Information Technology Policy in ASEAN Countries: Indonesia, Malaysia, Thailand, and Singapore

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ABSTRAKSI

Teknologi informasi memainkan peran yang lebih penting dalam kegiatan ekonomi. Para pemain kunci ekonomi dunia sangat bergantung pada kelancaran arus informasi. Teknologi informasi digambarkan sebagai instrumen penting pembangunan nasional. Kebijakan teknologi informasi sebagai cara meningkatkan daya saing dan mewujudkan kerjasama internasional dalam suatu kawasan khusus. Artikel ini menguraikan tentang persamaan dan perbedaan, dari perencanaan dan implementasi kebijakan-kebijakan teknologi informasi di Indonesia, Malaysia, Thailand, dan Singapura.

***Kata Kunci**: Teknologi Informasi (IT), ASEAN*

A. INTRODUCTION

The ASEAN region is one of the most rapidly growing economic areas. Traditionally, this region's economic growth has been based on their natural resources endowment (Singapore is one exception). However, the governments in the region are aware of the important role of telecommunications and information technology in assisting their economic growth. In response to the new dynamics and technologies of the information age, Southeast Asian countries are restructuring their development strategies and seeking to plan effective means to achieve high economic growth. As the economies of Indonesia, Malaysia, Thailand and Singapore became more mature, the industrial and service sectors of those countries are beginning to take advantage of information technology (IT), the convergence of various information based and mass media communications technologies, as significant components of their development planning. In most cases, information technology issues in ASEAN countries refer to computers and computerization, telecommunications and multimedia data technologies and their interdependencies.

B. DISCUSSION

1. INDONESIA

IT policy in Indonesia is a direct function of the country's national policy in science and technology and for industrial development. Since the mid 1970s, under the

policy planning leadership of Minister of State for Research and Technology, B.J. Habibie, Indonesia has pursued complex technological capacity building as a principal foundation of its national development and as a basic part of its policy of science and technology enhancement. This is the high technology development path that is intended ultimately to leapfrog Indonesia into a developed country status.

The need for IT development in government is increasing as attitudes change and as business and key private sector actors express their needs for greater capacity in IT, including facilitative regulatory environments to encourage software development, for example. In operational terms, one of the principal IT program-level initiatives is IPTEKNET.

IPTEKNET has two objectives: (1) to provide the Indonesian S&T community with ready access to data and information available from international sources; and (2) to transform and modernize Indonesia's S&T community by stimulating utilization of electronic communication by means of computer networking. (Ibrahim, Tjiropranoto and Slamecka, 1993: 4) IPTEKNET is proposed to function as a nonprofit consortium of organizations providing public information services. The consortium consists of 17 Indonesian organizations and nodes, including some key universities that are able to provide non-proprietary information and services to the public and are willing to conform to consortium standards, procedures and expectations. Twenty-seven additional, extension-type Indonesian organizations will provide access for their clientele to IPTEKNET's information services. IPTEKNET will function as a fee-based organization, that ultimately is planned to cover costs via its income.

In order to provide the needed access to problem-solving information, IPTEKNET is planned to: (1) coordinate Indonesian S&T information; (2) offer information services, i.e., provide various user interfaces; (3) train and market; and (4) provide other support services, including policy planning, technical information standards, means of access to information such as directories, support for the Internet gateway, technical assistance to member organizations, and representation of IPTEKNET users by means of regional and global professional activities (Ibrahim, Tjiroprannoto and Slamecka, 1993: 9).

Rapid network development is underway in Indonesia. Many of these initiatives are led by universities and research centers (Purbo, 23 May 1994).Most recently, BAKOTAN, or the national agency for the automation of state administration, is charged with

coordinating automation of government offices and disseminating IT policies in Indonesia. Its operating budget is from the Ministry of Finance and the chair of BAKOTAN also is the Minister of Finance. BAKOTAN works at the intersections of the public and private sectors. It offers seminars intended to achieve grassroots coordination among government agencies and private firms. The Indonesian National Development Planning Agency (BAPPENAS) will monitor and assess progress of this effort, especially as it contributes to the five year national plan (Musa, 1994).

Indonesia's private sector and business leaders see their needs as different from government priorities (Economic & Business Review Indonesia, 1993). In the IT and telecommunications sectors, business leaders are not aware of the government of Indonesia having an integrated policy on IT. Government agencies and state-owned companies procure and use whatever IT that they require. Business leaders see the need for integrated IT policies.

