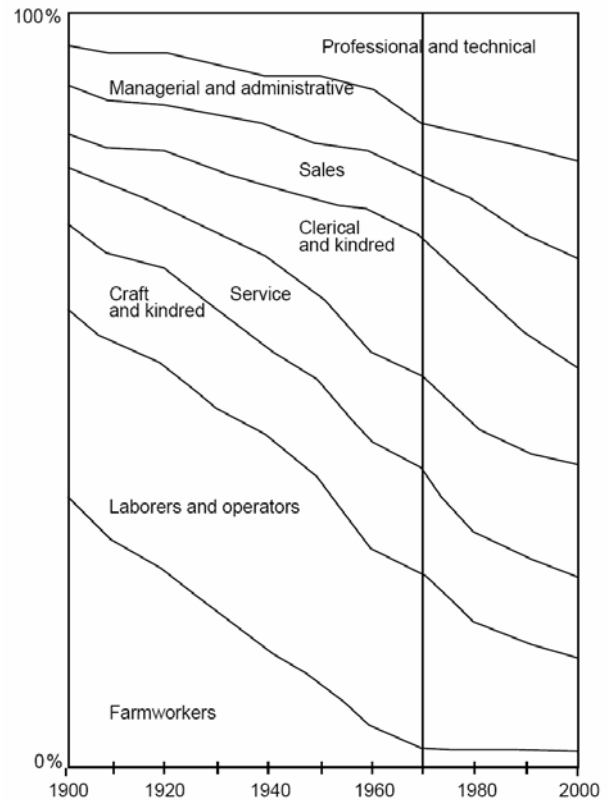
Why Knowledge is Important

Globalization walks hand in hand with the increasing reliance on knowledge as the primary source of generating value and thus wealth in the economic system. Why is knowledge so important in global economy? Because economic globalization also brought with it global competition in which there are constant changes and competitions of global scope.

Furthermore, as local industries have also become inextricably linked to the global market, they are wide open to the global competition. Knowledge in this context become the single most important resource that enables an economic entity to stand up to the competition and furthermore to find its place in creating beneficial economic value.

The diagram below shows the development of shares of the total workforce in the United States as a developed country. It shows how the United States progressed by increasingly moving its workforce into a technological and knowledge-laden work sectors.

Figure 2 Development of Shares of the Total Workforce in the USA from 1900 to 2000⁸



Intrinsic Value of Information and Knowledge

Friedrich August von Hayek⁹ asserted that the use of knowledge has an intrinsic value in the society. Hayek contented that even the market pricing mechanism, that dictates the optimum level of production and consumption based on the supply and demand curve, is essentially an exchange of information¹⁰. Viewed this way, the pricing is none other than information exchanged about the willingness of suppliers to sell or produce and the willingness of buyers to buy. Consider also that on any given day in Wall Street or BEJ (Bursa Efek Jakarta), tradesmen buy and sell stocks in a blip of time. By the end of the day, thousands of transactions had occurred by means of mere hand gestures or computer signals while no real money was being exchanged at every transaction. In fact, information was the only thing that was exchanged on every transaction. Not until the time of accounting does the “real” money being exchanged.

An economy becomes knowledge-based when strategies are adopted to increase productivity via the application of knowledge, rather than via increased inputs of capital or labor.

Asymmetries of Information

Joseph E. Stiglitz¹¹ wrote that in today's modern economy, individuals constantly face situation where there are asymmetries of information in the market¹². In economics, asymmetries of information occur when one party to a transaction has more or better information than the other party. These asymmetries of information could result in an imperfect market condition where the poor and weak (or the *inferior actors*) are unfairly disadvantaged from their lack of information.

There are many industries in Indonesia facing asymmetries of information. In farm products, for example, there is a tangible indication that information asymmetries do exist. The difference is great between those who know and those who do not in the Indonesian poultry industry, and that distinction has a huge impact on business opportunities¹³.

The same happens in other agricultural sectors, such as rice farming. Although Indonesia has plenty of fertile arable land and human labor¹⁴, our rice production has been utterly dismal. We have yet to prove that we can achieve rice sufficiency in the coming years. The government has been focusing on the protectionism policy to ban rice imports especially in summer to give Indonesian rice farmers a chance to make it into local market. However, this curb is far from being the solution because Indonesian rice industry inherently suffers from inefficient supply and distribution intermediation¹⁵. This problem, coupled with lack of agricultural and market information, is a prime cause that makes our local rice price uncompetitive. Recent UNDP report also supported the finding that the lack of technology was one of the foremost issues facing our rice production¹⁶.

Similar problem is faced by our rattan farmers in Kalimantan. These farmers face pricing pressure from the extremely long supply chain to get their rattan to end customers. One creative solution to this problem would be to vertically integrate the disjointed supply chain and mediate trade information to bring buyers closer to these farmers¹⁷.

Many more could be said by studying our industries one by one¹⁸. In general, knowledge in terms of strategic technology and information has become an important key developmental area to be addressed by Indonesia. However, as we will see in the second part, addressing technology is, although necessary, not sufficient by itself.

Part II – Beyond Economics

I have arrived at the conviction that the neglect by economists to discuss seriously what is really the crucial problem of our time is due to a certain timidity about soiling their hands by going from purely scientific questions into value questions... It seem to me that socialists today can preserve their position in academic economics merely by the pretense that the differences are entirely moral questions about which science cannot decide.

