

The Asian NII Experience

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Introduction

National Information Infrastructure (NII) policy has become a center of intense debate. The debate is conducted between those who claim that national policy should serve only to promote the private sector in to take the lead (U.S. Information Infrastructure Task Force 1993; King and Kraemer 1995; The World Bank 1993) and those who argue that concerted national government intervention can oversee rapid progress (Goh 1996; Korean Ministry of Information and Communication 1995; Kraemer and Dedrick 1994). In other words, government has a role to play in setting a strategic industrial policy. In the case of an NII platform, one of the questions is whether an NII policy should encompass national Internet policy and, if so, where within an NII program Internet policy should lie. There is a second issue concerning development of the Internet from a national policy perspective: where government intervention is recommended, policy choices are usually portrayed as focusing on *either* production *or* use, without seeing the issues as interrelated. Such a policy perspective runs the risk of placing infrastructure development (focused on the dominant telcos) in opposition to the entrepreneurs initiating a fledgling Internet service.

As other writings have shown, Asian governments have paid special attention to the expansion of information services in their countries (Ure [ed.] 1995; Petrazzini and Lovelock 1996). This special attention has been reflected in innovative policies aimed at (1) attracting international capital to finance infrastructure expansion, (2) rapidly improving the availability of both infrastructure and services, and (3) maintaining state control over *what* is provided and by *whom* to whom. The new policies, although framed within the broader global trend toward increased competition and use of private capital, thus have a unique Asian twist, as the state has attempted to retain management of the direction of reform.

In this paper I look at what these new policies have meant for the provision of Internet access in the region and, specifically, what the relation is between the NII programs and Internet policies of a number of selected Asian countries: China, Vietnam, Indonesia, Malaysia, Thailand, and India. The first section of the paper sets out the NII policy focus and the distinctive nature of the Asian development agenda. The second section looks briefly at the role of the Internet as a part of the overall NII program. The third section of the paper contrasts the NII and Internet programs of selected

Asian countries.

What is the NII?

The NII (or "information superhighway") is a term coined by the U.S. government to describe the convergence of telecommunications, information technologies, and the entertainment industry [1]. It is this convergence of discrete information industries into one that is seen to be the essential step toward the realization of an NII. The NII is not, however, one monolithic network--quite the opposite. It is a series of components, including the collection of public and private high-speed, interactive, narrow and broadband networks, which in some cases already exist and in many cases have yet to be built. It is the satellite, terrestrial, and wireless "conduits" that deliver content to homes, businesses, and other public and private institutions. It is the information and content that flow over the infrastructure, whether in the form of databases, the written word, a film, a piece of music, a sound recording, a picture, or computer software. It is the computers, televisions, telephones, radios, and other products that people switch on to access the infrastructure. It is the people who provide, manage, and generate new information and those that will help others do the same. And it is the customers.

As such, the NII is an all-encompassing concept put forward to link economic and social development with new networking technologies. Thus far, at the policy level the NII has been first and foremost a statement of *intent*: the intent to coordinate across what have been previously disparate industries in order to create (or maintain) a competitive economic framework. Principally, these industries are the telecommunications, broadcast, and computer industries. All are moving inexorably toward providing interconnected digital services to government, business, and individuals within the home. All information infrastructure providers as well as information service providers are looking to participate in the integration of the computer, telephone, and television networks and appliances. These three industries--telecommunications, computers, and broadcast--have very different histories, and, as a result, have had, until recently, substantially different industrial structures (see table 1) [2].

