Local Knowledge and the Digital Divide: Focus on Southeast Asia

Hans-Dieter Evers and Solvay Gerke

Working Paper No. 2

Institute of Asian Studies, Universiti Brunei Darussalam

Gadong 2013

ISBN: 978-99917-1-251-2

Editor, Working Paper Series

Prof. Dr. Tong Chee-Kiong, Director, Institute of Asian Studies, Universiti of Brunei Darussalam

Authors

Prof. Dr. Hans-Dieter Evers, Eminent Visiting Professor, Institute of Asian Studies, Universiti of Brunei Darussalam. Contact: hdevers@uni-bonn.de . Internet: https://sites.google.com/site/hansdieterevers/home

Prof. Dr. Solvay Gerke, Director, Center for Development Research (ZEF), University of Bonn, Germany (on leave) and Visiting Professor, Centre for Policy Research & International Studies (CenPRIS), Universiti Sains Malaysia.

List of IAS Working Papers

Working Paper No 1 King, Victor T., Culture and Identity: Some Borneo Comparisons. Gadong: Institute of Asian Studies-Universiti Brunei Darussalam 2013

Working Paper No 2 Evers, Hans-Dieter and Solvay Gerke: Local Knowledge and the Digital Divide: Focus on Southeast Asia. Gadong: Institute of Asian Studies-Universiti Brunei Darussalam 2013

Local Knowledge and the Digital Divide: Focus on Southeast Asia

Hans-Dieter Evers and Solvay Gerke

Abstract

The production, dissemination and utilization of knowledge are essential for development and the introduction of information and communication technology (ICT) is a precondition for developing a knowledge society. Countries, regions and populations are, however, divided, in terms of access to ICT. Socio-economic indicators on Brazil, Korea, Malaysia, Singapore, the Netherlands and Germany are used to show that the existing global digital divide and the knowledge gap are widening between developing countries and the industrial countries and within individual nations. The moral and cultural issues of the digital divide and the knowledge gap are identified. Access to primary education and the acquisition of reading and writing skills is a basic human right and an internal digital divide between those that have access to further knowledge and others without access is unjust and not acceptable. Furthermore a civilization needs "meta-narratives" as a common ground, an anchorage for basic cultural values, which have to be disseminated, known and accepted by all members of a society to avoid violent conflict, fundamentalisms of various kinds and alienation. Some countries have embarked on an ambitious plan to close the digital divide and to use knowledge as a base for economic development, by-passing earlier stages of industrialization. Some commentators have, in contrast, asserted that it is doubtful that closing the digital divide will let developing countries leapfrog to higher levels of development as the knowledge economy will deepen the digital divide between regions and populations and actually expand the gap between rich and poor. The paper discusses this controversy by arguing that global knowledge has to be localized and local knowledge utilized in developing a knowledge society. If it seems unlikely that the digital gap between developing and developed countries will be closed completely at least narrowing the gap at the lower end should be targeted. For this purpose minimal standards of "basic digital needs" should be formulated.

Key Words

Knowledge governance, digital divide, local knowledge, development policy, Southeast Asia

Local Knowledge and the Digital Divide: Focus on Southeast Asia

1. Defining Local Knowledge and the Digital Divide

1.1. The Production of New Knowledge and the Growth of ICT

New knowledge is produced at an unprecedented pace. The growth of scientific knowledge production, supported by advances in information and computer technology, has been primarily responsible for the explosive rate of increase in knowledge. "There is a widespread consensus today that contemporary Western societies are in one sense or another ruled by knowledge and expertise" (Knorr-Cetina 1999). This knowledge is governed, managed, monopolized or shared throughout the industrialized countries, but also increasingly in parts of the developing world. Knowledge is increasing with every journal article or book written on the particular subject. If we consider only those articles that have been accepted in international journals and have been officially recognized or 'authorized' by inclusion into a major databank, we see a steep rise not only in natural science and engineering knowledge but also of social science work on developing countries during the boom years of the 1980s and 90s (Evers and Gerke 2003). Of particular interest is the rising local social science production, as it indicates a rising concern for social and cultural processes under conditions of globalization and an increase in 'reflexive modernization'(Beck, Giddens et al. 1994). We observe that the concern for the direction of social and cultural processes, particularly of the emerging education-conscious middle classes (Gerke 2000) stimulates local knowledge production on society and culture.

Information and communication technology (ICT) is also growing fast, though at different rates. In 2007 in Northern Europe and North America between 57 to 84% of all households had internet access (OECD 2010). In some countries, like the Czech or Slovak Republic the number of internet subscribers more than doubles between 2005 and 2007 from 19 to 35% and 23 to 46% respectively. The use of handphones has also increased substantially worldwide, particularly in some of the Asian countries like Malaysia or Brunei.

Components of the information and communication technology (ICT) infrastructure and of institutions of knowledge production and dissemination are, however, unevenly distributed. In the year 2000 in the United States about a third of the work force was employed in ICT related sectors, in Korea only 4% or about half a million workers and much less in most of the developing world. In 2007 about 30% of R&D expenditure worldwide was spent in the European Union, Asia and the United States respectively, the remaining 10% in the rest of the world (UNESCO 2000, 2009). We estimate that in 2007 the ASEAN countries accounted for about 6% of the World R&D expenditure. The result is a widening digital divide, which mirrors the income differences between developed and underdeveloped economies (World Bank 1999). There are nodal points where digital equipment is concentrated, where knowledge is produced and from where it is globally distributed. Research on Indonesia, for example, may be extensively done by foreign scholars, affiliated to universities or research institutions around the globe, rather than Indonesian nationals or scholars

attached to its local institutions (Evers 2003). This raises the issue of how far local knowledge is produced to meet local needs rather than the interests of a global community of scholars or the R&D interests of multi-national corporations.

The unequal production and distribution of knowledge is widening the knowledge gap between highly productive and less productive countries. The distribution of ICT and the production of knowledge are interrelated, but the exact nature of this connection is far from clear. An ICT infrastructure can only be developed if the necessary scientific knowledge and expertise is locally available. The production of new knowledge is, however, not primarily dependent on the availability of ICT, though being on the wrong side of a digital divide reduces the chances for innovative knowledge production.

1.2. Local and Indigenous Knowledge

Most knowledge about the developing world and the transition societies is still produced outside the region to which it pertains. The capacity to benefit from knowledge is governed by two basic elements: the ability to acquire and to apply knowledge that already exists, and the ability to produce new knowledge. It is not enough to transfer local knowledge, e.g. knowledge embedded in a particular culture, from one country to another. Instead, in order to achieve a sustained development, it is necessary for the knowledge importing society to be able to acquire, to absorb the knowledge, to understand, to interpret it and to adapt it to local needs, and subsequently to produce knowledge endogenously along the same line (Cohen and Levinthal 1990). Knowledge, therefore, has to be imported and adapted to local requirements, i.e. global knowledge has to be “localized”. For any society and any nation state it will be crucial for further development whether or not this will be achieved (Gerke and Ehlert 2010).

Global knowledge, when used locally, has to be embedded in a local knowledge base. This local and indigenous knowledge has attracted the attention of social scientists and development planners for some time. Indigenous knowledge can be defined as "knowledge that is unique to a given culture or society" (www.nuffic.nl/ik-pages). While the term "indigenous knowledge" is the internationally most widespread term, it should not be confused with the term "local knowledge" as used here.