A Conversation with Friedrich A. von Hayek, AEI, Washington D.C., 1979

Globalization, in short, should extend not only to economics, but to views on social justice and solidarity... I shall argue that it is socially unjust if we benefit at the expense of someone who is poorer: at the very least, we should view negative redistributions as ethically wrong.

Joseph E. Stiglitz in "Ethics, Market and Government Failure, and Globalization"

Economic Distribution Disparity

Economics is not merely scientific in nature. Taken from its root word, economics literally means family (*oikos*) rules (*nomos*). It is a law, in a sense of natural law, which dictates the distribution of wealth among individuals in a community. Far from being merely a vehicle to obtain personal prosperity and wealth for individuals as is popularly understood today¹⁹, the aim of economics is intended to govern the allocation of resources and other inputs to direct a community towards development. Therefore it is of utmost importance how these economic rewards are to be distributed among the people.

Leaving the poor who already suffered to be obliterated from the effects of globalization is a practice of economic Darwinism.

As we have seen in Indonesia, the farmers are suffering the most from the uneven distribution of economic rewards. As a result, the farmers always lag in terms of economics prosperity. Furthermore, this poverty further barred them from obtaining proper education and knowledge to advance their farming, let alone procuring technology and machinery to make their work more efficient. There is an ancient adage: do not kill the goose that lays the golden egg²⁰. If we care about the economics of Indonesia, we should in fact pay attention to our farmers and producers who are disenfranchised and marginalized by the economic progress. It is this

practice of sustainable development that could eventually lead us into a real prosperity.

As Rini Soewandi aptly puts it, the great failure of Indonesian economics in its golden decade of 1980's to early 1990's is the fact that our economic growth does too little to liberate our factory workers and farmers from the pit of irreversible poverty.

The *Year of Jubilee*²¹ practice in Judeo-Christian Mosaic law might in fact be a great lesson for us. While economic rewards and personal ownership could be a vehicle to motivate people to be productive and be self-responsible, irreversible widening social inequality has to be seen as a violation to human rights to development and ultimately to God as the lawgiver and creator.

Building a Learning Society

Perhaps *cruelty* is the best description for the assumption that a global-force free market mechanism by itself is the answer to developmental problem in the planet. If not cruelty, then perhaps *ignorance* comes as the next choice of word. Without being armed with a keen attitude of learning, all these farmers and factory workers are only sands in the shore waiting to be washed away by the tide of globalization. Leaving the poor who already suffered to be obliterated from the effects of globalization is a practice of economic Darwinism.

This is not to say that the government should fall back into the protectionism international trade policy because we saw from history that this policy was prone to be used as a tool to protect the interests of the economic industrial elites at the expense of the downstream poor laborers. With the implementation of AFTA 2003 (ASEAN Free-Trade Agreements) which was designed to lower down the import tariff and barriers, no longer could Indonesia rely on protectionism. Rather the solution should focus on developing the minds of the farmers and factory workers to equip them with learning, information and knowledge.

Figure 3 Average CEPT (Common Effective Preferential Tariff) is cut across ASEAN countries for AFTA 2003²²

Average CEPT Tariff Rates (%)						
	1998	1999	2000	2001	2002	2003
Brunei	1.35	1.29	1.00	0.97	0.94	0.87
Indonesia	7.04	5.85	4.97	4.63	4.20	3.71
Laos	5.00	5.00	5.00	5.00	5.00	5.00
Malaysia	3.58	3.17	2.73	2.54	2.38	2.06
Myanmar	4.47	4.45	4.38	3.32	3.31	3.19
Philippines	7.96	7.00	5.59	5.07	4.80	3.75
Singapore	0.00	0.00	0.00	0.00	0.00	0.00
Thailand	10.56	9.75	7.40	7.36	6.02	4.64
Vietnam	6.06	3.78	3.30	2.90	2.89	2.02
ASEAN	5.37	4.77	3.87	3.65	3.25	2.68

As was discussed in part one, once the learning and education sector of a society is hit and torn by the negative impacts of globalization, that society will be less likely to recover from the setback because lack of human resource development will forever ensnare them in an endless downward spiral.

Viewed in this light, it became plain that Indonesia must stand up and assume ownership of its own problem by developing a learning society. No areas are too mundane to be excused from the practice of constant learning and gleaning of knowledge.

Box 2. Case Study: Knowledge-Intensive Technologies for Rice Farmers

Rice production today is becoming more knowledge intensive than ever. Rice technologies are becoming more complex and location-specific and must be tested on farmers' field. Farmers need to be educated on how to use these technologies to take advantage of it. However, reaching millions of rice farmers in Indonesia with these complex knowledge-intensive technologies (KIT) proves to be quite a challenge.

In Indonesia, technology evaluation and adaptation studies are done through collaboration by CRIFC (Central Research Institute for Food Crops) in Bogor with international organization CREMNET (Crop and Resource Management Network) and IRRI (International Rice Research Institute).

However, most farmers in Indonesia still face impenetrable barriers when it came to access to farming knowledge and funding to obtain technology products. Hence, most of the farmers settled with low production and sold their crops through *ijon* well before the harvest time for a very low price to the *tengkulaks*, rather than facing the uncertainties of the harvest. Recent news from Indonesian newspapers recorded how this is very much the case for farmers in Banyuwangi.

