Closing the Digital Divide: Southeast Asia's Path towards a Knowledge Society

Paper delivered at the Centre for East and South-East Asian Studies public lecture series "Focus Asia", 25-27 May, 2004

Hans-Dieter Evers and Solvay Gerke*

Working Paper No 5

2004

Centre for East and South-East Asian Studies

Lund University, Sweden

www.ace.lu.se

* Hans-Dieter Evers is Professor and Director, Center for Development Research (ZEF), University of Bonn. Solvay Gerke is Professor of Southeast Asian Studies, University of Bonn

WORKING PAPERS IN CONTEMPORARY ASIAN STUDIES

General editor: Professor Roger Greatrex
Assistant editor: Nina Brand

Publications in this series:

1. Is the world Ready for a Coherent ASEAN+3? / Cesar de Prado Yepes / isbn 91-975093-0-2
2. Renegotiating Gender and Power: Women's Organizations and Networks in Politics – The China Women Mayors' Association / Qi Wang / isbn 91-975093-1-0
3. Re-evaluating Preventive Diplomacy in Southeast Asia / J. Michael Tivayanond / isbn 91-975093-2-9
4. The Role of Law in Contemporary Indonesia / Mason C. Hoadley / ISBN 91-975093-3-7
5. Closing the Digital Divide: Southeast Asia's Path towards a Knowledge Society / Hans-Dieter Evers and Solvay Gerke / ISBN 91-975093-4-5

This working paper is published by the Centre for East and South-East Asian Studies, Lund University. The views expressed herein, however, are those of the author, and do not represent any official view of the Centre or its staff.

ISSN: 1652-4128
ISBN: ISBN 91-975093-4-5
Layout: Petra Francke, Lund University, Information Office
Printed in Sweden by Lund University, Media-Tryck, 2004
© Hans-Dieter Evers and Solvay Gerke

Abstract

The production, dissemination and utilisation 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 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.

Some Southeast Asian 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 industrialisation. 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 ASEAN and developed countries will be closed completely at least narrowing the gap at the lower end should be targeted.

Statistical data on the global absorption of locally produced knowledge are used to measure the way towards a knowledge society. Singapore, Brunei, Malaysia and the Philippines have relatively high local social science output, whereas Indonesia, Cambodia, Vietnam, Myanmar and Laos have low output rates. We diagnose four different paths from 1970 to 2000: Indonesia shows a stable high level of dependence, Malaysia and the Philippines are increasing local output but also increasing dependence, whereas Singapore is increasing output with decreasing dependence on global social science knowledge.

Contents

Defining the Digital Divide 1

Knowledge Governance 1

The Production of New Knowledge and the Growth of ICT 2

The Growth of Ignorance and the Destruction of Local Knowledge 5

The Digital Divide 6

The Widening Knowledge Gap 7

The Cultural Construction of the Digital Divide and the Knowledge Gap 8

Closing the Digital Divide and Developing Local Knowledge 9

Southeast Asian Visions of Localising Global Knowledge 9

The Digital Divide between Southeast Asian and European Countries 11

Closing the Internal Digital Divide: Malaysia 14

Creating Local Knowledge by Closing the Digital Divide: Singapore 17

Local and Global Knowledge on Southeast Asia 18

Social Science Knowledge 18

Local Knowledge of Southeast Asia 19

Regional Differences in Knowledge Production 20

The Development of Social Science Knowledge 22

Conclusions 26

References 27

Local Knowledge and the Digital Divide

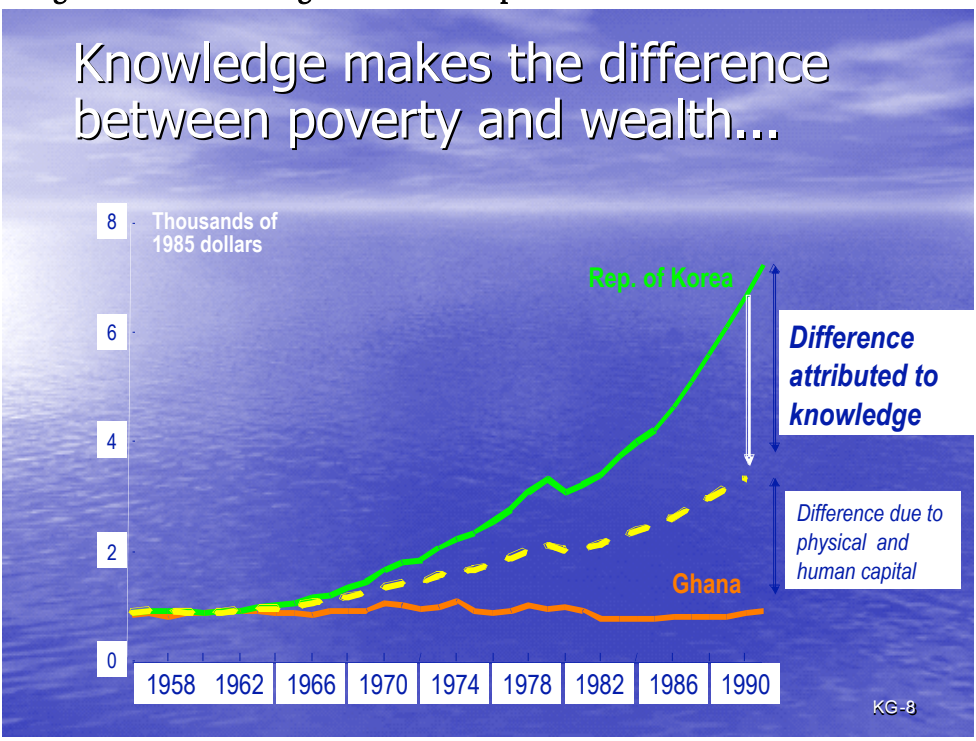
Defining the Digital Divide

Knowledge Governance

Land, labour and capital are, in classical economics, regarded as the three "factors of production". Development policy has been very much oriented towards improving the total and relative allocation of resources to these factors. Agricultural development, income generating activities and rural credit schemes are just some examples of a rich arsenal of development programmes that can be directly related to the conventual's wisdom that inputs into factors of production produce development. More recently a new factor of production has been added to the development debate; a factor that supposedly has overtaken the other factors in importance: *Knowledge* is now regarded as the main driving force of innovation and development.