Indigenous knowledge is generated within communities, is location and culture specific, forms the basis for decision making and survival strategies of indigenous communities, is not systematically documented and covers issues such as primary production, human and animal life as well as natural resources management. Indigenous knowledge includes any locally and culturally situated knowledge that was and still is produced in local communities and consists of factual knowledge as well as skills and capabilities. It may be barely conscious and only partially verbalized, even though it may be complex and comprehensive. It is often regarded as oral and rural in nature, though not necessarily static but dynamic and based on innovation, adaptation and experimentation. Furthermore the concept indigenous knowledge implies the notion of discrete and static communities, grassroots politics and folk culture. It carries a political connotation since the destruction of ecozones that were inhabited by marginal groups. Moreover it is often seen as the opposite to Western Knowledge, which is, however, not necessarily the case (Antweiler 1998).

In contrast we use a sociological concept of local knowledge that is not tied to local communities. The explosion of knowledge in the “information age” is paralleled by an intense interest in the generation of locally grown scientific knowledge production. We define local knowledge as any locally available stock of knowledge specific to the locality of their origin, including the present and past findings of local research that are not yet globalised.

The importance of local knowledge in general becomes increasingly recognized, including the need to develop a coherent local knowledge intellectual framework to interact effectively with Western science, facilitatory research methods to enable dialogue between natural resource scientists and local people as well as a methodology recognizing that local knowledge is dynamic and part of the globalization process (Sillitoe, 1998a). Local knowledge and the scientific-technological knowledge of development experts and researchers have to be combined in order to achieve participatory development research and planning. However, in the reality of development projects scientific-technological knowledge based on natural science research and local knowledge based on praxis, empirical experience and belief systems tend to differ widely. Combining the two knowledge systems in order to practice participatory development planning is time-intensive, requires a high degree of mutual interest and willingness on both sides (Neubert/Macamo: 2002). The weakening social and political community-structures as well as the shortage of endogenous development perspectives hinder the application of local knowledge in development (Antweiler, 1998: 490). Incorporated into development planning, local knowledge will be the motor for participatory, sustainable development.

Any knowledge production or use is local at the outset before it is globalised. The respective locality, where knowledge is produced can be a nation state, a society, a university or a meeting. Local knowledge is usually first shared by a community, a 'community of practice'. Local knowledge is made available globally as soon as it is published in a widely available journal, book or added to a digitalized data bank. The availability of means of communication and the digital endowment of a country has a decisive impact on the capacity of a population to gain access to globally available information and knowledge. In reverse, the shape of the ICT infrastructure determines whether or not global knowledge is transmitted, absorbed and "localized", i.e. adjusted to local cultural and social conditions (Liebenstein 2000). Only a fraction of indigenous or local knowledge is globalised and only a minor part of global knowledge enters local knowledge (Tomforde 2003). Local and global knowledge gets easily mixed in the post-modern world (Baruch 2001), a process that leads to cultural complexity and intellectual insecurity.

A model of the very complex knowledge process of local knowledge production and dissemination and the resulting knowledge gap contains the following elements.

1. An educational system, research institutions and research facilities, supported by government and private grants (knowledge governance)
2. High-level research personnel to carry out research projects and works of art (human resources development)
3. Access to locally available knowledge (local knowledge)
4. Access to globally available knowledge (global knowledge)
5. Gatekeepers to evaluate research output, e.g. in the form of peer reviews (authorization) or other forms of quality control
6. Published research results in local print media (local documents)
7. Published research results in internationally recognized print or digitalized media (global documents)

It should be noted that these variables do not cover the whole knowledge creation process. They refer mainly to the social and natural science output in the form of documents printed in globally available journals, the globalization of local research and the contribution of a local and global "community of knowledge workers" to the knowledge stock. Of particularly importance is knowledge authorized by a "community of practice" (peer review by knowledge gate keepers) and electronically made available in widely accessible digitalized data banks.

1.3. The Growth of Ignorance and the Destruction of Local Knowledge

The growth of knowledge also implies the growth of ignorance. With each new insight new open questions are created. The more we know the more we also know what we don't know. In this sense ignorance or "known not-knowing" increases at a faster rate than confirmed knowledge. This creates a feeling of insecurity and increases risk awareness, because outcomes of technological advances become less certain with knowledge about the complexity of the natural and socio-cultural world. For example the spread of ICT is based on research and development efforts and the production of new knowledge on digital data processing technologies. At the same time possible hazards of "electro-smog" have become a known possibility but their health hazard has not been proven beyond doubt. Research on electromagnetic fields under transmission lines and communication channels is under way, health hazards are a possibility, but the exact risks are still largely unknown.

The production of knowledge takes place in a framework of markets and power structures and is not necessarily guided by the use-value of knowledge to poor people. New insights may make old knowledge obsolete and lead to its replacement, but useful local knowledge may also vanish before the onslaught of knowledge systems thought to be superior. Research does not only produce new knowledge but also destroys old knowledge. In this sense ignorance rather than knowledge is enhanced. The digital divide has an impact on the distribution of knowledge and ignorance. The transaction cost of transmitting knowledge through ICT is much lower than communicating by much slower traditional means of communication. A new conception of time has evolved. Composing, writing and mailing a conventional letter takes more time than dashing off an e-mail. Digitalized global knowledge therefore tends to spread much faster than local knowledge.

1.4. The Digital Divide

The digital divide refers to the uneven distribution of information and communication technology (ICT) between and within nations (Menkhoff, Evers, and Chay 2010). In each country there are people who have access to modern communication technology while others are not enabled to make use of telephone connections, the internet and other ICT features. There is no doubt that such a digital divide exists but its severity and depth is evaluated differently according to the indicators used to measure it. The knowledge gap is a more complex phenomenon and refers to the uneven intensity of knowledge production, availability and dissemination worldwide. There appears to be a connection between the two: The digital divide determines to a large extent the capacity of producing and using new knowledge. Overcoming the digital divide and narrowing the knowledge gap between and within countries has become a prime target of international development agencies as well as of some national governments.

The World Development Report 1998/1999 distinguishes two types of knowledge: knowledge about attributes leading to information problems and knowledge about technology (i.e. knowhow), including knowledge gaps. "Typically, developing countries have less of this knowhow than industrial countries, and the poor have less than the non-poor. We call these unequal distributions

across and within countries *knowledge gaps*" (World Bank 1999). The international knowledge gap is thus defined in terms of the technological knowledge achieved in the OECD countries. The meaning of knowledge is not made explicit, but from the discussion on the knowledge gap we can deduce that education, expenditure for research and development and ICT infrastructure are seen as the crucial variables.

Usually the concept of a "digital divide" is used to relate to the technological aspect of the knowledge gap (Menkhoff, Evers, Chay, and Pang 2011). "The term 'digital divide' refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access information and communication technologies (ICTs) and their use of the Internet. It reflects differences among and within countries" (OECD 2001). Access to telephones appears to be the basic factor, because internet use per telephone subscriber does not differ very much between countries (Dasgupta, Lall et al. 2001). In general the concept "digital divide" is biased towards high technology and need to be reconceptualized to pay greater attention to social exclusion and inclusion (Warschauer 2003).

The debate about the impact of the digital divide on developing countries has given rise to diametrically opposed views. "Some believe that information and communication technologies (ICT) can be mechanisms enabling developing countries to 'leapfrog' stages of development. Others see the emerging global information infrastructure as contributing to even wider economic divergence between developing and industrialized countries" (Braga 1998).

In any case, closing the digital divide and the knowledge gap are regarded as necessary steps towards economic development. Knowledge is the most important factor of production and its growth is essential to propel a country into self-sustained growth. Development agencies like the World Bank, GTZ or DFID have been the outspoken proponents of the gap-closing strategy. UN organizations, particularly UNESCO emphasize universal access to information, equal access to education, cultural diversity and freedom of expression as essential principles for developing equitable knowledge societies. Whenever a point of view is authorized by leading development organizations, it advances to the status of an ultimate truth. But exactly at this stage we should sit back, take a closer look and re-think and re-search the issue at hand. Can and should a knowledge gap be closed to achieve development? The answer is yes, but considering the current situation and the unlike chance to close the digital divide completely alternative points-of-view should at least be discussed.