2. MALAYSIA

Malaysia's IT policies are articulated from the highest level of government. Prime Minister Mahathir Mohammad has pointed the country toward the year 2020 with his "Way Forward" leadership. In the information age that we are living in, the Malaysian society must be information rich. It can be no accident that there is no wealthy developed country that is information-poor and no information-rich country that is poor and undeveloped (Mahathir, 28 February 1991: 12)

The Vision 2020 strategy broadly conceptualized IT by specifying that Malaysia needed to stay abreast of high technology generally, and specifically Malaysia needed to be competitive in those technology industries where the country had comparative advantages. Microelectronics is one of those industries. (Shariffadeen, 1993) By these means, and by developing a scientific, innovative and producer society, Malaysia intends to become a fully developed nation by 2020.

The Malaysian Administrative Modernization and Management Planning Unit (MAMPU) was established in 1977 as a unit of the Prime Minister's Department. MAMPU has been Malaysia's central agency for coordination of computer utilization in government by means of technical and management assistance in public sector computer procurement and infrastructure, computer upgrading, office automation and in assisting in formulating national computer policy in the public service. In 1988, the National Consultative Committee on Information Technology (NCCIT) was formed with MAMPU serving as

NCCIT's secretariat. The NCCIT, serves as a public forum for discussion on computerization in Malaysia, is composed of public sector and private sector interests.

The National Committee on Data Processing (NCDP) is the highest-level committee on public sector computerization. Since 1985, it has been looking into areas such as IT policy review and formulation, IT strategies, as well as acquisition and usage of computers and standards. Three advisory committees assist the NCDP in the discharge of its responsibilities.

Malaysia's government is continuing its push towards becoming an "information-rich society." In August 1994, Civil Service Link (CSL) was launched. It is a computerized government information center. Operated by MAMPU, CSL provides information from 140 government agencies including 40 ministries. The information ranges from regulations and laws to information on licensing requirements to investment incentives for business, to tender advertisements to directories and data bases for trade and commerce.

The CSL enables the provision of better information services to the Malaysia public because it integrates disparate information in electronic and computer-accessible form. This new system is planned to improve cooperation between government and the private sector. Such cooperation is expected to enable Malaysia to 'continue to play a prominent role in regional socio-political developments, economies, the environment and technology." (Nadzri, August 10, 1994: 1)

In 1985, the Malaysian Institute for Microelectronic Systems (MIMOS) was established to advance Malaysia's national information-age goals, including: research and development in microelectronic systems and services to industry; training Malaysian talent in microelectronics; supporting new high technology and microelectronics; the dissemination of information and research findings in microelectronics; and creating an environment for exchange of microelectronic ideas. (MIMOS, n.d; Shariffadeen, 1988)

In 1990, a decision was taken by government to form a national IT board. By 1993 MIMOS was appointed as the principal coordinator and the Secretariat for that board, it is the new National Information Technology Council (NITC). (Hariri, 1993) The NITC will formulate a national IT policy. The policy will be a cooperative effort of both the public and the private sectors. The IT policy is planned to have five priorities: (1) creation of an informed society; (2) development of an IT industry; (3) telecommunications infrastructure; (4) manpower training; and (5) administrative mechanisms.

The establishment of the NITC provides added impetus for all-

encompassing IT application and utilization throughout Malaysia's economy and society, as well as in government. The NITC will encourage a more comprehensive, multi-sector and holistic strategy for Malaysia to establish a "scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but a contributor to the scientific and technological civilization of the future." (Mahatir, 1991: 2) The interdependent partnership approach of the NITC is congruent with the public sector-private sector partnership spirit of Vision 2020. The NITC can be expected to planfully launch Malaysia's IT industrial development and related support systems into greater competitiveness within Southeast Asia and the Asia-Pacific region.

3. THAILAND

Throughout the 1980s Thailand benefited from the relatively long term leadership of Prime Minister Prem Tinsulanonda and his strong commitment to structural reform and adjustment with concomitant coherent economic change. But the post-Prem period in Thailand has "seen significantly less consistency in its national policy formation."

Because of this lack of recent coherent policy leadership, Thailand does not yet have a national IT policy. Recent Thai governments have however, put into place policy advisory and organizational mechanisms to enable the science and technology systems of the country to support national economic and social development. The National Science and Technology Development Agency (NSTDA) is charged with this goal. Founded at the end of 1991, the NSTDA (1) advances science and technology development and (2) promotes research, development and engineering.