A by now famous example is cited in the World Development Report of 1998/98. Ghana and the Republic of Korea started of with almost the same GNP/cap in 1960. Thirty years later the Korean GNP/cap had risen more than six times, the Ghanaian was still hovering at the same level (in 1985 prices). Half the gap could be explained in terms of the 'traditional' factor inputs, the other half, according to World Bank experts, was attributed to 'knowledge' as a factor of production (World Bank 1999).

Diagram 1: Knowledge and Development



Source: World Development Report 1998/99

Knowledge has since been identified as one of the major factors, if not THE crucial factor of development. The idea is, indeed, fascinating. If natural resources are scarce, if FDI does not flow into the country as expected, if land is not fertile or scarce, knowledge can be introduced and put to effective use. In the almost poetic words of the World Bank, "Knowledge is like light. Weightless and tangible, it can easily travel the world, enlightening the lives of people everywhere." (World Bank 1999:1). Knowledge increasingly explains the gap between developed and underdeveloped, between poor and rich countries, between Singapore and Laos or Malaysia and Indonesia. Several Southeast Asian countries have thus planned and carried out strategies to bridge the digital divide, to close the knowledge gap between them and the OECD countries. They invented a framework to produce and utilize knowledge for economic and social development and follow an active policy of knowledge governance.

The Production of New Knowledge and the Growth of ICT

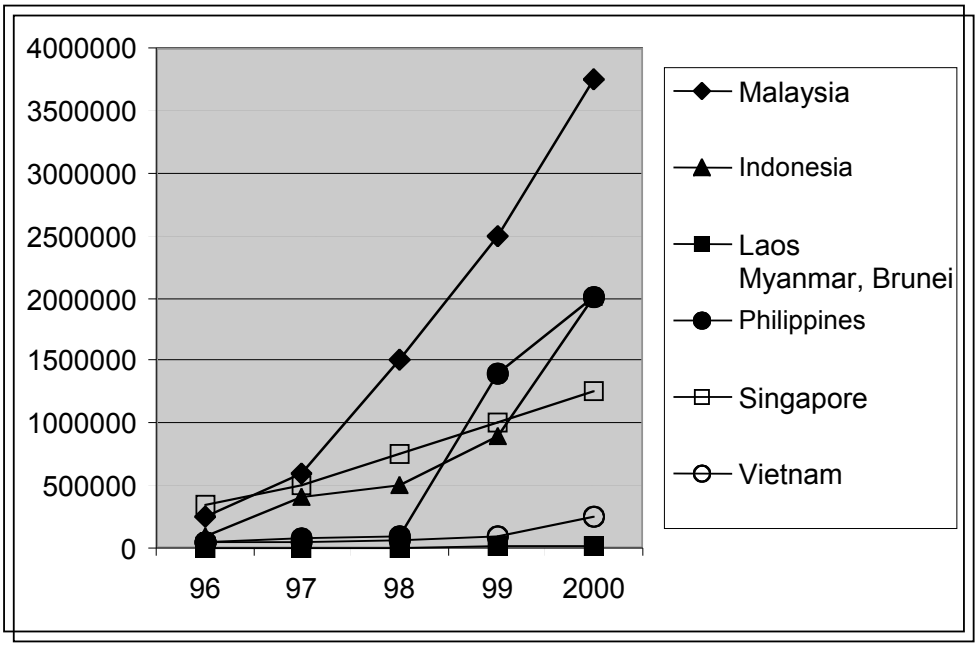
New knowledge is produced at an unprecedented pace. The growth of scientific knowledge production, supported by advances in information and

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, monopolised or shared throughout the industrialised countries, but also increasingly in parts of Asia. In a recent survey (of the Economic Intelligence Unit of the Economist, 18 April 2004) the 'E-readiness' of individual countries is measured in terms of their ICT infrastructure and the popular acceptance of digital equipment. Singapore is the 'shooting star' of knowledge governance: It improved its position on the ranking order from rank 12 to rank 7 close to Sweden, Denmark and the UK between 2000 and 2003.

Knowledge is increasing with every patent granted and every paper, journal article or book written on a particular subject. If we consider only those articles that have been accepted in international journals and have been officially recognised or 'authorised' 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 Southeast Asian 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 globalisation 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 in Malaysia, Indonesia and elsewhere (Gerke 2000) stimulates local knowledge production on society and culture.

Information and communication technology (ICT) is also growing fast, though at different rates. In 2001 in Northern Europe and North America between 40 to 60% of all households had internet access (OECD 2002). In some countries, like the UK or Portugal the number of internet subscribers more than doubled between 2000 and 2001. The use of handphones has also increased substantially world wide, particularly in some of the Asian countries.

Diagram 2:
Use of the Internet, ASEAN 1996-2000 (total number of internet subscribers)



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 East and Southeast Asia. About 30% of R&D expenditure worldwide is spent in the European Union, Asia and the United States respectively, a small proportion in the rest of the world (UNESCO 2000). 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 then Indonesian nationals or scholars attached to its local institutions (Evers 2003). This raises the issue of how far 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.

The Growth of Ignorance and the Destruction of Local Knowledge

The growth of knowledge also implies the growth of ignorance (Evers and Menkhoff 2004). 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 are 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. Digitalised global knowledge therefore tends to spread much faster than local knowledge.

The Digital Divide

The digital divide refers to the uneven distribution of information and communication technology (ICT) between and within nations. 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 world wide. 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.

Usually the concept of a "digital divide" is used to relate to the technological aspect of the knowledge gap. "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 development 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. Singapore and Malaysia have taken the lead in arguing the case in Southeast Asia and other ASEAN nations, like Thailand and Vietnam are following.

The Widening Knowledge Gap

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 internet users has risen from 40 thousand to 3.7 million from 1995 to the year 2000 and the number of computers has risen from 37.3 per thousand people to 103.1 during the same period. For comparison: in the whole region (East Asia and the Pacific) the ratio was 21,7 people in 2000, putting Malaysia far above the average. (Source: Development Data Group, World Bank). 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 are 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. Statistical indicators show that the global knowledge gap has been widening. This holds true for comparisons within as well as between countries and within and between ASEAN countries as well.