2. The Knowledge Gap: Moral and Cultural Issues

2.1. The Widening Gap

The digital divide is deepening and the knowledge gap is widening. The negative aspects of an uneven distribution of knowledge and communication opportunities are obvious and the right to education and access to knowledge is accepted by most nations and international bodies. Taking account of the fact that the gap cannot be closed and the digital divide not bridged in the near future the following issues should be taken into consideration:

1. The digital divide and the knowledge gap may be widening with the growth of knowledge - based economies

2. The existence of digital divides and knowledge gaps can be managed to attain comparative advantages in knowledge production and to achieve economic growth and development.
3. The emergence of knowledge clusters increases knowledge gaps (Evers, Gerke, Menkhoff 2010).

First we shall examine some evidence to investigate whether or not the advance of ICT has reduced the knowledge gap and secondly we shall analyze the knowledge gap itself.

Digital or knowledge gaps divide

1. nations, groups of nations or regions
2. classes, communities or persons within nations or regions.

A knowledge gap denotes a significant difference between indicators, measuring the properties of knowledge societies. These indicators measure usually averages of ICT infrastructure, human resources development, investments in research and development (R&D), and related fields. Indicators just "indicate" much more complex structures and institutions and have therefore to be supplemented by qualitative, analytically descriptive data.

Optimistic commentators argue that the fast expansion of information and communication technology (ICT) has improved the access to knowledge. Especially the spread of personal computers and the internet has connected millions of people to the knowledge resources of the world-wide-web. In Malaysia e.g. the number of computers has risen from 103.1 per thousand people in 2000 to 311 in the year 2009[1] and the number of internet users has risen from 4,977,000 to 15,823,700 in the same period (Malaysia Economic Planning Unit 2010). But access to ICT resources is not equally distributed and the digital divide has increased.

More and more people gain access to global knowledge resources and a fair proportion is probably making use of them. Comparing countries critical commentators are, however, not convinced that "the knowledge revolution will let developing countries leapfrog to higher levels of development…. In fact, the knowledge gap is likely to widen the disparities between rich and poor, imprisoning many developing countries in relative poverty" (Persaud 2001). It is equally uncertain that the new knowledge technologies will bolster democracy just on the basis of better access to information and improved knowledge of political issues.

The digital divide as well as the knowledge gap is widening, because some regions within countries develop faster than others and some countries are on a faster track towards a knowledge society than the less endowed.

There are several arguments to back up this view:

1 When it became apparent that knowledge is the major factor of production, rich countries, the US in particular, have broadened protection of intellectual property rights, especially patents. Late-comers in the race towards a knowledge economy are barred from using essential knowledge or have to pay a high price for its use. In fact, "the knowledge-intensive and militarily strong developed nations have been exploiting their power to promote their economic interests beyond free-market outcomes" (Persaud 2001). The so-called "US-led war on terror" has increased this

tendency.

2 Big multinational corporations have absorbed local knowledge, especially in the field of medical plants. The resulting products are patented and sold, thus devaluating local knowledge in developing countries. Big development agencies, among others the German GTZ, US AID or the British DFID, are packaging the knowledge gained in development cooperation into products that will then be sold to customers, mainly governments and international development agencies.

3 Increased reliance on digitalized information and ICT in financial markets will increase the gap between industrialized and developing countries. From 1990 to 1994, when the knowledge economy had not yet started to arise, emerging stock markets yielded returns of 117 percent on invested capital. During the same period, US investors would have lost about 2 percent on their investment in markets of industrialized countries. In contrast, emerging market stocks fell 27 percent between 1995 and 2000, and those in developed markets rose 43 percent, mainly driven by technology stocks (Persaud 2001). The emerging markets, particularly the so-called tiger economies, yielded high returns during the early 1990s due to their successful industrialization, whereas the already industrialized countries gained from the increased use of knowledge as a factor of production and collected a "productivity and innovation rent" during the second half of the 1990s, while the knowledge gap widened. But knowledge also creates virtual economies based on trust and belief. When trust is withdrawn, virtual knowledge economies crash, as happened in 2001-02.

Statistical indicators show that the knowledge gap has been widening, if we take the measurements for granted. This holds true for comparisons within as well as between countries. We shall now have a closer look at the knowledge gap and the digital divide and its creation.

2.2. The Cultural Construction of the Digital Divide and the Knowledge Gap

During the debate on the emergence of knowledge societies, knowledge-based economies and the widening knowledge gap, the "GAP" has become essentialised. In other words, the existence of a gap between those that possess knowledge and those that are less endowed is taken for granted, and is not deconstructed into its components or succumbed to critical evaluation. We shall therefore have a closer look at the concept itself and analyze its meaning.

First of all we have to recognize that knowledge gaps are not evil by themselves. In fact, knowledge gaps are a precondition for any development of knowledge, science, research and human development. It is obvious that adults are supposed to know more than children, a university student should know more than primary school pupils, a physicist can be expected to know more about nuclear fission than a sociologist, and an expert should know more than a laymen. These categories of people are all separated by knowledge gaps regarding their respective fields of specialization. Often new knowledge is created out of the cooperation between specialists without closing the knowledge gap between them. In fact all interdisciplinary research makes sense, if a knowledge gap exists between the cooperating scientists. Without knowledge gaps there is no progress in research and development.

Similar arguments may be brought forward in regard to the digital divide. High-tech industries or computer software developers require different kinds of communication technologies than students or farmers. The needs of users have to be the guiding principle for an evaluation of the digital divide. Only if the requirements of industries and the digital needs of the population are not met a digital divide exists.

But how do we deal with the gap in knowledge between industrialized knowledge economies and

the developing countries? This, after all, is the crucial issue at hand. The concept of a "gap" indicates a hierarchy between haves and have-nots or haves and have-less. If this is the case we have to consider about which type of knowledge we are talking: knowledge about specific branches of science, knowledge about kinship terminology, knowledge about Islamic religious ritual, knowledge about survival under harsh ecological conditions? The value of knowledge is determined by experts, mainly from the industrialized knowledge economies and by processes in powerful organizations like the big transnational corporations, government departments, UNESCO, the World Bank and other large organizations. They determine what knowledge is essential and what is not. They construct the knowledge gap and the digital divide.

The knowledge gap is deliberately or inadvertently widened by the monopolization of the application of knowledge through patents and the insistence on securing intellectual property rights by powerful organizations, especially the WTO. The TRIPS Agreement, concluded in 1995, determines rights over intellectual property and grants temporary monopolies for innovations and inventions. Poorer countries and people are excluded from access to vital 'knowledge goods', such as medicines, seeds, and educational materials (Oxfam 2001). Selling knowledge in the form of licenses, franchising and overseas education have developed into a multibillion dollar business for the OECD countries, which capitalize on the knowledge gap between them and the developing world.

The digital divide and the knowledge gap are constructs within the world of development cooperation, but they can also be seen as the result of a global marketing strategy of the industrialized countries, especially the United States. The knowledge gap is constructed in such a way, that it cannot be closed. Developing nations are instructed to follow a strategy of improving their knowledge base by investing heavily in ICT and by following the model of the most highly developed knowledge-based economies in the North. As this model is changing fast, the developing countries (and a large part of the other industrialized economies) are engaged in a futile race of catching-up, instead of trying to improve their competitive advantage by stressing local knowledge resources, occupying niches, and forming strategic alliances among themselves and with selected others.