Table 1. NII's converging industries

	Ownership	Market Structure	Market Scope
Telecoms	Public	Regulated	Mixed
Computers	Private	Unregulated	International
Broadcast	Mixed	Regulated	Domestic

The public switched telephone network has traditionally been in the hands of the state, or of a regulated private national monopoly. Until very recently, it has been a highly regulated industry, but interconnection between monopoly providers and a set of common standards has meant that the telephone system itself has become fairly ubiquitous. The computer industry has essentially been part of the private sector, although the industry had considerable early support from the state in terms of military and civilian contracts. The computer industry has remained surprisingly unfettered by regulation and is intensely competitive. The history of television stations is more mixed, the stations being partly state run and partly privately owned. Given the influence of the mass media and the importance of content, the broadcast medium has usually been subject to comparatively stringent regulation and has remained largely domestic [3]. What digitalization has done is to bring these industries to a potential point of convergence. In turn, convergence has brought about the possibility of synergy--the benefits to be had by players in one industry utilizing their technology in another industry at very little extra cost--thus providing the commercial imperative.

In 1994, the worldwide market for information technology (IT), products, and services was cumulatively valued at approximately US\$853 billion. Between 1993 and 1998, the world market for information services is expected to have grown from US\$275 billion to US\$465 billion, an annual growth rate of 11 percent. By the turn of the century, the investment in telecommunications infrastructure alone is expected to exceed US\$200 billion globally, and the global telecoms sector will represent a US\$1.1 trillion industry. Thus, a primary motivating factor for so many countries to follow the U.S. lead and announce their own NII programs has been that the stakes are seen to be so substantial (see table 2).

Table 2. Asian NII programs and their estimated costs

Country	NII Program	Time Frame	Cost (billion US\$)
Japan	Japan National Information Infrastructure (JNII)	National broadband infrastructure by 2010	330-550
South Korea	Korea Information Infrastructure (KII)	Broadband infrastructure installed by 2010	57.9
Singapore	IT 2000	Fiber to building; full-service cable network by 2000	2.65
Malaysia	Malaysian Information Highway	Fiber to the home by 2020	30
Thailand	IT 2000	Broadband access by 2002	18
Indonesia	Indonesian National Information Infrastructure (INFONAS)	Broadband infrastructure in place by 2010	
China	China National Information Infrastructure (CNII)	Broadband net delivering over a million telephone channels + 10,000 TV channels by 2020	200

The U.S. government, as the leading example, sees the NII as being of strategic importance given its dominance in these technologies. The Clinton administration has outlined a vision of a new U.S. economy based on broadband telecommunications and interactive multimedia. This infrastructure network is to be used for a wide variety of social and economic purposes. Thus it will become a central feature in the transformation of the United States into an information-based economy.

However, the information industries in the United States are already relatively mature, and the United States is one of the world's leading suppliers of knowledge, products, and content in these domains. In contrast to the United States, most Asian countries have poor infrastructure, and as a result, have focused on supply-side developments rather than considering demand issues (see table 3). Thus, where the policy focus in the developed world is on integration of services, in the developing world it is on construction of facilities.

Table 3. Penetration rates for telephone, television, and personal computer in the United States and Asian countries, 1994

Country	Telephone	Television	Personal Computer
United States	59.5	79	29.7
Japan	47.8	64	12
Singapore	47.3	38	15.3
Hong Kong	54	36	11.3
South Korea	39.7	32	11.2
Taiwan	40	32	8.1
Malaysia	14.7	23	3.3
China	2.3	23	0.2
Philippines	1.7	12	0.6
Indonesia	1.3	9	0.3
India	1.1	5	0.1
<i>Developed countries</i>	<i>52.3</i>	<i>63</i>	<i>18.7</i>
<i>Developing countries</i>	<i>5.2</i>	<i>18</i>	<i>0.7</i>

For developing countries, therefore, the issue has become one of playing catch-up by making significant increases in spending for IT in the hopes of not being left behind in the global struggle for competitive advantage. As the global economy moves from the industrial age into the information age, an efficient information infrastructure is perceived to be the crucial precondition to economic competitiveness. In this regard the development of the information infrastructure is compared to the role played by the railways in the early stages of the industrial revolution. The countries and companies that are to dominate this industry are expected to lead the world into the new world economy.