The knowledge gap is deliberately or inadvertently widened by the monopolisation of the application of knowledge through patents and the insistence on securing intellectual property rights by powerful organisations, 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 multi billion dollar business for the OECD countries, which capitalise 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 industrialised 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 industrialised 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.

We shall now have a closer look at the knowledge gap and the digital divide and its creation.

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 analyse its meaning.

First of all we have to recognise 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 specialisation. 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 industrialised 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 industrialised knowledge economies and by processes in powerful organisations like the big transnational corporations, government departments, UNESCO, the World Bank and other large organisations. They determine what knowledge is essential and what is not. They construct the knowledge gap and the digital divide.

Closing the Digital Divide and Developing Local Knowledge

Southeast Asian Visions of Localising Global Knowledge

Most ASEAN leaders and governments have developed visions of developing a knowledge-based economy and a knowledge society as a way to achieve parity with Western nations. These visions are invariably directed at using global knowledge to achieve economic progress.

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 Malaysia, or at least its 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 K-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).

Indonesia has followed suit where it has also become fashionable to pronounce "visions and missions" as a first step in the national and local planning process. "Terwujudnya Masyarakat Telematika Nusantara Berbasis Pengetahuan di Tahun 2020" ("Creating a Nusantara Telematic Society by the Year 2020") is the vision statement of the KTIN (Kerangka Teknologi Informasi Nasional), the National Framework for Information Technology. The document is broad-based, extending from support for e-business to good governance and e-democracy. This vision and the appended action plan are directed, however, at information technology (TI) and not at knowledge per se, on which information technology has to be based. Little has been done so far, to put this plan into action.

Singapore launched it's start into a knowledge society in 1992. By now Singapore has a very well developed knowledge infrastructure in terms of ICT, research institutes and knowledge workforce (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, like NUS, NTU and SMU strive for recognition as world class research centres, and institutions like A*Star 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 in Singapore between 1999 and 2000 alone (A*Star 2002) and also, as discussed below, a steep increase of papers published by Singaporeans in international journals..

The emphasis on impression management, like changing the names of statutory boards to make them more appealing to an international audience, the invention of visions and missions, the use of culture-bound place names like Cyberjaya indicate that an attempt is made to create an epistemic culture (Knorr-Cetina 1999; Evers 2000), a culture of knowledge production. The creation of a knowledge-based economy is therefore not just ICT driven, but has developed into a social and cultural process as well. Social science research is part of this process. It is significant as it creates knowledge on a particular society and its processes of change and development.

The Digital Divide between Southeast Asian and European Countries

Singapore and Malaysia 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, 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. 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 2000.

Table 1
Knowledge Development Index, 2000
Indonesia, Malaysia, South Korea, Germany, Netherlands Compared

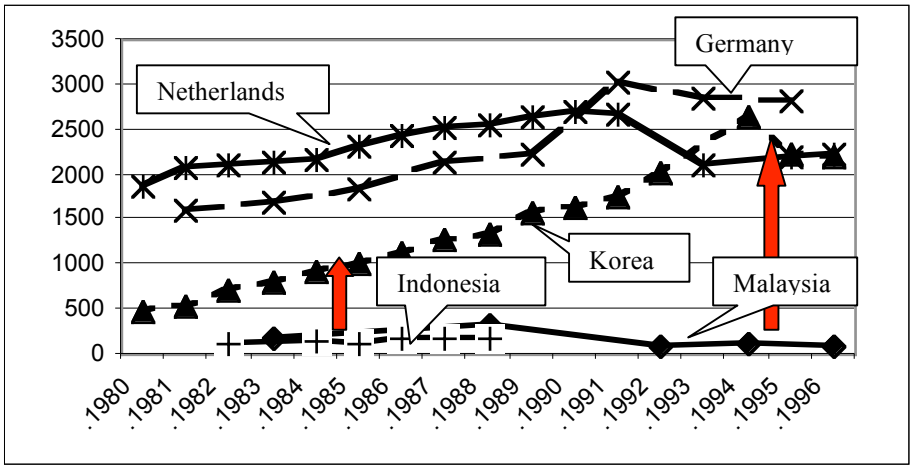
Country	Know-ledge Index Score	Know-ledge Index	Computer Infra-structure	Info-struc-ture	Edu-cation and Training	R&D and Techno-logy
Indonesia	1,518	21	21	20	21	21
Malaysia	2,645	17	17	17	17	16
South Korea	4,053	15	16	11	16	13
Germany	4,615	12	12	13	12	7
Netherlands	4,777	10	10	9	13	8

Source: Third Outline Perspective Plan, Malaysia 2001, Chapter 5, pp.131-130. For a calculation of the index see p.129 of the plan

Malaysia is doing well on some ICT indicators, like mobile phones per 1,000 people. According to the Malaysian Communications and Multimedia Commission in March 2001 there were 254 mobile phone subscribers/1000 population in Malaysia, i.e. more mobile phones per inhabitant in Malaysia than in Germany. 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 knowledge gap, in fact, is widening.

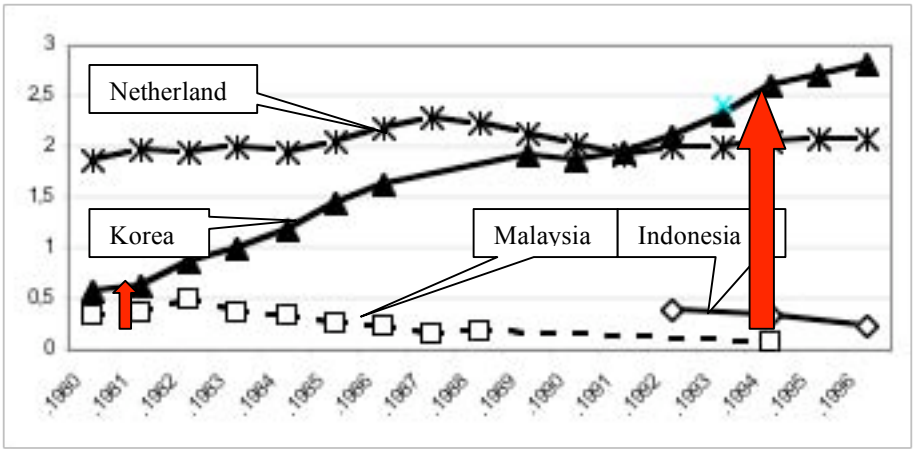
Diagram 3:
Researchers per Million Inhabitants, 1980-1996:
Malaysia, Indonesia, Korea, Germany, Netherlands



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

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 (see the following diagram).