2.3. The Knowledge Market

The market fundamentalism of neo-classical liberal economics decrees that only marketable knowledge with commercial value is useful. The commercialization of knowledge is not an inevitable aspect of globalization, but the result of strategic action (Petrella 2002). The restructuring of university education and research towards the production of marketable knowledge transfers resources from a basic pursuit of knowledge to the production of applicable knowledge in aid of the accumulation of capital and the enhancement of "shareholder value". What kind of knowledge is useful is determined by the managers of large corporations and by helpful bureaucrats. Knowledge gains in value by being sold and bought. Knowledge without market value is reduced to insignificance while other forms of knowledge may be raised to prominence. Local knowledge is usually under-priced until it is globalised and becomes marketable.

The digital divide and knowledge gap are the result of this process and, at the same time, have lead to a degradation of knowledge that does not profit from strong commercial demand. The knowledge gap is also widened by the destruction of local knowledge. Think tanks, working for government departments, interest groups or commercial enterprises are important instititutions for the production of new local knowledge. They may, however, use media power and financial resources to destroy new local knowledge rather than disseminating it.

Since the days of Plato new “dangerous” knowledge has been the target of persecution, ridicule or destruction. In short, the knowledge gap is not a natural, inevitable phenomenon but is constructed and maintained by powerful strategic groups in their pursuit of capital gains, profit and political power.

Whereas the widening knowledge gap is usually seen as detrimental to development, management experts have constructed another knowledge gap that is highly valued and esteemed. This is the gap between the stock market value of companies and the book value of their assets. As the “Economist” shows, the gap is biggest for companies that have most rapidly boosted spending on research and development (R&D). "The value of a business increasingly lurks not in physical and financial assets that are on the balance sheet, but in intangibles: brands, patents, franchise, software, research programmes, ideas, expertise" (Economist 1999). Thus in 1999 the pharmaceutical giant Merck had a book value of $12,6 billion, a market value of $139,9 billion, and a calculated knowledge capital of $48,0 billion. The crash of world stock markets in 2001 and 2002 with a very substantial reduction of the market value of large companies is partly attributed to a loss of trust in the capabilities of corporate management and the market mechanisms. The crisis is, however, also due to the loss of belief in the virtual world of knowledge-based economies. Max Weber has discussed the rationalization of economy and society during the capitalist industrial revolution and the demystification (“Entzauberung”) of the industrial world. We could now begin to talk about the second “Entzauberung”, namely the demystification of the utopia of the capitalist knowledge-based free market economy. The destruction of virtual capital and the sharply reduced value of corporate knowledge have shown that the knowledge economy is a constructed world, in which the value of knowledge is often determined by beliefs, myths and market forces.

The digital divide is easier to govern than the production and dissemination of knowledge. The ICT infrastructure is to a certain extent the precondition for the production and globalisation of knowledge, but ICT alone does not stimulate or produce new knowledge. The ability (or knowledge) to use computers and communication hardware is an essential precondition for knowledge development and the success in creating a knowledge society rather than just an ICT infrastructure will determine if and how the digital divide will vanish and the knowledge gap will be narrowed.

2.4. Moral and Cultural Issues of Knowledge and Development

Having discussed the constructed and therefore often virtual rather than real knowledge gaps we hasten to emphasize that there are indeed real and obvious differences between countries and within their populations. Some people own computers, others not, some can read and write, others cannot. The crucial questions are: How deep are the digital divide and the knowledge gaps? And: when and how are divides and gaps detrimental to development?

There appear to be three major issues.

1 The moral issue: People have a right to know, and education is a basic human right. If people are deprived in absolute or relative terms, it is morally wrong. In terms of a specific value set common in democratic nations, a large gap in access to knowledge is not acceptable. Access to primary education and the acquisition of reading and writing skills is regarded as a basic human right and usually enshrined in a country's constitution. An internal digital divide between those that have access to further knowledge and others without access is unjust and not acceptable.

2 The economic or developmental issue: As knowledge is an important factor of production, nations or regions with a low level of knowledge cannot develop or at least face a crucial obstacle to alleviate poverty, reach political stability, democratise their political system and move ahead on the path of civilisation. On the other hand economic deregulation and the spread of a knowledge-based economy may, as has been argued for the case of Malaysia, increase income disparities (Ishak 2000).

3 The cultural issue: A civilisation needs "meta-narratives" as a common ground, an anchorage for basic cultural values, to avoid being torn apart by dissent, fundamentalisms of various kinds and alienation. These meta-narratives and the basic cultural values have ideally to be disseminated through education, mass media and ICT, have to be "known" and accepted by all members of a society. Furthermore a vibrant epistemic culture is a precondition for the production of new knowledge (Evers 2000).

If it seems unlikely that the digital gap between developing and developed countries will be closed completely at least narrowing the gap at the lower end should be targeted for action. For this purpose minimal standards of "basic digital needs" should be formulated. Access to the internet for every school could be among the basic digital needs, as well as a minimum of one fixed telephone line per 1000 population and administrative district. A strategy of reaching a nationwide digital basic needs standard, combined with the creation of regional centres with high levels of ICT infrastructure appears advisable.

3. Closing the Digital Divide and Developing Local Knowledge

3.1. The Digital Divide between Asian and European Countries[1]

Several of the ASEAN countries have been singled out for their success in promoting economic development through stringent development policies, including support for the growth of a knowledge-based economy and the formation of knowledge societies. Statistical indicators show,

[1] We would like to thank Marissa Ayesha Mohamed Idenal, Center for Development Research (ZEF), University of Bonn, for data input and valuable suggestions.

however, that the digital divide has deepened, both within ASEAN and between single ASEAN countries and the EU, the US and Japan.

The divide is measured by indicators, selected by development professionals and large organisations. By constructing these indicators, they also define the digital divide and the knowledge gap. Often small countries are compared with the US, which is used as bench mark for comparative indicators. It does not make much sense to compare the largest and industrially most advanced country with much smaller ones without taking the specific conditions for creating a knowledge society into account. We have therefore opted to compare ASEAN countries among themselves and Malaysia and Indonesia with countries of similar population and geographical size. We should, however, never forget that the gap is constructed by interested parties and depicts a virtual world of development.

There are many indicators that may be used to describe a knowledge society. We shall look at a few of them and then try to locate Malaysia's and Indonesia's position in comparison to selected industrialised and knowledge-based economies.

Table 1 Knowledge Development Index, 2000, 2005 & 2010: Indonesia, Malaysia, South Korea, Germany, Netherlands Compared

Country	Computer Infrastructure			Infostructure			Education and Training			R&D and Technology		
	2000	2005	2010	2000	2005	2010	2000	2005	2010	2000	2005	2010
Indonesia	22	22	21	19	22	22	20	20	20	21	21	22
Malaysia	17	17	17	17	17	16	18	17	18	17	17	19
South Korea	16	13	12	11	13	13	16	16	14	11	9	5
Germany	13	6	4	14	10	5	12	14	16	7	8	9
Netherlands	8	2	3	8	4	7	14	12	12	8	10	13

Country	Knowledge Index Score			Knowledge Development Index		
	2000	2005	2010	2000	2005	2010
Indonesia	1,518	1,105	1,471	21	21	21
Malaysia	2,645	3,004	3,106	17	17	17
South Korea	4,053	4,027	4,547	16	14	12
Germany	4,615	4,290	4,585	12	11	11
Netherlands	4,777	4,581	4,597	11	7	10

Source: Economy Planning Unit, Prime Minister's Department Malaysia (http://www.epu.gov.my/malaysianeconomyfigures2010)

The Malaysian Economic Planning Unit has calculated a Knowledge Development Index to