Of the three NSTDA national centers, the National Electronics and Computer Technology Center (NECTEC) is mandated to develop Thailand's electronics and computer technology. NECTEC began in 1986. In order to realize technology transfer, NECTEC encourages scientific and technology research and development institutes to network among themselves.

NECTEC functions under the Ministry of Science, Technology and Environment (MOSTE). Using research and development funding, NECTEC works with government organizations, Thai universities and the private sector to advance electronics and computer development. As part of the system of national five-year planning, NECTEC has pursued a number of development projects. Some of the key projects have included: (1) development of domestic computer manufacturing; (2) custom chip manufacturing; (3) biomedical

electronics; (4) industrial electronics; (5) artificial intelligence; (6) research and development of manufacturing software; (7) computer networks; and (8) manufacturing of telecommunications equipment for domestic consumption. NECTEC provides research funds to both the private sector and universities to develop prototypes in electronics and computers for manufacturing and marketing.

A National IT Committee (NITC) was appointed by the parliament to supervise and look into the country's IT future. It is chaired by a deputy prime minister. With IT elements scattered throughout the seventh national plan there is the need for much greater coherence and integration in Thailand's IT development. NECTEC staff serve as the NITC Secretariat and supports the National IT Plan Working Group Organization. The organization has seven sub-committees, including ones on: (1) National IT Plan in process; (2) government computerization phase I; (3) Thailand EDI Council, TradeSiam; (4) IT manpower planning; (5) examination of IT laws and regulations; (6) Thailand IT year 1995; and (7) promotion of private sector R&D. The organization also has an expert group in support, plus five working groups on: (a) finance, security, trade, insurance; (b) transport, tourism, telecom infrastructure; (c) IT industry, including hardware and software development; information services, telecom and broadcasting; (d) public sector, including education, health, welfare, labor and government services; and (e) manufacturing. Because of legislation by Parliament, NECTEC is freed from some government regulations so that its IT coordinative and promotion objectives might be better realized.

There is need for effective articulation among Thailand's many IT government users. These various government entities include: the military, budget bureau, ministry of finance, ministry of communications and so on. Each has its own computer systems, guidelines and procurement approaches. There is need also for IT training throughout government even at the permanent secretary level. There is widespread need for IT socialization, education and experimentation throughout Thai society. Consequently, NECTEC gives grants to high school students and universities to do related research and software development. ThaiSarn (Thailand Social/Scientific Academic and Research Network) has been established. It uses networking technologies to link Thai universities for information exchange on research and development.

One of NECTEC's private sector initiatives includes plans for a science and technology and

research and development industrial park to be located north of Bangkok near the international airport and tertiary education institutions, such as the Asian Institute of Technology. Soon, NECTEC will locate itself in a new building that will enable greater synergies and coordination in IT development and training among government agencies and to be close to IT industrial production. The industrial park and NSTDA complex are expected to take two to three years to design and complete

With a vocal business community, the entrepreneurial needs of the private sector are becoming known. Because of Thailand's rapid economic growth, there is a rising demand for IT and telecommunications infrastructure. This, combined with a plethora of relatively uncoordinated government actors and anachronistic laws and regulations, suggests that there is a great need for Thailand's IT industry and environment to become unfettered if it is to grow to its full potential. The Association of Thai Computer Industry (ATCI) has led the call for greater liberalization and more effective IT strategies from government.

The Bangkok non-governmental organization, Thailand Development Research Institute (TDRI), has researched and developed a strategy to facilitate the creation of a rational IT policy framework for Thailand. It is called "IT and Thai Society in 2010."

Then Director of the TDRI Science and Technology Development Program, Dr. Chatri Sripaipan (1993) and his colleagues conducted a study on the role of information technology and Thai society in the year 2010. It identified twelve initiatives for a transition into an information society with an ultimate goal for an improved quality of life as characterized by more balanced development, more productive workers and better public services.

Despite the present lack of a national IT plan, the Thai government has instituted some recent IT-related policy initiatives and measures. As part of the computerization of the public sector, there has been an "adoption of minimum standards for IT equipment and computer literacy of civil servants." In order to provide a tax incentive for research and development investment by the private sector, there is an allowance of a 150 per cent deduction "of R&D expenses from corporate income." As part of the campaign to promote the awareness and understanding of IT, 1995 has been declared "Thailand IT year." The electronics industry will continue to be promoted by means of a reduction of import tariffs for electronic devices."