Trust as Economic Capital

What is the most important capital needed for an economy? Arguably, the answer is not *money*, but rather *trust*. Money is only one among many capitals needed in a fully functioning economy. It is trust that constitutes the very cornerstone capital in an economic system upon which all other capitals hinge. Consider how a *Rupiah* bill would not mean anything if nobody placed trust in the issuer or guarantor of this paper called money or the numeric amount in our bank account. After all a *Rupiah* bill is only a promissory note from Bank Indonesia guaranteeing that it worth whatever face value it has.

Academically, trust is categorized as a *social capital*. Social capital refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems. Therefore efforts for economic development in Indonesia must be directed to address the issues in social dimension, to increase the stock of social capital, so as to say. Skills for building plural society and conflict resolution became important to build the economy in far flung areas laden with SARA²³ conflicts such as in Maluku²⁴. Social diseases such as KKN²⁵ should be addressed first to create healthy trust before moving forward with the economic development agenda.

In the context of building knowledge-based economy, social trust or social capital is of significant value. The reduction of information asymmetry depends on the development of social capital, networks and knowledge of the *inferior actors*²⁶ (those who would otherwise be marginalized by lack of access to information). In this knowledge-based economy, sharing, rather than hoarding, information leads to a mutually beneficial outcome²⁷. And sharing, in most cases, requires trust in society. In fact, studies have shown that social capital is an indispensable asset in the knowledge-based economy²⁸.

Box 3. Study of Social Capital Realities in Indonesia

Recently in 2002, several social scientists from UC Berkeley did a research on social capital in Indonesia²⁹. The empirical findings challenge existing assumptions in social capital literature (such as Putnam, Sobel, etc.) In particular the findings can be summarized as:

(1) Industrialization might have diminished social capital especially in rural communities. Bremen³⁰ argued that this erosion of social capital contributed to the crime, violence, and riots among laid-off workers returning to their villages in rural Java in the aftermath of 1998 Asian financial crisis.

(2) Rapid industrialization led to dramatic decline in social capital and caused civil unrest.

It is therefore imperative for us to evaluate our development and progress of Indonesia in its entirety. We should not hammer economic transformation agenda at the expense of thinning social capital which results in decaying community. Development agenda must be seen in the light of all aspects including socio, economic, politic and knowledge. Development in these areas must be progressing hand-in-hand without tilting the balance and bankrupting the social capital.

Part III. Responding to Challenges

Developing Human Resources

The importance of human resources development to build a learning society and knowledge-based economy cannot be overemphasized. A raw benchmark for technological human resource is the TIMSS (Trends in International Mathematics and Science Study), done in 1998-1999.

We are proud of Indonesian students' achievements in various international competitions in science such as in 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 very low.

Figure 4 Cost for education in Indonesia³¹

	Average cost to parents (in Rp.)	
	Public school	Private school
Elementary School	4.8 million	6.1 million
Middle School	5.6 million	5.7 million
High School	7.0 million	6.8 million

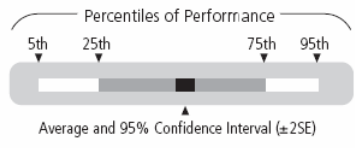
Apart from the financial resource problem, other difficult issues prevail such as to convince Muslim leaders that *madrasah* (Islamic schools), where many children obtain their education, should not only teach religious education but also general science as well³². The Jakarta Post wrote: anyone new to the debate on the Sisdiknas education bill may be forgiven for thinking that the issue was about religion, not education, given the main controversies surrounding it. It is ironical that while our education system is a mess, our lawmakers were busy inculcating controversial religious agenda into the education system.

In university level, even Indonesia's top universities ranked near the bottom of the Asiaweek's Best Universities ranking in 2000, well behind those of Malaysia, Philippines and Thailand. Moreover, there is a widening gap between the labor market and our education output, especially in postsecondary education. To make matters worse, many of our talented human resources are not able to attain university education because of burgeoning university education cost. We have no choice other than seeing the education system in Indonesia as what it is: a mess that needs a clean up³³.

Exhibit: International Comparison in Science and Mathematics Achievement



SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.



- ▲ Country average significantly higher than international average
- No statistically significant difference between country average and international average
- ▼ Country average significantly lower than international average

Significance tests adjusted for multiple comparisons

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.8).
 †† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.
 1 National Desired Population does not cover all of International Desired Population (see Exhibit A.5). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.
 2 National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.5).
 () Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

Figure 5 Asiaweek's 2000 Ranking for Asia's Best Universities 2000 (overall multidisciplinary)³⁴