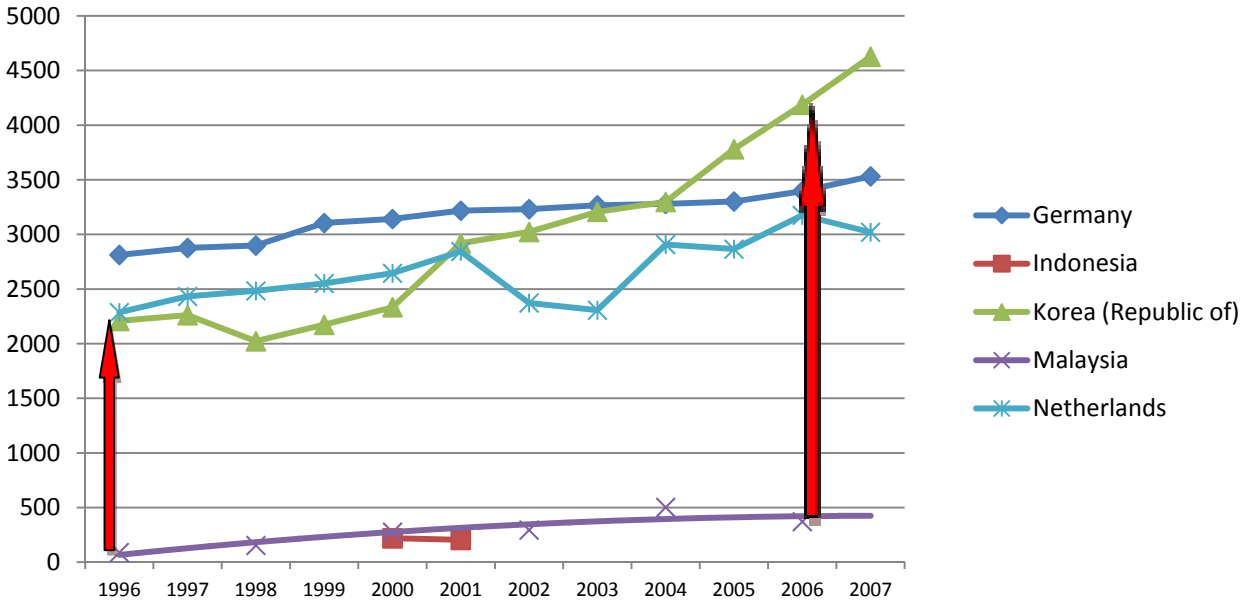
monitor Malaysia's position in relation to other countries. The ranking list is topped by the USA and Japan. Looking at the five countries under consideration, Malaysia and Indonesia took the 17th and the 21st place out of 22 countries in the year 2010.

Malaysia is doing well on some ICT indicators, like mobile phones per 1,000 people. According to the Malaysian Economic Planning Unit 2010 there were 1,026 mobile phone subscribers/1,000 inhabitants in Malaysia, i.e. less mobile phones per inhabitant in Malaysia than in Germany(1,283/1,000 inhabitants). On two other indicators, namely R&D researchers per million inhabitants or patents filed, Malaysia still trails far behind Korea, Germany, the Netherlands and other OECD countries, but is ahead in comparison with other ASEAN countries, like Indonesia.

The more important question would be, however, whether the gap is narrowed. Looking at time series data, this does not seem to be the case at present. The digital divide, in fact, is widening.

Diagram 1

Researchers per Million Inhabitants, 1996-2007: Malaysia, Indonesia, Korea, Germany, Netherlands



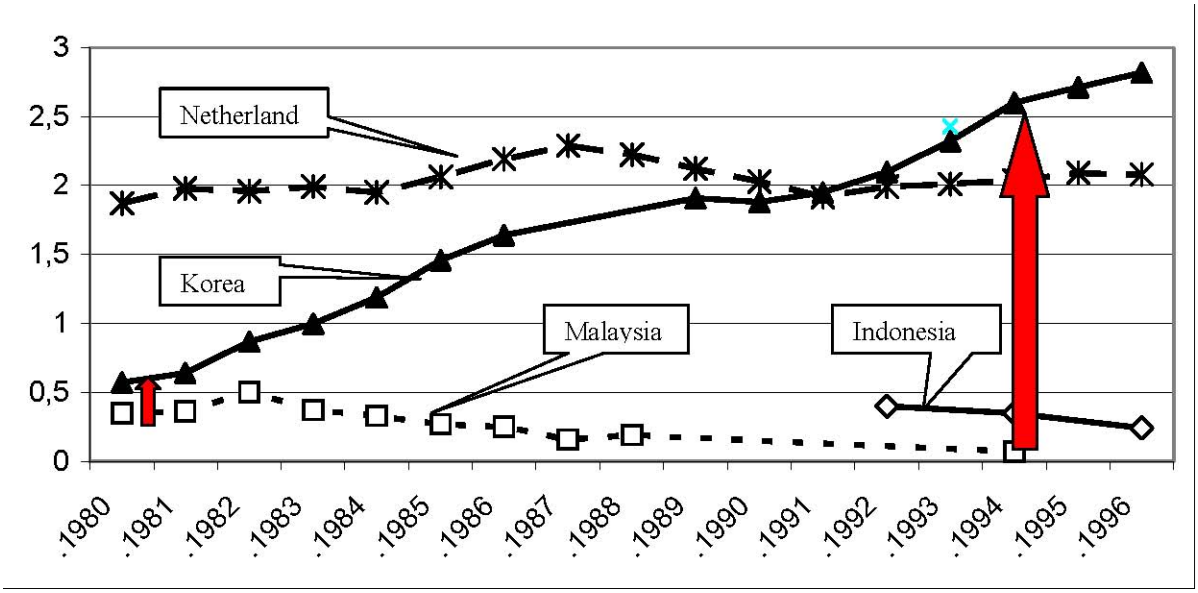
Source: UNESCO 2010 Statistics: R&D Tables (http://www.estime.ird.fr/article207.html)

The picture does not change dramatically, when we use other indicators, like the expenditures for R&D. Korea is still increasing its investment in applied knowledge production, the Netherlands remain stable, Germany has settled on an even keel at a high level, but Malaysia is on a downward trend during the 1990s, long before the Asian financial crisis broke. For Indonesia we have not been able to obtain later data, but it is very unlikely that the number of research personnel has increased in recent years (Gerke and Evers 2001). In 1980 there was almost no knowledge gap between Korea and Malaysia, by 1995 the gap had widened dramatically, if measured by expenditure on R&D. The

gap remained relatively constant from 1996 until 2006. (see the following diagram 2 & 3).