Diagram 4:
Expenditure on R&D as Percentage of GDP, 1990-1997



Source: (Evers 2003) based on UNESCO Statistics

The declining rate of relative R&D expenditure and the number of researchers have, among other factors, reduced Malaysia's competitiveness in relation to other countries.

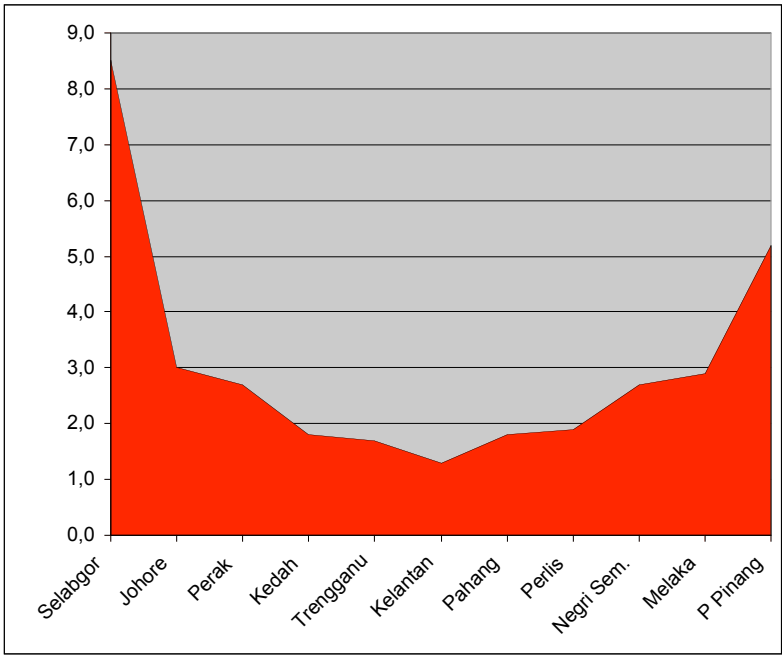
Closing the Internal Digital Divide: Malaysia

The attempts at closing the digital gap have been slowed down by the Asian financial crisis in the 199os. 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 5:
The Digital Divide among States, Malaysia 2000 (internet subscribers per 1000 population)

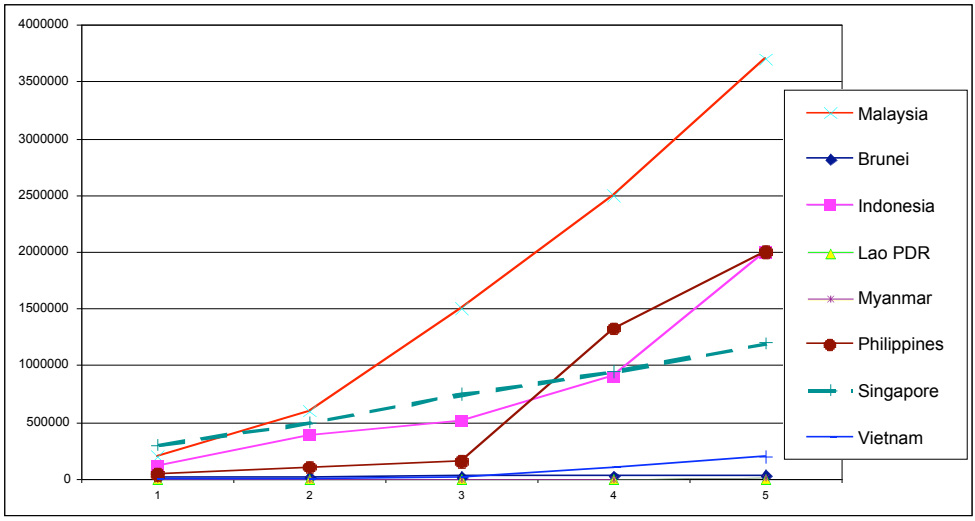


Source: Data from the Economic Development Board, Malaysia

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 Multimedia Super Corridor (MSC), the founding of new research institutes and universities and various programmes 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.

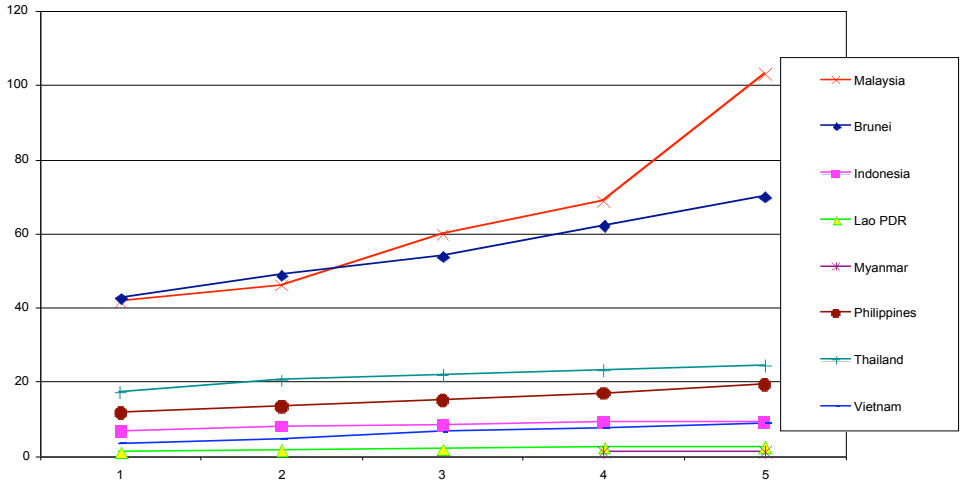
Two indicators are used to show the widening Knowledge gap between Malaysia and the other ASEAN countries.