1	Kyoto Univ.	39	Pusan National Univ.
2	Tohoku Univ. (Japan)	40	Jawaharlal Nehru Univ.
3	Univ. of Hong Kong	41	Univ. of Otago
4	Seoul National Univ.	42	Tongji Univ. (China)
5	National Univ. of Singapore	43	Chonbuk National Univ.
6	Chinese Univ. of Hong Kong	44	Chengchi Univ. (Taiwan)
7	Hong Kong Univ. of Science and Technology	45	Univ. of Wollongong
8	Australian National Univ.	46	Tianjin Univ. (China)
9	Univ. of Melbourne	47	Univ. of Malaya
10	Univ. of New South Wales	48	Univ. of the Philippines
11	Nagoya Univ.	49	Ochanomizu Univ.
12	Taiwan Univ.	50	Chungnam National Univ.
13	Univ. of Sydney	51	Thammasat Univ.
14	Korea Univ.	52	Universiti Putra Malaysia
15	Kyushu Univ.	53	Prince of Songkla Univ.
16	Cheng Kung Univ. (Taiwan)	54	Xi'an Jiaotong Univ. (China)
17	Yonsei Univ.	55	Victoria Univ. of Wellington
18	Tsing Hua Univ. (Taiwan)	56	Macquarie Univ.
19	Hokkaido Univ.	57	Universiti Sains Malaysia
20	Sun Yat-sen Univ. (Taiwan)	58	Univ. of Canterbury
21	Univ. of Auckland	59	Khon Kaen Univ.
22	Keio Univ.	60	Southeast Univ. (China)
23	Univ. of Western Australia	61	Univ. of Indonesia
24	Central Univ. (Taiwan)	62	Chiang Mai Univ.
25	Univ. of Queensland	63	Kasetsart Univ.
26	Univ. of Adelaide	64	Univ. of Dhaka
27	City Univ. of Hong Kong	65	Chung Hsing Univ. (Taiwan)
28	Chao Toung Univ. (Taiwan)	66	Aoyama Gakuin Univ.
29	Waseda Univ.	67	Ritsumeikan Univ.
30	Monash Univ.	68	Gadjah Mada Univ.
31	Sogang Univ.	69	Doshisha Univ.
32	Ewha Womans Univ.	70	Fu Jen Catholic Univ. (Taiwan)
33	Sungkyunkwan Univ.	71	De La Salle Univ.
34	Chonnam National Univ.	72	Ateneo de Manila Univ.
35	Kyungpook National Univ.	73	Diponegoro Univ.
36	Kyung Hee Univ.	74	Univ. of Santo Tomas
37	Taiwan Normal Univ.	75	Airlangga Univ.
38	Hanyang Univ.	76	Univ. of Mumbai

We have to realize that Indonesian students pursuing higher education from technology-leading universities in United States are among the very forefront Indonesian human resources, and therefore shared vital responsibility for furthering the development of learning in Indonesia.

We have no choice other than seeing the education system in Indonesia as what it is: a mess that needs to be cleaned up.

Beyond formal education, human resource development really needs to be carried out as a lifelong learning. In this era of globalization and knowledge-based economy, no technology areas stand still in time. Therefore mastery of technology must be continually renewed to match the skill set requirements in the industry. In fact, economic and technological transformations will put a premium on lifelong efforts to deepen and broaden personal knowledge. This means that we should put an emphasis on education both formal and informal training to continually replenish human capability to be

knowledgeable and skilled in strategic areas of technology and applied science.

In many countries, the lifelong learning is achieved through the establishments of vocational schools that address not only educational gap but also career gap so that a person's skill might be upgraded and matched with an actual job opening in the industry.

ICT (Information and Communication Technology)

ICT is also known in Indonesia a *Telematics* (Telecommunication and Informatics). Recent studies by OECD brought forth the evidences that ICT is a key factor that enables rapid economic growth. United Nations has also made ICT development of utmost priority to alleviate developmental problems in the third world countries. Initiatives have been launched to build digital broadband access in less developed countries so that they will not be marginalized from this digital divide.

Box 4. Case Study: Rice Knowledge Bank – How Rice Farmers Benefit from ICT

Imagine walking into an internet café and watching youngsters - bubbling with enthusiasm - taking delight in demonstrating the basics of computer use to their parents. The assumption, understandably, would be that they are demonstrating the latest computer game. But surprisingly for Dr Nag, Director General of the Mekong Department of the Asian Development Bank, what he found was something quite different.

What intrigued Dr Nag was that in this, one of the cramped Internet cafés that dot the roadsides in the impoverished rice-growing areas of northeastern Thailand, the kids were showing their parents pages from Rice Doctor, a diagnostic program developed by the International Rice Research Institute (IRRI) to help rice farmers manage the pests and diseases that attack their crops. The kids were translating the relevant pages of Rice Doctor into Thai for their parents.

Although encouraged by this type of story, IRRI knows that rice knowledge rarely flows this directly to farmers. As a result, IRRI focuses its ICT and knowledge-dissemination efforts on the intermediaries - members of national agricultural research and extension systems (NARES) and other partners such as NGOs - who run extension services. In other words, IRRI trains trainers, who then adapt institute research methods and recommendations to local conditions and relay them to farmers. [Source: [New Agriculturist Online](#)]

As part of social and economic development, Indonesia must develop its ICT sector to support its key sectors.

Even for the rice farmers, advances in ICT could greatly improve access to agricultural knowledge, technological know-how and market information that is crucial for their productivity.

Several important ICT initiatives include:

a) ICT and Human Resource/Education

We need to build capable human resource for furthering the use of ICT in Indonesia. It must be noted that the knowledge and skill set in ICT needs to be continually replenished because technology continue to improve rapidly. Furthermore, the development of ICT awareness must start at least at the secondary level of education, if not primary level.

The government through Minister of Efficiency of State Apparatus (*Menteri Pendayagunaan Aparatur Negara*) has drawn up a Five-Year program for the development of ICT in Indonesia³⁵. In educational sector, this plan aims to:

- 1) Develop collaboration between ICT industry and ICT educational institutions through training and R&D collaboration and establishing networks for skill and capacity development.
- 2) Develop and implement ICT curriculum and using ICT as an essential part of learning tools in schools, universities and training centers.
- 3) Establish distance learning programs including participation in Global Development Learning.
- 4) Facilitate the use of Internet for more efficient teaching and learning.