Diagram 2

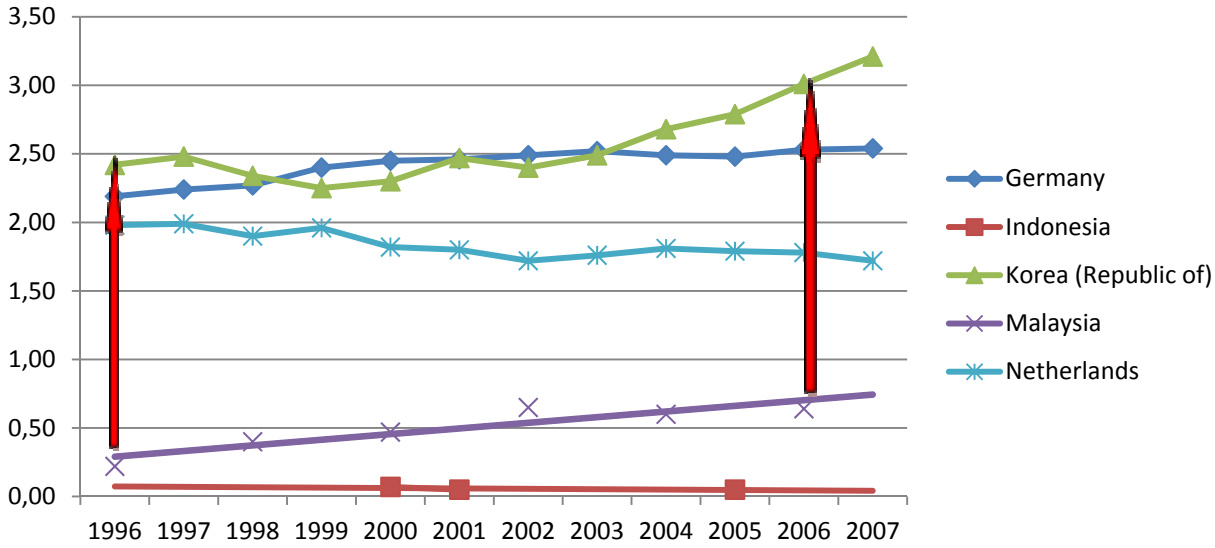
Expenditure on R&D as Percentage of GDP, 1980-1996



Source: (Evers 2003) based on UNESCO Statistics. Arrows show the increasing digital gap between Malaysia and South Korea, 1985 and 1995

Diagram 3

Expenditure on R&D as Percentage of GDP, 1996-2007



Source: UNESCO Institute for Statistics, (http://stats.uis.unesco.org/unesco/TableViewer/)

The declining rate of relative R&D expenditure and the number of researchers between the years 1980 and 1996 have, among other factors, reduced Malaysia's competitiveness in relation to other countries. However the Malaysia's rate of relative R&D expenditure slowly increases between the years 1996 and 2006 as well as the number of researchers. This means that new knowledge and science policies have had some effect.

3.2. Closing the Internal Digital Divide: Malaysia

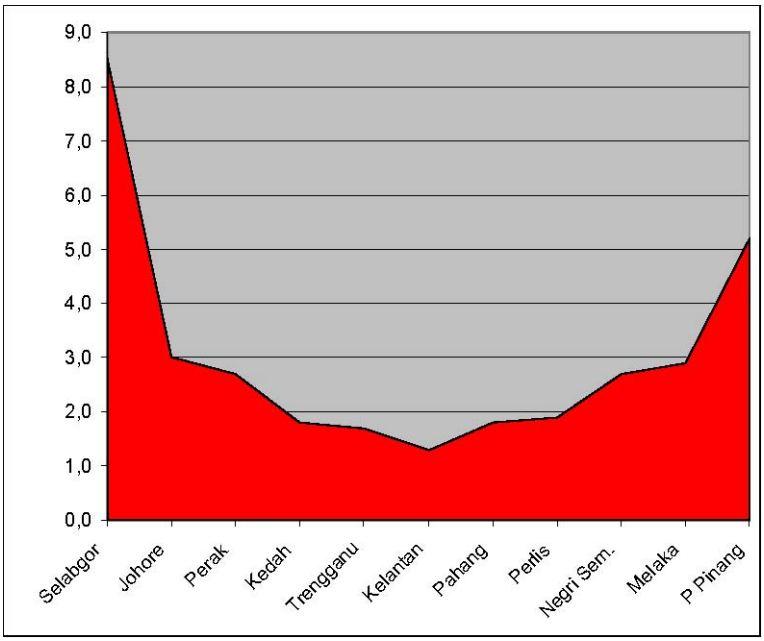
In 1991 Malaysia's Prime Minister proposed in a much-publicised speech that Malaysia should become a fully industrialised country by the year 2020 (Evers and Gerke 1997; Evers 2003). Meanwhile the transition from a newly industrialising to a fully industrialised country has become less attractive. The "Wawasan 2020 (Vision 2020)", as the Prime Minister's speech is known, had to be up-dated and the Malaysian government has made the move towards a knowledge-based society and economy its primary target. In the words of Dr. Mahathir: "In our pursuit towards developing the knowledge economy, knowledge has to replace labour and capital as the key factors of production in our economy. The challenge for Malaysia is to develop this knowledge amongst our citizens so that our success will be due to the contributions of Malaysian talents and knowledge workers" (Dr. Mahathir bin Mohamad, Putrajaya 8 March 2001 – advertisement in the New Straits Times 13-04-2001).

The attempts at closing the digital gap have been slowed down by the Asian financial crisis in the 1990s. High tech industries have not moved their R&D divisions to Malaysia as expected and large transnational corporations have developed their knowledge base much faster in their headquarters than in Malaysia. But also the uneven development of the ICT infrastructure, i.e. the digital divide within the Malaysian economy, may explain the fact that Malaysia has fallen back in the competitive global race towards a knowledge society in comparison to the industrialised economies. Indeed there is an internal digital gap within West-Malaysia, because the development of the infrastructure of a knowledge economy has been concentrated in and around the capital Kuala Lumpur and Putrajaya, leaving other areas behind.

In Peninsular Malaysia there is still a wide gap between rural and urban areas and between the West-coast and East-coast states. There are large differences in educational attainment and the number of technicians, researchers in the labour force and ICT infrastructure. The access to telephone lines ("teledensity") is seen as an essential precondition for the development of a knowledge society, as data and news transmission and the use of computers depend mostly on telephone technology. A similar digital divide is shown, if we measure the number of internet subscribers (see diagram).

Diagram 4

The Digital Divide among States, Malaysia 2000 (internet subscribers per 1000 population)