Diagram 6:
ASEAN Digital Gap: Internet Users 1996-2000



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

Diagram 7:
Personal Computers per 1000 Population, ASEAN 1996-2000

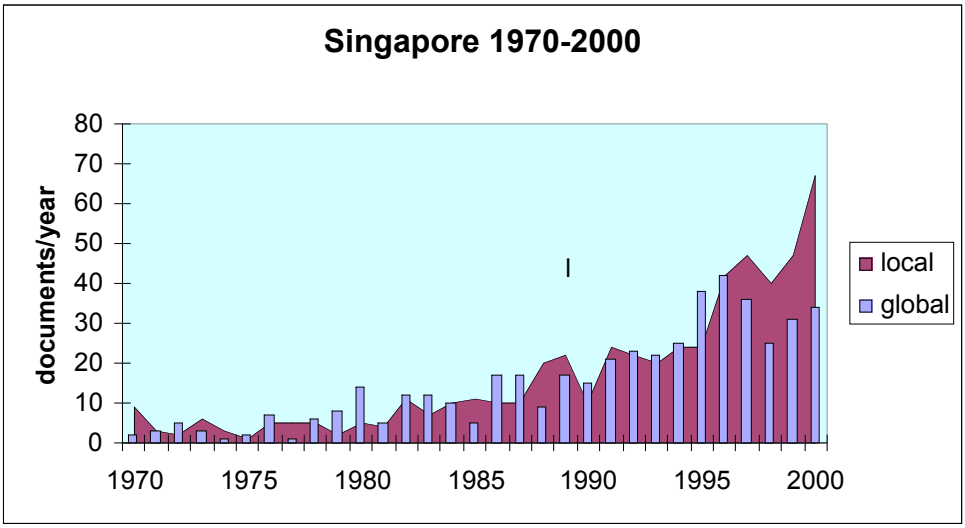


Source: Development Data Group, World Bank 2002 and Third Malaysia Perspective Plan, various tables.

Creating Local Knowledge by Closing the Digital Divide: Singapore

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). There was also a steep increase of papers published by Singaporeans in international journals. Local social science output accounted substantially more than indexed documents on Singapore produced elsewhere (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)

Local and Global Knowledge on Southeast Asia

Social Science Knowledge

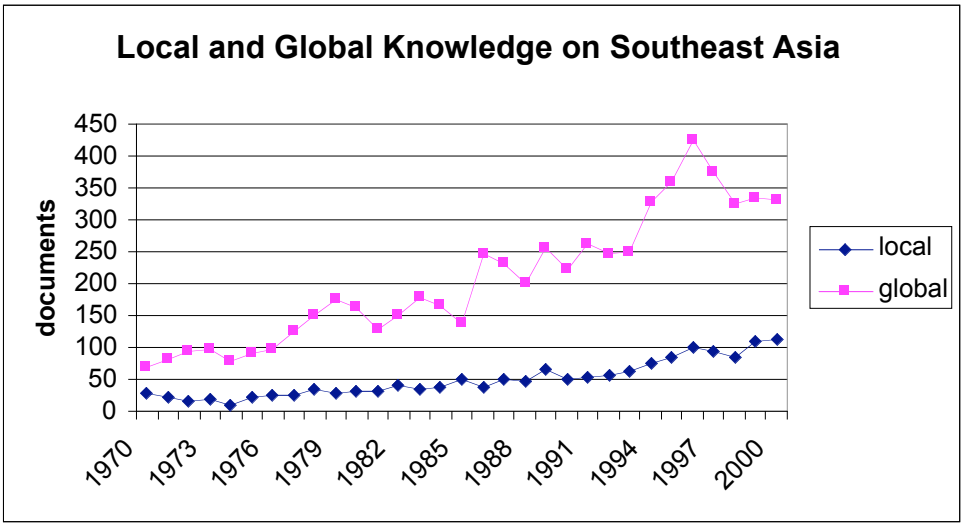
Social Science research is part of an epistemic culture. As an illustration on how the epistemic landscape of Southeast Asia is structured we shall present some data on social science research on Southeast Asia as it is carried out under global conditions. We shall then focus on research on the area done by Southeast Asians themselves.

Social science knowledge differs from other fields of knowledge in so far as it constructs an image of society and social processes. Up to which extend this image reflects reality or is a 'social fact' of its own has been debated by social scientists since Emil Durkheim. The same is true of the question how far concepts and theories used for the construction of society have an impact on social action and eventually on the structure of future societies. Thinking and writing on one's own society is part of a 'reflexive modernization' which implies the frequent construction, de-construction and reconstruction of images of society. It is essential, how far this process of reflection on social processes and structures happens within a society or elsewhere. Outer-directed reflection creates dependent modernity or cultural dependency or 'dependent cultural globalisation'. Orientalism, as analysed by Edward Said or the 'Myth of the Lazy Native' explained by Syed Hussein Alatas are descriptions of dependent cultural globalisation (Alatas 1977; Said 1978). But how can we analyse, let alone measure the degree of 'dependent or independent modernity and globalisation'?

The measurement of knowledge production is beset by many problems especially when knowledge is in its tacit or secret form – in this case we will not be able to measure it as it is not published and made accessible to a wider public. In our study we have applied bibliographic measures, i.e. use data stored in selected databanks as a database for our purpose. This entails the intensive search of databases for Social Science (taken as an umbrella of disciplines which include Sociology, Geography, Political Science, Anthropology etc.) such as the Social Science Citation Index and Sociological Abstracts, which have been selected because of their good coverage in terms of social science publications, and current as well as back issues of these publications. Published text, their authors, and their institutional affiliations have been adopted as variables in determining the locus of social science knowledge production. Data from these variables have been tabulated over a 30+ year period (1970 – 2002) which have been analysed in line with the

time-series analysis adopted by Stahl, Leap & Wei to obtain the rate and measures of global and local knowledge production (Stahl, Leap et al. 1988).

Diagram 9:
Global and Local Social Science Research on Southeast Asia, 1970-2000



Source: Sociological Abstracts. The lines depict the total number of documents published each year referring to at least one Southeast Asian country, whose author is writing from a Southeast Asian institution (local knowledge) or from elsewhere worldwide (global knowledge).