The success of this initiative is yet to be seen, but the burden of responding to this challenge does not rest solely in the government hands. Private sector and educational institutions are responsible to make this vision for ICT and education a reality.

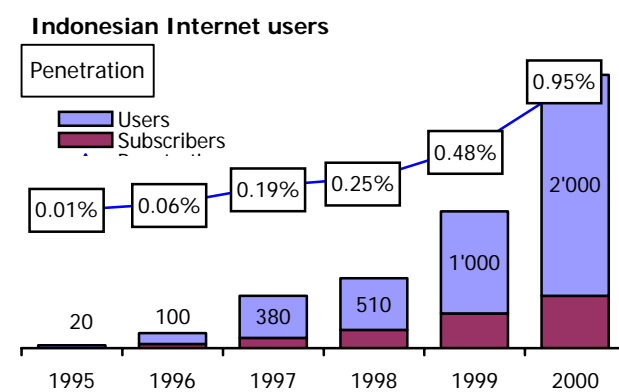
Box 4. ICT and Economic Development

Until now it is hard to measure the role of investment in the information and telecommunication sector in the growth of GDP, or its contribution to it. However, the International Telecommunication Union (ITU) put forward a recommendation saying that a 1% increase in teledensity would drive a 3% increase in GDP. Meanwhile, a study carried out by Sallstrong Consulting in 2001 concluded that a 10% increase in IT spending would drive a 13% increase in GDP. According to the Sallstrong report, in 2001 Indonesia spent only 0.6% of its GDP to purchase IT and telecommunication equipment. Although it was an increase compared to the previous years, the figure was the smallest among many other countries in Asia, like India 1%, Philippine 2.4%, Singapore 3.7%, and Thailand 1.2%.

b) Access to ICT

We need to address the digital divide in access to information highway. Lack of access to ICT has been an impediment for growth for many developing countries such as Indonesia. Access to communications and Internet has thus become a national priority not only in Indonesia but also internationally. United Nations have created ICT task force to support development of Internet access from various underserved populations around the world using wireless technology³⁶. Wireless infrastructure has a great advantage over wired one because of its fast deployment.

Figure 6 Indonesian Internet Users. Source: APJII-ITU 2001³⁷



Despite the rapid growth of Internet users in Indonesia today, our penetration rate is still much lower than the average penetration rate in Asia-Pacific. Recent study in year 2000 by Asia Network Research showed the correlation between the Internet penetration rate and per-capita GDP of a country.

Figure 7 Correlation between Internet penetration rate (% of population) and per-capita GDP (in USD). Source: ANR, 2000³⁸

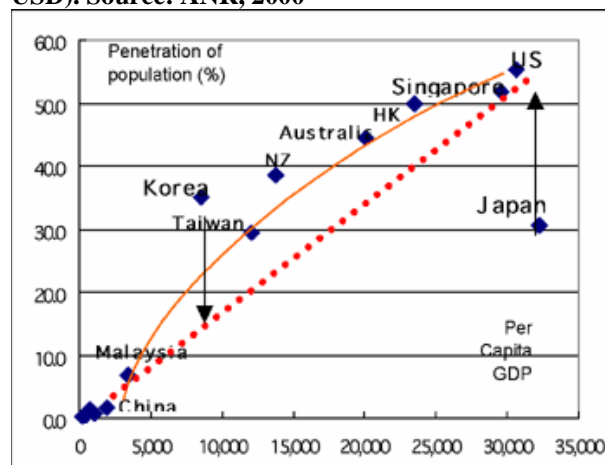


Figure 8 Indonesian ICT facts (ca. 2002)

Geographic	> 12,000 islands
Population	215 M, 60% live in Java
Income percapita	US\$700
Literacy	86%
Teledensity	3%, but most concentrated in Java
PC Ownership	+/- 4 M, mostly owned by corporate
Internet Users	1% , but less for Internet subscribers
ISPs	170, but only 50 in operations
Internet Café	+/- 2000

Few challenges remain for Indonesia to truly develop its access to ICT. Most notably is the government failure to curb the monopoly from the state-run PT. Telkom as provider of ICT service³⁹. Indonesia is facing an unhealthy and uncompetitive atmosphere in this industry. ISPs are fighting against the incumbent PT. Telkom. Furthermore, the government restricted the use of VoIP⁴⁰ provided by ISPs and stipulated heavy measures to protect the monopoly by PT. Telkom⁴¹.

Overall, factors hampering the ICT developmental progress in Indonesia include⁴²:

- 1) The lack of availability and unbalanced distribution of information and communication infrastructures
- 2) The absence of use of alternative telecommunication technologies
- 3) The rare sources of funding for the building of the new information and telecommunication infrastructures
- 4) The telecommunication reform, as mandated by Law Number 36/1999 and The Blue Print of Government Policy on Telecommunication Development Strategy, had not been carried out properly
- 5) People's lack of awareness of the benefits of ICT
- 6) The absence of definitive National ICT Development Plan

Addressing these factors should well be on our agenda to respond to the challenges towards a knowledge-based Indonesian society.

Empowering Small and Medium Enterprises

The importance of strengthening SME (*Small and Medium Enterprises*) or UKM (*Usaha Kecil Menengah*) have been well established in academic as well as public policy administration.