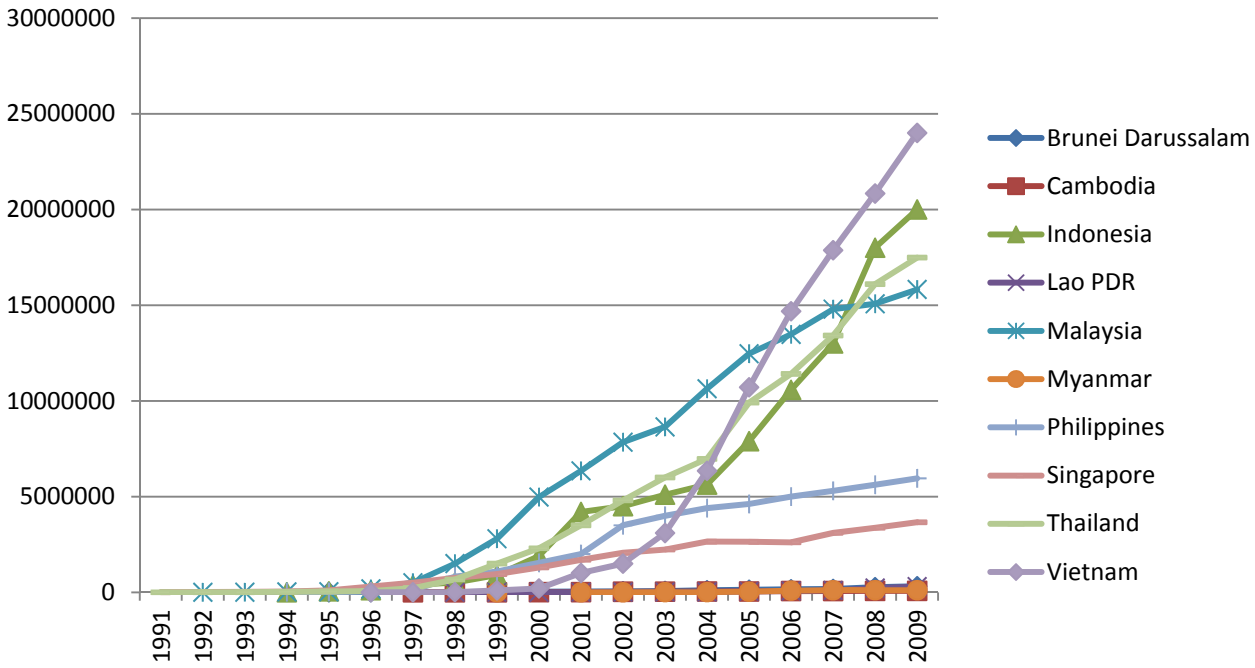


Source: Data from the Economic Development Board, Malaysia

What may be the reasons for the internationally widening knowledge gap in Malaysia during the 1990s? Government policy has been very supportive. The building of the MSC, the founding of new research institutes and universities and various programs assisting innovation in industries have been important steps towards building a knowledge economy. Malaysia has a large highly skilled workforce and a good system of public and private higher education. Part of the problem may be the measurement of the knowledge gap, which is constructed in such a way that local knowledge factors are undervalued and global ones overvalued. As we have argued above, the knowledge gap is not given, but is constructed by governments and experts. If the comparative frame of our analysis is changed and we compare Malaysia to its fellow members of ASEAN, the picture changes dramatically. Knowledge gap indicators show that Malaysia's knowledge strategy has paid off and Malaysia is moving ahead of all other ASEAN states. The knowledge gap is widening, but in favour of Malaysia. Two indicators are used to show the widening Knowledge gap between Malaysia and the other ASEAN countries.

Diagram 5

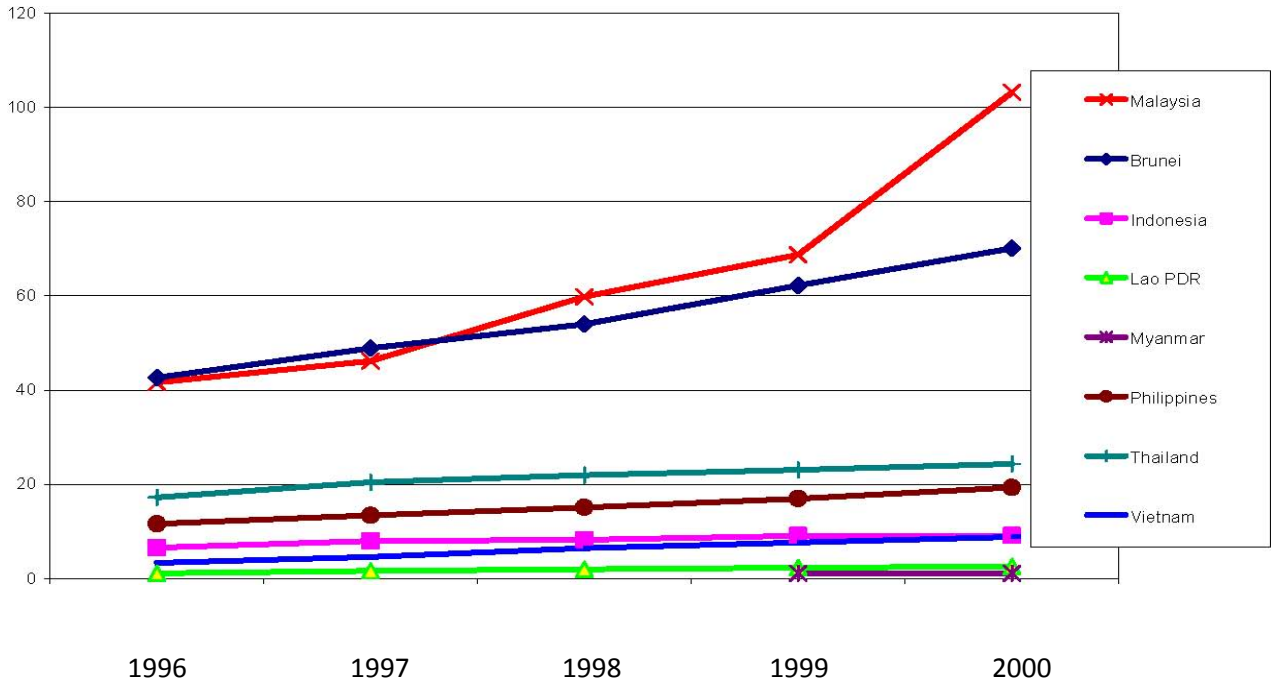
ASEAN Digital Gap: Internet Users 1991-2009



SOURCE: International Telecommunication Union, World Telecommunication/ICT Development Report and World Bank estimates (http://data.worldbank.org/indicator/IT.NET.USER)

Diagram 6

Personal Computers per 1000 Population, ASEAN 1996-2000



Source: Development Data Group, World Bank 2002 and Third Malaysia Perspective Plan, various tables.

3.3. Creating Local Knowledge by Closing the Digital Divide: Brazil and Singapore

The Brazilian government has invested heavily in developing ICT and a local knowledge base. As a result the output of locally produced scientific articles rose by almost 500% during 1980 to 2000. The country could move up to a leading position in Latin America, where it accounts for over 40% of all scientific papers indexed in a major data bank (Motti 2000).

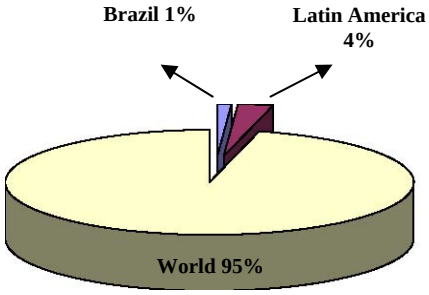


Diagram 7

Local Knowledge: Biological and Medical Research Publications, originating from Brazil and Latin America, 2000 (% of papers in a data bank). Source: (Motti 2000)

Small countries with no or only limited natural resources have to rely on knowledge as a major asset for development. Singapore launched its policies to close the digital divide and develop a knowledge-based economy in 1992. By now Singapore has a very well developed ICT knowledge infrastructure in terms of ICT, research institutes and knowledge workers (Toh, Tang et al. 2002).Considerable research is being conducted by scientists and researchers in Singaporean institutions of higher learning and research centres especially in the areas of biotechnology and the life sciences which the Singapore government is promoting in its bid to stay economically competitive in the knowledge-based economy (Singapore Economic Development Board 1999). Universities strive for recognition as world class research centres, and government research institutions are set up to carry out cutting-edge applied research. If we look at local knowledge production in terms of the level of patenting activities, we will see a 34% increase in the number of patents applied for in Singapore between 1999 and 2000 alone (A*Star 2002). The numbers of patents applied in Singapore reached its highest peak in 2006 with 2,036 applications, the number has decrease to 1,581 in 2008(Agency for Science, Technology and Research, Singapore 2010). There was also a steep increase of papers published by Singaporeans in international journals. Local social science output accounted for more than half of indexed documents on Singapore produced world-wide (Evers and Gerke 2003).