The objectives of the NII programs also differ between the East and the West, since the developmental perspective in the East is to take a much more governed approach to the market. In the emerging economies of the Asia-Pacific region, privatization has been limited if not absent, whereas competition in various segments of the market is more widespread than in, for example, Latin America. (The two regions that have experienced the widest and most profound telecoms reforms in the developing world are Asia and Latin America. Yet, despite shared leadership in telecom restructuring, these two regions differ considerably in the reform strategies adopted.) In China, India, Indonesia, Malaysia, Thailand, and Vietnam, the state remains the major operator in the information sector. The Philippines is the only case in the Asia Pacific in which both the incumbent and competing operators are under private instead of public ownership (table 4). In all these cases, various degrees of competition have been introduced in both basic and valued-added services. However, the state has reserved to itself a high level of discriminatory decision-making power, which has led, in some cases, to the reversal of liberalization measures previously embraced.

Table 4. Structural reform of telecommunications in selected Asian countries

State-dominated reform	China, Vietnam	Markets still dominated by state-owned firms; competition growing but still in its early stages.
Maintaining state control	Indonesia, Thailand	Further down the liberalization/privatization path, but still largely controlled by the state and with limited competition.
Mixing public and private	Malaysia, India	Retained state ownership of the incumbent operator, but allowing extensive private participation in the market and have brought competition to most segments of the market.
Promoting private competition	Philippines	Fully privatized and competitive market.

The persistence of state dominance juxtaposed with avowed strategies of liberalization characterizes East Asian developments, with the unifying theme to Asian liberalization being that the removal of state controls is far from complete. At stake is the management of the direction of reform. The result has been the creation of a range of innovative market structures and ownership arrangements reflecting the degree to which the state has opened the door. This paper now looks at whether and where Internet development policies fit within these NII frameworks.

The Internet

For many, the Internet is the forerunner to the NII. It has already become a major part of most NII initiatives. Between 1988 and 1996, the Internet doubled in size almost every year. A powerful appeal of the Internet as a prototype for the new information infrastructure has been that innovators can take relatively small risks while still accessing a huge potential market. In this regard, the economics of telecommunications deployment contrasts markedly with that of the Internet. But the current state of the Internet reflects a unique set of economic conditions: tremendous market access has been achievable with a very small initial investment, an advantage that has led to a wide range of experimentation and innovation. Combining low barriers to entry with unusually high potential for growth in usage volume, the Internet has thus far been an extraordinary platform for innovation. The problem for policymakers is that the Internet, with its very low cost of entry, operates on top of an expensive physical communications infrastructure. Very large investments are required by those countries that do not have the requisite infrastructure.

For policymakers and regulatory authorities around the world there is another basic problem of definition: is the Internet

a telecommunications service and therefore subject to regulations over access to the network (such as who may provide access and at what price)? Or, is it an information service, requiring regulation of content? While comparisons are often made between Singapore's separation of the domestic network (proxy) server from the international network and China's attempts to maintain a national "intranet," it needs to be recognized that these are interim positions rather than absolute stances. (How for example will Singapore's position be maintained after 2000 when international telecommunications are liberalized?) Many government restrictions will become increasingly pointless as telecommunications services continue to be deregulated and liberalized, as basic data transmission costs begin to fall dramatically, and as large corporate demands drive the network (Internet and intranet) market. From this perspective, it is important to examine the different stances adopted by governments around the region.

State-dominated reform

China

China's regulatory structure for the Internet is evolving rapidly, attempting to keep pace with rapid growth. The current regulatory structure developed out of attempts in the early 1990s to coordinate development of China's information infrastructure. The Joint Committee for National Economic Informatization, a policy advice unit of the state council, was established in 1993, ostensibly to come up with policies for development of an NII. However, the Joint Committee quickly became focused on the Internet. The Joint Committee was responsible for the first attempt to establish regulatory guidelines for Internet development in China: the Interim Regulations for Connection Networks to International Networks, issued in late January 1996. These regulations named the four organizations authorized to manage Internet services (the Ministry of Posts and Telecommunications [MPT], the Ministry of Electronics Industry [MEI], the Chinese Academy of Sciences [CAS], and the state Education Commission), and, most significant, gave the MPT the sole power to operate and manage international links to the Internet (Triolo and Lovelock 1996). Subsequently, the Public Security Bureau issued regulations requiring Internet users to register with public security authorities. (This regulation does not apply to employees of foreign companies that have Internet access through their own corporate networks, as long as the companies are not offering commercial services in China.)