Local Knowledge of Southeast Asia

How much knowledge is produced on Southeast Asian societies and cultures, and which proportion of this knowledge is produced locally? The knowledge on Southeast Asian societies is increasing with every journal article or book written on the area. If we consider only those articles that have been accepted in international journals and have been officially recognised or 'authorised' by inclusion into the Sociological Abstracts, we see a steep rise of work on Southeast Asia world wide during the years 1970 and 2002 (see diagram 9). Most of social science articles are still written by foreign scholars, affiliated to universities or research institutions around the globe (Dahm 1975), but our data show that an increasing proportion of these internationally recognised articles are written by Southeast Asian nationals or by scholars, attached to Southeast Asian institutions[1].

[1] We are not yet able to identify foreign nationals, working at local institutions. It remains an open question how far they will do research from a local point of view.

The output of Southeast Asian social scientists has increased considerably over the past four decades. Based on our preliminary data on social science research by Southeast Asian authors, we see that the number of social science articles written by scholars from Southeast Asian countries has more than tripled[2] when comparing the 1970s with the 1990s. This indicates that the epistemic culture of Southeast Asia is quite strong as far as the social sciences are concerned and appears to be increasingly recognised by the global epistemic community of social scientists. There are, however, considerable differences between countries, both in terms of the knowledge available about them and the contribution of local social scientists to that knowledge.

Regional Differences in Knowledge Production

Southeast Asian countries can be divided into two groups, those about which a large global knowledge base exists and those with only limited knowledge resources.

Table 2:
Indicators of Local Knowledge Production and the Global Social Science Knowledge Stock on Southeast Asian Countries 1970 - 2000

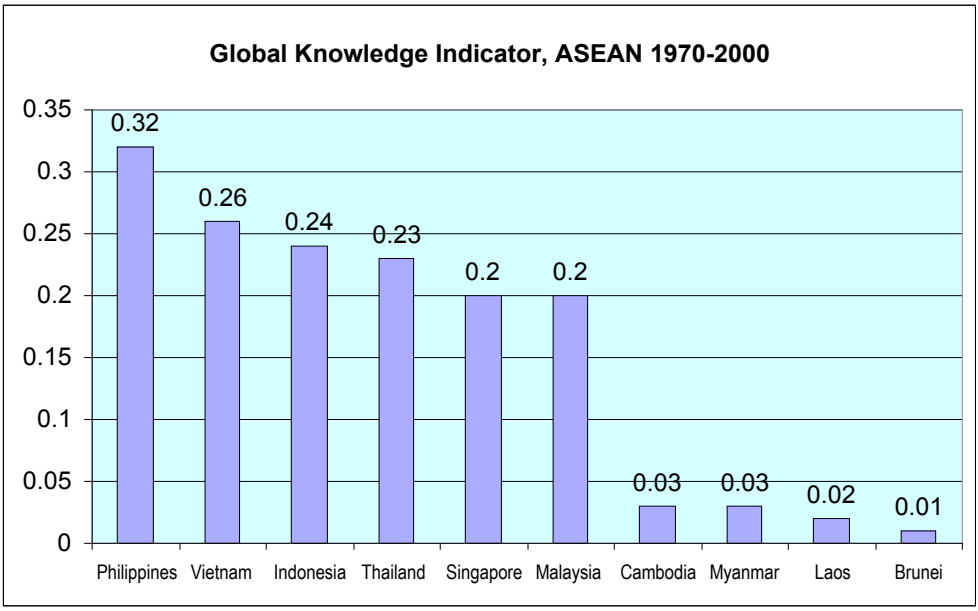
rank		Local K Stock Indicator		rank		Global K-Stock Indicator
1	Singapore	53.5		1	Philippines	0.32
2	Brunei	35.7		2	Vietnam	0.26
3	Malaysia	25.1		3	Indonesia	0.24
4	Philippines	24.1		4	Thailand	0.23
5	Thailand	18.8		5	Singapore	0.20
6	Indonesia	7.1		6	Malaysia	0.20
7	Cambodia	2.9		7	Cambodia	0.03
8	Vietnam	2.4		8	Myanmar	0.03
9	Myanmar	1.9		9	Laos	0.02
10	Laos	0.8		10	Brunei	0.01

The Global Knowledge Stock Indicator (GKSI) measures the volume of social science documents on a particular country in relation to all documents in the data base. It shows the strength of the research interest in different countries. Personal preferences of authors and gatekeepers, like peer reviewers and

[2] From 229 (from 1970 to 1979) to 770 documents (from 1990 to 1999)

editors of journals, officials of funding organisations, international organisations and government agencies have probably had a decisive impact on what social science knowledge is produced and added to the global fund of accessible knowledge. Diagram 10 shows that globally the Philippines are the most researched country in Southeast Asia.

Diagram 10:
Indicator of Global Knowledge Production on all ASEAN Countries 1970-2000

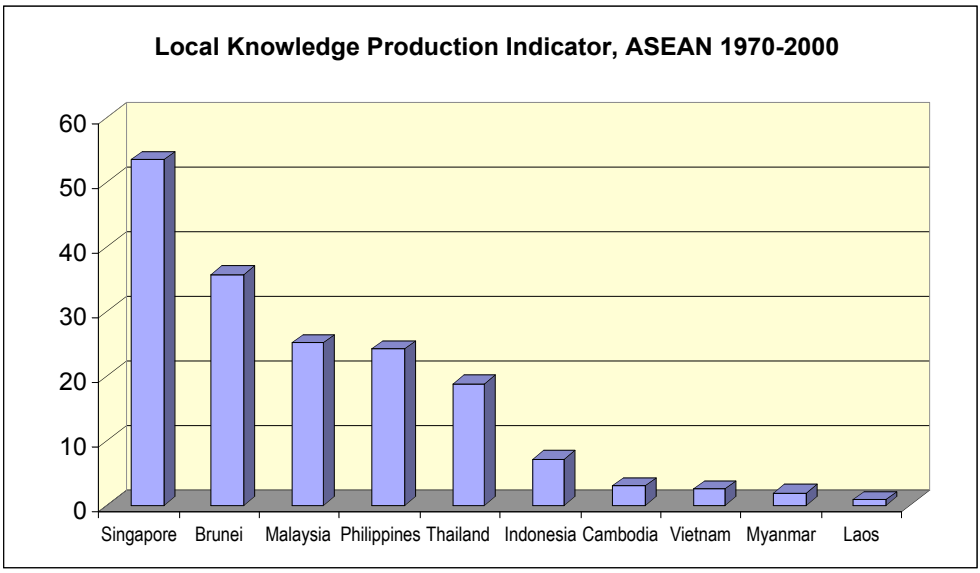


Source: Sociological Abstracts 1970-2000

The Local Knowledge Stock Indicator (LKSI) -locally produced documents as percent of all documents available on a particular ASEAN country- measures the strength of local social science (see diagram 11). There is a knowledge gap between two groups of countries, namely Singapore, Brunei, Malaysia, the Philippines and Thailand in the upper group and Indonesia, Cambodia, Vietnam, Myanmar and Laos in the lower group. It can therefore be said that ASEAN countries are stratified into an upper and a lower knowledge class[3].