In Indonesia, SMEs constitutes 99% of the total number of enterprises and employs 99% of the work force. Yet their share in national GDP is meager (only 58.2%). The trends toward globalization stimulated by WTO and AFTA presents a clear and present danger for Indonesian SMEs due to their lack of integration with the local industry. Most SMEs are struggling with the

immediate local market with no standing in the national or global competition landscape. 80% of the SMEs do not have access to the financial market and thus are limited to their own capital or non-bank loans.

Figure 9 Indonesian SME facts⁴³

Has under US\$ 5M in sales
99% of the total number of enterprises
Absorb 99% of labor forces
Contribute 58.2% of GDP
74% located in small cities or rural areas
Are most resilient during economic crisis compared to big firms and conglomerates: 64% not affected, 31% reduced activities and 4% discontinued.
Major problems: Marketing (27%), Productions (25%), Accounting (17%), Access to capital (16%), Human Resources (15%)

Figure 10 Indonesian Government Initiatives for SME

TATP (Technical Assistance and Training Program)
SMECDA – (SME Center for Development Agency) Critics: government led (top down approach, covers only areas where SMEs are cooperative to the government, increased dependency instead of entrepreneurship, and is a source of rampant KKN
SIBM – Sentra Informasi Bisnis Masyarakat (Community Business and Information Center)
Warintek – Warung Informasi dan Teknologi (Information and Technology Kiosk)
UPP – Unit Promosi dan Pemasaran (Promotion and Marketing Unit)

Tight integration between the SMEs and the local industry requires an intermediation of information and a push for ICT technologies to support it. Social capital and capable human resources are also crucial. Local governments should work hand in hand with the private sector to establish a cluster of industries consisting of local SMEs. Government's role is to provide incentives to create a flourishing local industry. In addition, the government is to setup initiatives for assisting the development of SME clusters.

The role of consulting agencies that could bring in appropriate knowledge and know-how is central to developing SMEs, especially to address their handicaps in: tapping into local/national/global market, entrepreneurship and funding, as well as effective production technology. According to a recent study by Asian Development Bank, aside from government regulations, business consultants have proved to be most effective in developing SMEs⁴⁴.

Figure 11 Spatial Distribution for Small and Medium Enterprises in Indonesia (1996-2000)

	Business Units (%)			
	1996	1998	1999	2000
Sumatra	16.4	16.2	15.0	14.9
Java	65.9	66.2	67.9	67.7
Bali & Nusa Tenggara	4.9	5.0	5.2	5.8
Kalimantan	5.0	5.0	5.1	4.8
Sulawesi	6.7	6.5	6.4	6.5
Maluku & Papua	1.1	1.1	0.4	0.3
Total	100.0	100.0	100.0	100.0

As can be seen from the figures above, places outside Java and Sumatra are still lacking in SME development and thus faces the challenge for developing their SMEs. Therefore, this is one area of the challenges we need to address.

Figure 12 Example of SME clusters in Indonesia

Metal Parts: Tegal, Sukabumi, Sidoarjo
Export Furniture: Serenan-Klaten (wooden furniture), Hulu Sungai Utara-Amuntai (rattan furniture)
Others: Tanjung Batu (agricultural tools), Manpang (tempeh and tofu), Kebumen (roof tile)

Government, University and Industry (GUI) Collaboration

Developing a knowledge-based economy requires the interaction of the public sector (local government), private enterprises (industry), research and education institutions (universities) as well as the learning society at large. This triad is also popularly known as GUI collaboration. The Japanese called this collaboration *san-kan-gaku renkei*.

In the context of the knowledge-based economy, this GUI collaboration proved to be an effective way to do technology transfer that will bring mutual benefit.

Box 5. Case Study: BHTV and the need for GUI collaboration in Bandung

America has its Silicon Valley. India has its Bangalore. Even our neighbor Malaysia has its MSC (*Multimedia Super Corridor*). To some, the vision of BHTV (*Bandung Hi-Tech Valley*) in Indonesia is real.

Bandung is the capital of West Java and home to prominent universities such as Institut Teknologi Bandung (ITB) and Parahyangan University. It is also home to many state industries such as PT. Dirgantara Indonesia (formerly Nurtanio), PT. Kereta Api Indonesia, PT. PLN, PT. Pos, PT. Telkom, and PT. PINDAD (weaponries); as well as private technology

companies such as PT. INTI (telecommunications), PT. LEN (electronics), and OMEDATA (IC components).

Judging from the inputs, Bandung is fertile ground for the collaboration between local government, university and industry. However, this collaboration has yet to be worked on. To bring the vision of BHTV to life, GUI collaboration must first become a reality.

Why is it important? Consider the case that in 2000 an ITB student succeeded in implementing the cores design for Viterbi decoder. Viterbi algorithm is very useful to encode and decode data signal to make it more resistant to transmission errors. This is an important technology in telecommunications area. *Cores* is functional modules that can be reused by electronic engineers to simplify design process. However, this breakthrough did not find its way to the local industry and instead was donated into the *opencores.org* public domain.

Contrast this with China, who by 2001 has been selling DSP (Digital Signal Processing) Viterbi controllers. The benefit to China is enormous. Beside the direct economic benefit from being able to commercialize the product, China benefited from: local job creation and strengthening of local industries, all of which ultimately contributed to the local economic development.