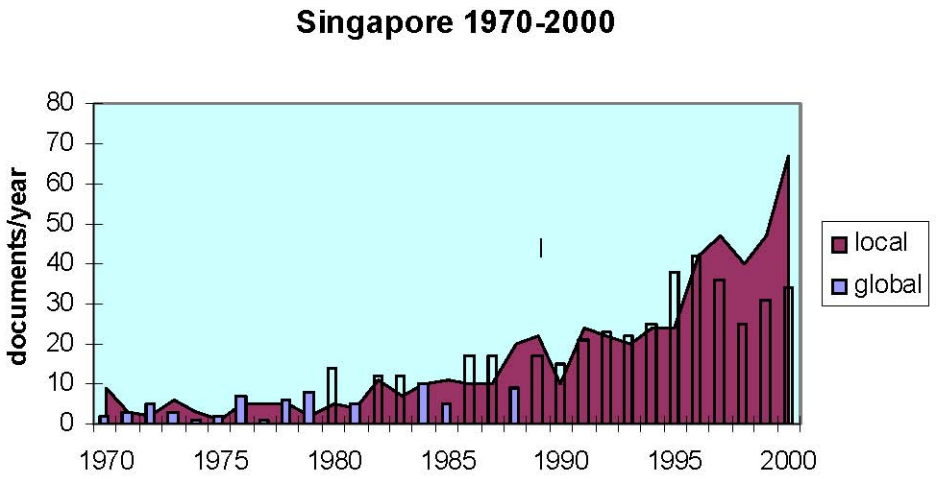


Diagram 8

Local and Global Social Science Production on Singapore, 1970-2000

Source: Sociological Abstracts 1970-2000 (Evers and Gerke 2003, see also Evers and Gerke 2012)

4. Conclusions

Knowledge has been widely recognised by economist as the most important factor of production in a "new economy". The production and utilisation of knowledge is therefore essential for development. Some countries, Malaysia among others, have embarked on an ambitious plan to use knowledge as a base for economic development, by-passing earlier stages of industrialisation. Some commentators have, in contrast, asserted "that it is doubtful that the knowledge revolution will let developing countries leapfrog to higher levels of development" as "the knowledge economy will actually expand the gap between rich and poor" (Persaud 2001).

We have argued that the digital divide and the knowledge gap are not natural phenomena, but are constructed by experts and organisations. Depending on the indicators and the areas they use for comparison, different conclusion can be drawn. It can be argued that knowledge gaps are a precondition to development and innovation, and that a knowledge gap will always be found between and within countries. As is the case with any unequal distribution of resources, development ethics and human rights issues have to be considered. The right to education and information should be safeguarded. A global standardisation or total commercialisation of knowledge under the guise of "relevance" is counterproductive to development. Drawing on various sources and data-sets we have shown that the global knowledge gap is widening even in relation to those countries, whose governments have embarked on vigorous programs of supporting a knowledge-based economy? Devaluation of local knowledge by globally operating experts as well as marketing strategies of large corporations are as much responsible for the widening knowledge gap as other factors of global development and governance. A comparison within world regions or with comparable countries will, however, reveals the competitive advantage that can be gained by high investments in ICT combined with local knowledge production and dissemination.

5. References

A*Star (2002). National Survey of R&D in Singapore 2001. Singapore, Agency for Science, Technology and Research (A*Star).

Antweiler, C. (1998). "Local Knowledge and Local Knowing." Anthropos **93**: 469-494.

Baruch, Y. (2001). "Global or North American? A Geographical Based Comparative Analysis of Publications in Top Management Journals." International Journal of Cross Cultural Management **1**(1): 109-126.

Beck, U., A. Giddens, et al. (1994). Reflexive Modernization. Politics, Tradition and Aesthetics in the Modern Social Order. Cambridge, Polity Press.

Braga, C. A. P. (1998). Inclusion or Exclusion. http://www.unesco.org/courier/1998_12/uk/dossier/txt21.htm.

Cohen, W. M. and D. A. Levinthal (1990). "Innovation and Learning: The Two Faces of R&D." The Economic Journal **99**: 569-596.

Dasgupta, S., S. V. Lall, et al. (2001). Policy Reform, Economic Growth, and the Digital Divide:An Econometric Analysis. Wasington, D.C., World Bank Working Paper No. 2567.

Economist (1999). Measuring intangible assets. Eonomist, 12 June 1999**:** 72-74.

Evers, H.-D. (2000). "Globalisation, Local Knowledge, and the Growth of Ignorance: The Epistemic Construction of Reality." Southeast Asian Journal of Social Science 28(1): 13-22.

Evers, H.-D. (2003). "Transition towards a Knowledge Society: Malaysia and Indonesia in Comparative Perspective." Comparative Sociology **2**(2): 355-373.

Evers, H.-D. and S. Gerke (1997). "Global Market Cultures and the Construction of Modernity in Southeast Asia." Thesis Eleven **50**: 1-14.

Evers, H.-D. and S. Gerke (2003). Local and Global Knowledge: Social Science Research on Southeast Asia. Southeast Asian Studies Working Paper No. 18. Bonn, Department of Southeast Asian Studies, University of Bonn.

Evers, H.-D. and S. Gerke (2012). “Globalisation of Social Science Research on Southeast Asia”, in Z. Ibrahim (ed.), Social Science and Knowledge in a Globalising World. Kajang: Malaysian Social Science Association, pp. 103-116.

Evers, H.-D., S. Gerke, and T. Menkhoff. 2010. "Knowledge Clusters and Knowledge Hubs: Designing Epistemic Landscapes for Development." *Journal of Knowledge Management* 14:678 - 689.

Gerke, S. (2000). Global Lifestyles under Local Conditions: The New Indonesian Middle Class. Consumption in Asia. Lifestyles and Indentities. B.-H. Chua. London and New York, Routledge**:** 135-158.

Gerke, S. and H.-D. Evers (2001). Hochschulen in Indonesien. Bonn, Department of Southeast Asian Studies, University of Bonn.

Ishak, S. (2000). "Economic Growth and Income Inequality in Malaysia, 1975-1995." Journal of the Asia Pacific Economy **5**(1-2): 112-124.

Knorr-Cetina, K. (1999). Epistemic Cultures: How the Sciences Make Knowledge. Cambridge, Harvard University Press.

Liebenstein, G. v. (2000). Interfacing Global and Indigenous Knowledge: Towards an Indigenous Knowledge Information System. Sixth UNESCO-ACEID International Conference on Education, 12-15 December 2000, Bangkok, Thailand.

Menkhoff, Thomas, Hans-Dieter Evers, and Yue Wah Chay (Eds.). 2010. *Governing and Managing Knowledge in Asia, 2nd revised edition*. New Jersey, Singapore and London: World Scientific Publishing.

Menkhoff, Thomas , Hans-Dieter Evers, Yue Wah Chay, and Eng Fong Pang (Eds.). 2011. *Beyond the Knowledge Trap: Developing Asia's Knowledge-Based Economies*. New Jersey: World Scientific.

Motti, E. (2000). "The Knowledge Economy and Health in Brazil (editorial)." Eurotrials (March): 1-4.

OECD (2001). Understanding the Digital Divide. Paris, OECD. OECD (2002). Measuring the Information Economy. Paris, OECD: www.oecd.org/sti/measuring-infoeconomy.

Oxfam (2001). Intellectual Property and the Knowledge Gap. Oxfam Discussion Paper 12/01. Persaud, A. (2001). "The Knowledge Gap." Foreign Affairs **80**(2): 107-117. Petrella, R. (2002). The principal economic challenges presented by current globalisation.

Document Attac (http://attac.org/).

Toh, M. H., H. C. Tang, et al. (2002). Mapping Singapore's Knowledge-Based Economy. Economic Survey of Singapore (Third Quarter 2002). Singapore**:** 56-75. Tomforde, M. (2003). "The Global in the Local: Contested Resource-use Systems of the

Karen and Hmong in Northern Thailand." Journal of Southeast Asian Studies **34**(2): 347-360. UNESCO

(2000). Facts and Figures. Paris, UNESCO Institute for Statistics.

Warschauer, M. (2003). Technology and Social Inclusion. Rethinking the Digital Divide. Cambridge, Mass., MIT Press. World Bank (1999). World Development Report 1998-99: Knowledge for Development. New York, Oxford University Press