[3] There seems to be a high correlation between GNP/pc and the local knowledge indicator, yet data cannot be presented here.

Diagram 11:
Indicator of Local Knowledge Production, all ASEAN Countries 1970-2000

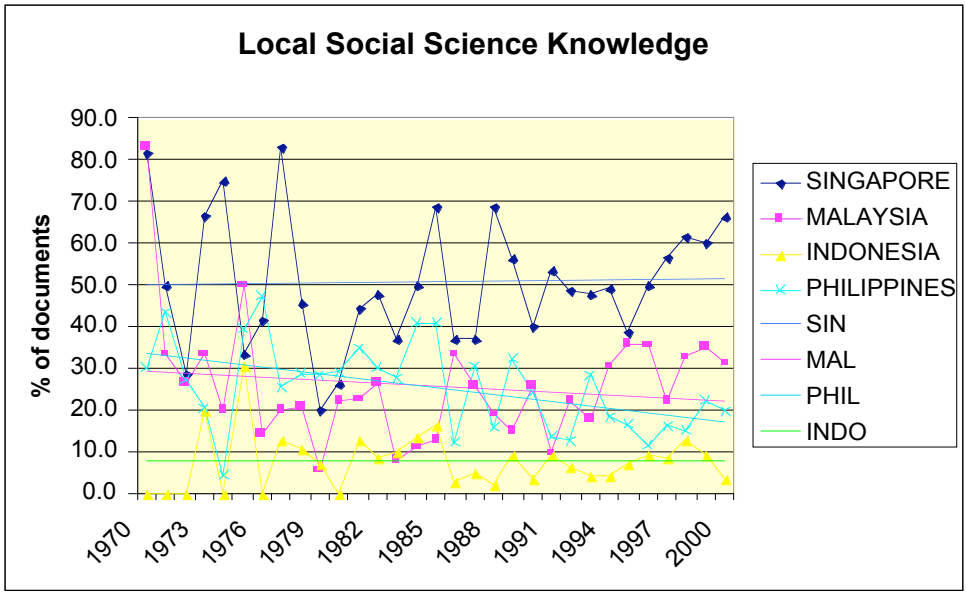


Source: Sociological Abstracts 1970-2000

The Development of Social Science Knowledge

The production of local and global knowledge has varied over time. This may be due to a number of factors which will have to be analysed. Southeast Asian countries have different political systems, have followed different development strategies and have experienced different impact of the financial crisis of the 1990s. A look at the time series of knowledge production between 1970 and 2000 shows different long-term trends.

Diagram 12:
Trends of Local Social Science Knowledge Production on Selected Southeast Asian Countries, 1970-2000



Source: Sociological Abstracts 1970-2000. Trends are shown by bold linear regression lines.

We hypothesise that the higher the percentage of globally produced documents the greater is the dependence on outside sources for the interpretation and construction of ones own society. If social science production is mainly carried out elsewhere the process of "reflexive modernization" is impeded. (Beck, Giddens et al. 1994). Our data do not contain most of the locally published research results and are therefore deliberately biased[4]. But still we may be allowed to argue that a knowledge gap or "knowledge dependence" is either widened or closed. The diagram 12 shows four different paths of local knowledge development. Indonesia has a low but stable output of local knowledge, Malaysia and the Philippines have relatively high but declining local output and Singapore has a high and increasing local knowledge production.

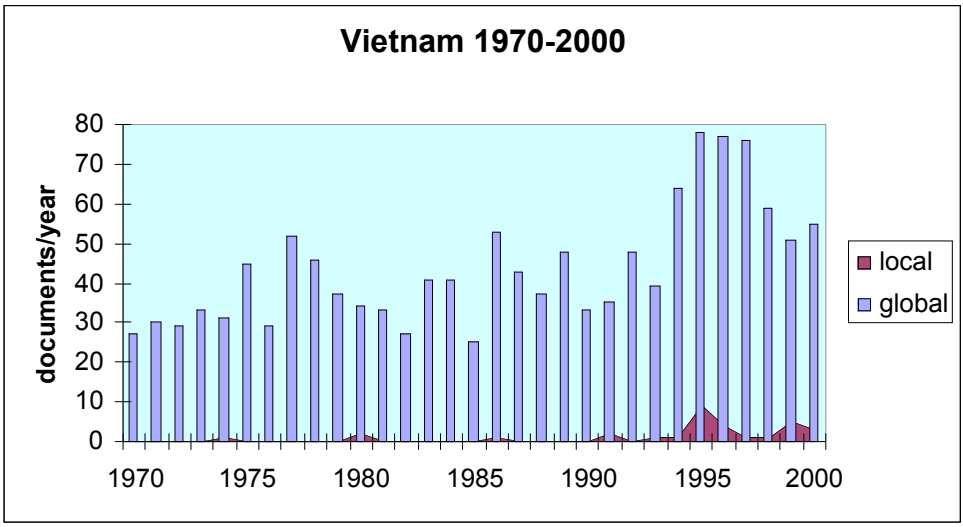
Argued from a global point of view the social science knowledge stock on Indonesia is stable on a high level of dependence on outside knowledge, Malaysia and the Philippines have increased their dependence on foreign sources, whereas Singapore has successfully globalised their social science output. It is, of course, possible that the countries of the lower knowledge

[4] A look through the reading lists of social science courses in Southeast Asian universities shows that mainly international books and journal articles, i.e. "global knowledge" is used as teaching material.

class produce reasonable amounts of local knowledge which is simply not published in internationally recognised journals and therefore not globalised, but the interpretation and construction of their own societies is nevertheless based on this globaly not recognised local knowledge. Therefore the process of reflexive modernisation as stated above would not be impeded and the hypothesis "the higher the percentage of globally produced documents the greater is the dependence on outside sources for the interpretation and construction of ones own society" would be invalid. The fact that only little local knowledge of those countries is globalised does not yet prove that they depend on global knowledge instead in the process of interpreting and constructing their own societies, which essentially is a search of their own identity.