In March 1996, the Joint Committee was elevated to the status of a leading group under the state council, and renamed the Leading Group on Informatization. This group consists of a high-level panel of ministerial and vice-ministerial representatives from government departments involved in telecommunications, such as the MPT and MEI, as well as public security departments. The group is charged with drafting and implementing policies to coordinate development of China's information infrastructure, including the Internet. Currently, organizations such as Xinhua, which wish to connect their nationwide networks to the Internet, must apply to the Leading Group for permission. Other companies wishing to become Internet service providers (ISPs) or content service providers (CSPs), offering either primarily content services or some dial-up access must apply to the local MPT affiliate for a license. Most of the companies offering services do so as agents of the MPT.

Vietnam

Vietnam's recent data communications developments closely correspond to the top-down policy-guided approach in China. The data communications policy in Vietnam was first laid out in 1993 as part of the country's IT2000 plan. IT2000 mandates the development of data communications networks in three areas of the Vietnamese economy: government services; financial, banking, and commercial services; and networking for the education and research and development communities. As part of the telecommunications reform process, a VNPT subsidiary, Vietnam Data Communications (VDC) was also established in 1994. VDC set up the country's first domestic and international data backbone using the X.25 protocol [4]. As was the case in China, the Data Communications Center voiced its desire to run the Vietnamese Internet, causing a rather heated debate to unfold between the monopoly Department of Posts and Telecommunications (VNPT) and Vietnam's other providers of networking services. In November 1994, just six months after the start of VARENET (the Vietnamese Academic and REsearch NETwork), an associated network named Netnam began offering services as a not-for-profit data communications provider for Vietnam's nongovernmental organizations (NGOs) and commercial sector. The network was able to start up on a grant of US\$18,000 from a European aid agency. By early 1996, Netnam had about 350 users online and was consequently reaching the point of

economic viability. Although the network was originally intended to service the NGO community, Netnam quickly moved into providing services for the commercial sector, and roughly 60 percent of Netnam's users are corporations.

Other private network startups followed, such as Toolnet and T-net, which connect to the Internet via dial-up lines to neighboring countries, such as Thailand. The telecommunications leadership used the ensuing uncertainty to come out with its own regulatory initiative, arguing that, since it had been granted a monopoly on telecom and since the Internet link would need to be carefully monitored because of security and cultural risks, it should be the one to control the Internet link. It further argued that giving VDC control over the Internet link would slow the development of the Internet in Vietnam since data communications skills are in such short supply in Vietnam and VDC does not have the technicians to run such an operation. Thus, earlier this year Vietnam's telecommunications authority issued a "temporary regulation" allowing Vietnamese enterprises to apply for licenses to provide Internet connections and services, allegedly in response to rising fears in the Communist Party that free access to information could help undermine its rule. (The Vietnamese government is particularly concerned about access to Web sites established by overseas opposition Vietnamese groups.)

Under the proposed rules, all ISPs and their customers are required to register with the Directorate General of Posts and Telecommunications (DGPT). Service providers will have to submit technical details to the interior ministry so the Internet can be policed. Only telecommunications companies are allowed to offer Internet services and receive subscriber revenues, and charges and access to communications will be controlled by the DGPT. The 16 clauses in the draft ban the transfer of any information that "damages national security, threatens public order, or does not correspond with the traditions and moral values of the Vietnamese people." While taking these concerns seriously, observers believe that the key issue blocking the country's access to the Internet is conflict over which state organization will control access to the technology and charge user fees. The majority of players in the debate appear to believe that Internet access is vital for Vietnam's sustained economic development. Heightening this perception is the country's membership in the Association of Southeast Asian Nations (ASEAN), which is making extensive use of the Internet. Hanoi is said to be closely studying the system in China, where Internet access is allowed but all users are required to register with the police.