It is precisely the lack of GUI collaboration in Bandung that prevented technological advancement to make its way into economic benefit for local people.

Indonesia still has to learn a lot from the more developed regions on how to connect the government, university and industry to share knowledge and pursue strategic research to propel local economic development through technology transfer to industry and government. At the present time, universities in Indonesia can mostly be characterized as an ivory tower. The gap between the skills developed in the universities and the actual need in the market is vast. In short, the universities as research institutions must research relevant technologies that will bring value to the society through industry.

Government can help by providing policy incentives (such as lower tax for technology entrepreneurs and FDI or *foreign direct investment*) as well as being the biggest consumer for the technology because government is almost always the biggest buyer.

University plays an important role by generating the relevant body of knowledge that could further the productivity of the businesses and industries around it. Remember the assessment that lack of access to production technology is one of the chief problems faced by our SMEs. Here, the universities should focus mainly on the applied research that has a direct benefit

to local economy instead of cutting edge but irrelevant ones.

Industry also plays a crucial role in turning the body of knowledge into economic value that ultimately brings monetary benefit as well.

Technology-oriented large or multinational corporations can help tremendously here. Since technology cannot be developed in vacuum, these corporations could help to direct research activities into marketable products. In turn when the research becomes marketable, it becomes profitable and self-sustaining, or even can spin off profitable entrepreneurial venture.

Self-sustainability is an important result from GUI collaboration. Chinese Premier Zhu Rongji, in a bold move in 1998, stipulated all Chinese state research agencies to sustain itself in five years by commercializing their research output. Prior to that, state research agencies were lax and incompetent with modern technology. However, after the installation of Zhu's new policy and years of struggle by these research agencies; China began to reap its benefit today. Nowadays, these research centers are self sustaining because they can commercialize their research which in turn brings in more funds for them to do research.

Marketable research means that the research output is actually having economic value. This is the key to bringing Indonesia one step closer to a knowledge-based society and economic reality. Indonesian universities today still do not have enough budgets allocated for research.

Smaller SMEs and technology entrepreneurs are also very important in this effort because the smaller the company is, the more flexible and agile it is. In the United States, the government encourages entrepreneurial technology startups and small enterprises by awarding SBIR (Small Business Innovative Research) grants. SBIR rewards small private sectors taking the risk to foster innovative technology for the benefit of public at large. Indonesian government could also learn from this to encourage local visionary *techpreneurs*.

The big challenge for us remains: how to make the government, university and industry collaborating with one another? There is no easy answer for this question but clearly an interdisciplinary skill as well as a uniting vision in different areas of engagement is crucial.

Summary

In summary, the globalization (along with it trade liberalization) and proliferation of knowledge-based economy today confronted Indonesia with a threat as well as opportunity to act on. Responding to this threat and opportunity, one thing remains clear: that Indonesia must take a step towards knowledge-based economy. There are cogent reasons for being a knowledge-based society as presented in the first part.

Being knowledge-based does not solve all of Indonesian economic problems. Broader contextual issue must be addressed, including: (1) the administration of socio-economic justice, (2) the pressing on towards a learning society and (3) the building social trust capital as a prerequisite to socio-economic collaboration.

Moving forward, there are four interrelated developmental areas that we need to respond to: (1) human resource development and education, (2) developing and unleashing the potential of ICT (information and communications technology), (3) empowering SME (small and medium enterprises) and (4) practice of GUI (government, university and industry) collaboration.

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About the FICA CSS Economic Development Focus Group – This focus group is under the ministry of FICA CSS (Fellowship of Indonesian Christians in America, Center for Strategic Studies). This focus group aims to be the redeeming voice to the marketplace by explicating Biblical truth in Indonesian and global context today.

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¹ API is the Indonesian Textile Association or *Asosiasi Pertekstilan Indonesia*, the umbrella association for all textile and garment producers in Indonesia.

² Asia Times Online: [Indonesia Needs to Cut Textile Prices](#)

³ [Indonesia and Globalization](#) (by Rini Soewandi, Indonesia's Ministry of Industry and Trade, from *The Globalist*, excerpted from "Asia's New Crisis: Renewal through Total Ethical Management" John Wiley & Sons, 2004)

⁴ Melba Padilla Maggay is a social scientist at the Institute for Studies in Asian Church and Culture, Quezon City, Philippines.

⁵ Maggay, Melba P. [Globalization: Some Socio-Cultural Comments](#).

⁶ PPP is an abbreviation for Purchasing Power Parity. Purchasing power parity exchange rates are useful for comparing living standards between countries.

⁷ OECD 1996, *The 1996 Science, Technology and Industry Outlook*

⁸ Development of Shares of the Total Workforce in the USA 1900 – 2000. Source: Stewart, T. A., 1997: *Intellectual Capital. The New Wealth of Organizations*, New York: Doubleday.

⁹ Friedrich August von Hayek was the 1974 Nobel Prize winner in Economics. He was famous for his defense of free-market capitalism against socialism and neo-classical Keynesian thoughts.

¹⁰ Hayek, Friedrich A. [The Use of Knowledge in Society](#). *American Economic Review*, XXXV, No. 4; September, 1945, pp. 519-30.

¹¹ Joseph E. Stiglitz was the 2001 Nobel Prize winner (shared with two other economists). He was famous for his work in analyzing the asymmetries of information in the market mechanism. He was also the proponent of bringing the issue of ethics into the economic analysis.