The large differences between ASEAN countries can be exemplified by contrasting Singapore and Vietnam. The global output on Vietnam is much higher than on Singapore, which attracts only limited interest among social scientists, but the local contribution of Vietnamese scholars to global knowledge is still minimal (see diagrams below).

Diagram 13:
Local and Global Social Science Production on Vietnam, 1970-2000 (SA)



Source: Sociological Abstracts 1970-2000

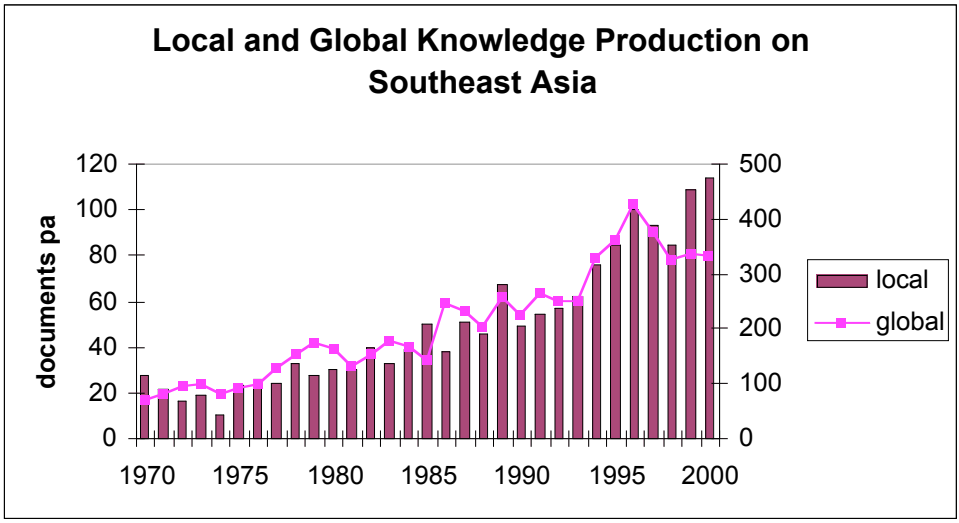
Another contrasting case would be Brunei, about which very little is published each year in international journals, out of which scholars located in Brunei

itself have a fair share. Publications on Laos are also rare, out of which hardly any are produced locally in Laos itself.

The data used in this paper yield rough indicators to diagnose the development of social science production in the form of internationally recognized journal articles. The indicators are rough in the sense that they do not give any clue as to the form and contents of the knowledge contained in the documents, except that they refer in one way or another to a particular Southeast Asian country[5].

To end on an optimistic note: Southeast Asian researchers have at least kept up their internationally recognized production of knowledge at the same pace, at the same yearly rates of increase as outsiders (see diagram 14). The trouble with growth rates is, as the developing world has experienced that those starting from a high plateau gains more: a gap develops. Closing the k-gap will not be easy, but looking at the past five years the future looks promising.

Diagram 14:
Local and Global Knowledge Production on Southeast Asia 1970-2000



Source: Sociological Abstracts 1970-2000. Left scale: locally produced documents, right scale: globally produces documents.

Local knowledge production of Southeast Asian scholars has kept pace with global knowledge production. Percentage increases from year to year have

[5] The scope and contents of Southeast Asian studies has been analysed in Evers, H.-D. (1999). Crisis and Beyond: Theorising Southeast Asia. 4th ASEAN Inter-University Seminar on Social Development, 15-18 June 1999, Prince of Songkla University, Pattani.

been similar. In the past ten years local knowledge production has increased even more than global production. If the trend remains in tact we can assume that Southeast Asia will move forward in the world of social science.

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 and Singapore 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. 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 a vigorous programme 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 ASEAN or with comparable countries will, however, reveal the competitive advantage that can be gained by high investments in ICT combined with local knowledge production and dissemination.

References

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

Alatas, S. H. (1977). The Myth of the Lazy Native. A Study of the Image of the Malays, Filipinos and Javanese from the 16th to the 20th Century and its Function in the Ideology of Colonial Capitalism. London, Frank Cass.

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.

Dahm, B. (1975). Die Südostasienwissenschaft in den USA, in Westeuropa und in der Bundesrepublik Deutschland. Göttingen, Vandenhoeck & Ruprecht.

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.

Evers, H.-D. (1999). Crisis and Beyond: Theorising Southeast Asia. 4th ASEAN Inter-University Seminar on Social Development, 15-18 June 1999, Prince of Songkla University, Pattani.

Evers, H.-D. (2000). Epistemic Cultures: Towards a New Sociology of Knowledge. Bielefeld, Working paper 330, Sociology of Development Research Centre. University of Bielefeld.

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 T. Menkhoff (2004). "Expert Knowledge and the Role of Consultants in an Emerging Knowledge-based Economy." Human Sytems Mangement 23(2).

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.

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

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.

Said, E. W. (1978). Orientalism, Western Conceptions of the Orient. London, Routledge & Kegan Paul.

Stahl, M. J., T. L. Leap, et al. (1988). "Publication in Leading Management Journals as a Measure of Institutional Research Productivity." The Academy of Management Journal 31(3): 707-720.

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.

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.

Authors' address

Prof. Dr. Hans-Dieter Evers, Prof. Dr. Solvay Gerke
Center for Development Research (ZEF), University of Bonn
Walter-Flex-Str. 3
53113 Bonn
Germany

Tel: 0228-734911, 0228-731971
Fax: 0228-731972
E-mail: hdevers@uni-bonn.de
Internet: http://www.uni-bonn.de/~hevers/