Maintaining state control

Indonesia

In Indonesia the government has employed the controlled reform mechanism of the Joint Operating Scheme (JOS) to introduce foreign capital and technology into the telecoms sector. Herein the state has divided the incumbent's operations into 6 geographical areas (initially 12) and contracted private companies to build turnkey local networks.

Until 1995, telecommunications services in Indonesia were primarily the responsibility of two operators: domestic services were operated by PT Telekomunikasi Indonesia (PT Telkom), and international services were predominantly provided by PT Indosat. Although both of these companies have been partially privatized, they are still majority-controlled by the Indonesian government.

The basic target for telephone services set by the current five-year plan (Repelita VI, commencing in 1995) is for an increase in switching capacity of 5 million lines at a combined cost of US\$8.4 billion. Private sector investment in joint operations with PT Telkom will provide 2 million lines, with an equity investment of US\$2.4 billion.

However, although the Indonesian NII program (INFONAS) is principally focused on the expansion of the basic telecommunications service and the government has plans to provide multimedia services (including the Internet) to all districts in the country by 2001, the country's Internet service is to be regulated by the broadcasting bill. This is because the Indonesian authorities are concerned about access to video material from foreign sites. As a result, the Advisory and Broadcast Control Agency is to be established to advise on regulatory matters.

In contrast to the JOS concessions in the telecommunications sector, broadcasters must be established with capital entirely owned by Indonesian citizens or by Indonesian legal entities that are entirely owned by Indonesians. Subsequent

financing or sales of shares must be approved by the government. By late 1996, official estimates suggested that Indonesia had about 20,000 Internet users, with a growth rate of 10 percent a month.

Thailand

In Thailand, telecommunications reform has passed through three distinct phases. A growing awareness of the link between the economy and the telecommunications infrastructure compelled the government to act to develop the sector [5]. As elsewhere across Asia, the Thai government sought to stay actively involved as the industry progressively opened. The strategy of reform pursued, however, was different, with limited privatization and somewhat greater liberalization. The mechanism for attracting finance and opening the industry to competitive pressures was also somewhat divergent with the implementation of a build-transfer-operate (BTO) scheme.

The advantage of a BTO is that the transfer of ownership after the build stage but before the operate stage allows the requirement for basic services to remain under state control to be circumvented without being directly challenged. In other words, privatization can be avoided (or at least stalled), and liberalization can be controlled. The state also benefits through the technology transfer involved.

Paralleling developments in the telecommunications sector, the government has yet to articulate a well-developed IT policy or to establish an independent agency to oversee progress toward an integrated NII initiative. This has resulted recently in confusion and acrimony over Thailand's Internet policy and sustained high access charges, which users claim are stunting demand and confining most Internet usage to large corporations and the major urban centers.

Thailand does not yet have a national IT policy. Recent Thai governments have, however, put into place policy advisory and organizational mechanisms. The National Science and Technology Development Agency (NSTDA) is charged with this goal. Founded at the end of 1991, the NSTDA is mandated to (1) advance science and technology development, and (2) promote research, development, and engineering. Of the three NSTDA centers, the National Electronics and Computer Technology Center (NECTEC) is mandated to develop Thailand's electronics and computer technology. NECTEC, begun in 1986, functions under the Ministry of Science, Technology, and Environment.

NECTEC gives academic grants for research and software development, and in this regard helped to establish ThaiSarn (Thailand Social-Scientific Academic and Research Network) in 1992. ThaiSarn was the main Internet access point in Thailand prior to the emergence of private ISPs in 1994.