¹² Stiglitz, Joseph E. [Ethics, Market and Government Failure, and Globalization](#).

¹³ Kristiansen, Stein. [Information Asymmetry and Economic Concentration: The Case of Hens and Eggs in Eastern Indonesia](#). ESA Working Paper No. 03-21 (December 2003). The Food and Agriculture Organizations of the United Nations.

¹⁴ According to census (Sensus Penduduk) in 2000, almost 60% of the Indonesian population work and depended their lives on agricultural sector.

¹⁵ *Pikiran Rakyat*: [Indonesia Swasembada Beras?](#) (Wednesday, March 10, 2004)

¹⁶ [Achievement in Rice Self-Sufficiency in Indonesia](#) (UNDP Report).

¹⁷ [Borneo: Brokering a Better Deal for Rattan Farmers](#) (UC Berkeley News Center).

¹⁸ A proposed agenda or to do item for the study for economic development in Indonesia is to perform in-

depth studies on various strategic industries in Indonesia to holistically equip direct private-sector players as well as formulating recommendations to local public policy makers.

¹⁹ Many people mistook Adam Smith by believing that self-interest is the "invisible hand" virtue that makes the Smith market mechanism work.

²⁰ The metaphor is from Aesop's fable of a man who, having been given a goose that laid golden eggs, could not bear to wait for wealth to come gradually in small quantities. Hoping to get all the eggs at once he killed the goose to get them and thus cut off the supply.

²¹ Leviticus 25:8-54. The Year of Jubilee is a cyclical period of every 50 years where everyone is to return to his own property and thus provide an even redistribution and a clean start for those being marginalized by the economic progress.

²² CEPT tariff cut for AFTA 2003, Source: Indonesian Business Perspective, [Harvest International's Journal for Decision Makers](#).

²³ SARA is an acronym of *Suku Agama Ras dan Antargolongan* or ethnic, religion, race and interclass – often used as primary source for conflicts in plural Indonesia.

²⁴ To understand the need for building trust in a plural Indonesia, especially in conflict areas, this paper provides a good picture: Kirwen, E. L. and Pierce, L. I. [Breaking Through Barriers: Rebuilding Trust and Social Capital in Maluku, Indonesia](#).

²⁵ KKN is an acronym for *Korupsi, Kolusi dan Nepotisme* or corruption, collusion and nepotism.

²⁶ Ferrary, Michel. [Trust and Social Capital in the Regulation of Lending Activities](#). *Journal of Socio-Economics* (2003), 31, 6, p. 673-699.

²⁷ This is a general statement arising from the theoretical observation of Prisoner's Dilemma problem and Game Theory.

²⁸ Gelauff, George M.M. [Social Capital: An Indispensable Asset in the Knowledge-Based Economy](#). Paper for the Social Capital and Economic Development Workshop. March, 2003.

²⁹ Miguel, Gertler, and Levine. [Did Industrialization Destroy Social Capital in Indonesia?](#) June 2002. University of California at Berkeley.

³⁰ Breman, Jan. (2001). *The Impact of the Asian Economic Crisis on Work and Welfare in Village Java*, *Journal of Agrarian Change*, 1(2), 242-282

³¹ Source: Study by the Research and Development Department, Ministry of National Education, 2004.

³² The Jakarta Post: [The Winding Road to Better Education](#), by Sayidiman Suryohadiprojo. June 19, 2004.

³³ The Jakarta Post: [Education Bill and the Real Mess behind the Educational System](#), by Elwin Tobing. June 18, 2003.

³⁴ Source: [Asiaweek.com](#)

³⁵ Minister of Efficiency of State Appartus (*Menteri Pendencygunaan Aparatur Negara*), head of Telematics Coordination Team in his letter number 133/M.PAN/5/2001.

³⁶ United Nations Information and Communication Technologies Task Force. Website: <http://www.unicttaskforce.org/>

³⁷ Source: APJII (*Asosiasi Penyelenggara Jasa Internet Indonesia*), ITU-2001.

³⁸ Aizu, Izumi. [A Comparative Study of Broadband in Asia: Deployment and Policy](#). May, 2002. Asia Network Research.

³⁹ [Promoting Internet Policy and Regulatory Reform in Indonesia: Assessment Report, February 2003](#). The European Union's Asia IT&C Programme for Indonesia.

⁴⁰ VoIP or Voice over IP is an alternative for cheaper voice telecommunication using Internet as its data carrier. It is cheaper largely because unlike telephone lines, the data line has

⁴¹ The existing regulations about VoIP are stated in Minister of Transportation Decree No. 23/2002 concerning VoIP services for the public dated March 26, 2002. The decree stipulated that the VoIP service providers should have at least 28 port E-1 access equipment distributed in seven provinces. The incumbent, PT. Telkom, is Indonesia's only E-1 provider.

⁴² [Promoting Internet Policy and Regulatory Reform in Indonesia: Assessment Report, February 2003](#). The European Union's Asia IT&C Programme for Indonesia.

⁴³ Sources: Bank Rakyat Indonesia (www.bri.co.id)

⁴⁴ Asian Development Bank (ADB) arrives at this conclusion through study cases in its implementation of SME empowerment projects in four regencies: Sragen and Pati in Central Java; and Pare-Pare and Bulukumba in South Sulawesi.