Mixing public and private

Malaysia

Malaysia's IT policies are articulated from the highest level of government with Prime Minister Mahathir's "Vision 2020" program and his "Way Forward" leadership. In 1985, the Malaysian Institute for Microelectronic Systems (MIMOS) was established to advance Malaysia's national information-age ambitions. The MIMOS mandate included researching and developing microelectronics, training Malaysian talent in microelectronics, supporting new high technology, and creating the environment for technology transfer.

In 1990, a decision was taken by the government to initiate a national IT board and in 1993 the National Information Technology Council (NITC) was formed, with MIMOS appointed as the principal IT policy coordinator. Since then, NITC has formulated national IT policy focused on five areas: (1) creation of an informed society, (2) development of an IT industry, (3) telecommunications infrastructure, (4) work force training, and (5) administrative coordination.

In contrast then to neighboring Southeast Asian initiatives, Malaysia's NII focus is somewhat more integrated and a little broader, encompassing the electronics industry development (in particular, semiconductors and microelectronics) as well as the telecommunications sector. As such, the Malaysian Information Highway initiative has more in common with South Korean and Taiwanese developments. More recently, the NII investment focus has been on Mahathir's high-tech investment zone, the Multimedia Super Corridor (MSC). The US\$2 billion, 15-by-40 km, zone south of Kuala

Lumpur is designed to attract companies in multimedia industries, such as Microsoft, Oracle, Sun Microsystems, NTT, and Disney, and to nurture local talent.

To accompany the MSC development, the government is providing a "Multimedia Bill of Guarantees," which pledges that a set of laws separate from those in force--particularly in the areas of censorship and cross-border transmissions--in the rest of the country will be employed to facilitate investment and development.

Where this "industrial master planning" leaves Internet service provision has yet to be addressed by the policymakers, particularly given the content (censorship) concessions to be granted to companies which establish themselves in the MSC. The government hopes that the existence of two ISPs will lead to the upgrading and expansion of Internet service throughout the country, especially to schools and rural areas. But the recent introduction of timed local calls by Malaysia Telekom suggests that Internet usage will remain low while the perception of high access costs persists.

India

If China can be seen as a somewhat chaotic, underdeveloped version of the Singapore model, India is a chaotic version of Hong Kong. India has had Internet access for several years already through the Department of Electronics' Education and Research Network (ERNET). However, as with China, full-fledged Internet connectivity began only recently with India's long-distance carrier, Videsh Sanchar Nigam Ltd. (VSNL), providing access to subscribers in the major cities.

India has not had an explicit national initiative toward the development of high-speed data networks, as China has had with the China NII program. India, instead, has very much followed a market-driven, piecemeal approach to infrastructure development. As a result, the provision of Internet services by an apex organization such as VSNL has caused problems. Although VSNL is in direct competition with the private value-added service providers, no discussions were held with the VAS providers in order to plan for this major development. Consequently, the private service providers are not clear as to the kinds of online services they can provide through the Internet. The lack of coordination and political battles between the Department of Electronics, the Department of Telecommunications, the National Informatics Center, and VSNL are seen to be slowing down the growth of the Internet in India. For many companies, the ISP market will be seen as a "losing proposition" until long-distance and international leased-line costs come down and availability improves.

While the various existing networks are essentially addressing the same market segment for Internet access and are thus in competition with each other, the Department of Telecommunications has continued to restrict the growth of the Internet because of its long-standing monopoly over telecommunications in the country. The ongoing liberalization in India is expected to gradually change this.

Conclusion

Since the launch of the U.S. vision of their NII in late 1993, countries around the world have either announced their own NII initiative or reconfirmed infrastructure development programs already undertaken as approximating the development of a national information superhighway. However, much international discussion to date on the information infrastructure has been influenced unduly by a focus on the particular circumstances in the United States and its preoccupation with constructing a broadband information superhighway. This has created the erroneous impression that these issues should be priorities everywhere and that investments in such broadband capacity will provide enormous benefits everywhere.

To date, the demand for broadband capacity, particularly in the developing world, has been small because the vast majority of new information and communication services do not require broadband enhancement. Internet services, for example, do not require an information superhighway. However, Internet service provision does provide a range of regulatory, technical, social, and economic issues for governments to attend to. And without a realistic assessment of their objectives and their resources, governments run the risk of damaging their Internet and NII programs and, as a result, their trade and economic competitiveness.

This paper has argued that, although Asian governments have sought to stay actively involved in the reform of the telecommunications sector and the development of an NII program and although Internet policy is seen as an integral part of any NII program, there is scant evidence of coherent or constructive policy-making on an integrated basis. It is apparent that all countries are on a developmental path where electronic information and communication services are becoming more central to economic, social, cultural, and political life. But each country is on its own path of development, and different countries are at different points along their respective developmental paths.

Indeed, each country needs to assess which sectors of industry and government activity should receive priority attention for information and communication service development and application. This will depend, in part, on domestic priorities for economic and social development, as well as requirements for maintaining and extending benefits from international trade. Each country also needs to identify those sectors where applications of information and communications services can help overcome significant bottlenecks to economic and social development.

The objectives of the NII programs in the developed and developing worlds are substantially different, if only because in the developed countries much of the envisioned NII will be achieved through the evolution of the existing infrastructure and services, whereas developing countries still have much of the basic infrastructure to build. The objectives of the NII programs also differ between the East and the West since the developmental perspective in the East is to take a much more governed approach to the market. This in turn transforms the objectives of the various stakeholders. There are, however, certain commonalities that tend to characterize the society vision statements emanating from national governments. From this perspective, the differences between the strategic initiatives of the various Asian economies are instructive.

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Notes

1. The NII has also been referred to as the "information superhighway," "infobahn," or "I-Way." In 1990, U.S. senator Ernest Hollings argued before the Senate Commerce Committee in support of U.S. information infrastructure legislation. The concept of a "national data superhighway" began to gain currency when it was entered into the initial draft of the High Performance Computing Act (HPCA) of 1991 by Al Gore, then a U.S. senator. See HPCCI 1994. The notion of building a data superhighway to stimulate the U.S. economy was expounded in the Democratic presidential campaign and later became a key component of the Democratic administration's economic reconstruction policy. See Mueller 1993. The politicization of the issue is an important element in its subsequent high profile. Following the 1993 U.S. announcements, almost all Asian governments

- set up a policy office under the government to directly coordinate their strategic initiatives.
2. Whereas the computing industry requires "colossal and continuous high-risk investment in research and development," telecommunications investment is "lumpy, requiring large scale commitments to periodically build out the network, [with] smaller scale capital investment to upgrade the network ... as new software applications are made available. This is intensive investment. Television investment, after the initial broadcasting or cable network has been built, falls mainly on programme making or buying, which is continuous, but nowhere near the scale or risk of R&D expenditures in the computing industry." For an elucidation of this theme, see Lovelock & Ure 1995, 150.
 3. While a rapid expansion in the internationalization of the audiovisual industries has occurred, the domestic scale remains easily dominant in world markets--a point that is often overlooked in the rush to cable TV, video on demand, and other entertainment-driven multimedia initiatives. Most television programming, for example, never leaves its nation of origin.
 4. The Internet in Vietnam is still in an infant phase of development. Vietnam's information infrastructure remains quite far behind those of its more advanced neighbors, so the focus has so far been on e-mail communications over analog dial-up lines. More advanced features such as the Web, or even TCP/IP, are still in the future.
 5. Similarly in Malaysia, an appreciation of a relationship between economic growth and the telecommunications infrastructure appears to have been one of the major drivers of increased liberalization. However, in Thailand the economic boom of the 1980s exposed chronic shortages in the telecommunications sector, while in Malaysia it was the need to respond to recessionary forces that induced government action. See [the Malaysia section](#).