For the near-term future, the initial National IT Plan efforts

already have begun to yield some preliminary results. NECTEC's Dr. Thajchayapong has identified these following six outcomes: (1) create standardized software for use by government agencies; (2) improve software procurement by government; (3) establish a "type approval" agency to maintain standards and to protect consumers; (4) invest in research and development telecommunications equipment manufacturing; (5) create a one-stop reservation system for transport and tourism; and (6) establish a medical network for public health systems communication. (Thajchayapong, 20 June 1994)

For the longer-term future, Thailand's fortuitous location and cultural proximity to Indochina and Myanmar should serve it well. The opening of Vietnam and Cambodia, to foreign investment and IT infrastructure development can be expected to have Thai influence be important to its near neighbors.

4. SINGAPORE

The tiny city-state of Singapore is one of the world's early innovators in the use of IT and telecommunications as a principal government policy element of its national development planning. The government as early as the late 1960s and early 1970s stated that "brains services and brains industries" would be a critical factor in the country's economic development. This highest-level leadership and a sustained commitment to this development strategy have been instrumental in Singapore's IT success.. Because of prior IT investment and experience, Singapore's development potential for the future has been significantly enhanced. The country is well-positioned to further and competitively exploit these technologies and related producer services. (Norton, 1991)

Since independence in 1965, Singapore government, under the political leadership of the People's Action Party (PAP) have planned and implemented the country through four stages of economic development: (1) from entrepot to industrialization in the 1960s; (2) capital-intensive industrialization the 1970s; (3) knowledge-intensive industrialization in the 1980s; and (4) globalization, including regionalization, in the 1990s. Key goals for this decade include attaining "developed" country status, and achieving balanced economic development by means of following and enhancing the government's long-standing economic philosophy of being a market economy, competing effectively in the global economy, strengthening the labor force by means of merit-based advancement, maintaining a clean environment and by operating cooperatively among the sectors of business, labor and government.

(Natarajan, 1993) The ultimate goal of the PAP is to provide an high quality of life for the people of Singapore. In turn, the electorate is expected to return PAP candidates to office; this is the political and social contract in Singapore.

Since the country's inception, Singapore has premised its development on investment in modern infrastructure capacity. Technology has been a critical element of this strategic approach. In 1970, at the height of Singapore's industrialization push, government leaders looked to the future by calling for "science-based and technology oriented industries." (Goh, K.S., 1972, p. 275) In the 1990s, four technology-driven strategic thrusts are guiding Singapore's information-age planning. These include: (1) the national technology plan; (2) information technology IT 2000; (3) the national automation master plan; and (4) the national biotechnology master plan.

Unlike Indonesia, with its early science and technology and big industry policies, Singapore has only recently explicitly framed a comprehensive science and technology strategy plan. For a number of years prior to the national technology plan however, the building blocks of such a strategy had been laid. Singapore seeks to enhance its research and development capacity, its industrial competitiveness and its commercial and new technology development. Such innovations are intended to lead to economic growth.

The National Technology Plan has set out these targets for 1995: (1) to increase research and development expenditure to 2 per cent of gross domestic product; currently, it is 1.1 per cent; (2) to achieve a ratio of 40 research scientists and engineers per 10,000 labor force; currently, it is 32; and (3) to have a minimum of 50 percent of research and development expenditure by the private sector. The technology sectors that have been identified as relevant to Singapore's growth include: microelectronics; electronic systems; IT; materials technology; manufacturing technology; biotechnology, food and agrotechnology; and energy, water, environment and resources.

The National Science and Technology Board (NSTB) is Singapore's lead agency responsible for seeing that the National Technology Plan is realized. NSTB's principal functions are to: (1) promote research and development activities; (2) establish research institutes and centers in the private sector; (3) develop human resources in science and technology; (4) execute joint science and technology activities internationally; and (5) promote awareness and recognition of science and technology in Singapore. NSTB also coordinates

with Singapore's many existing science and technology research institutes and centers to insure the success of the National Technology Plan.

Between 1991 and 1995, NSTB will have provided S$ 2 billion to stimulate industry-driven research and development. The instruments for this include: grants to the private sector for research and development; infrastructure support by means of phase II development of the Singapore Science Park, the technology corridors as part of the IT 2000 planning, and linkage to the international research and development community; training for science, technology, and human resources so as to realize a research culture in Singapore; commercialization assistance, as in the cases of patent filing, joint venture facilitation and developing strategic partnerships; and tax incentives for private sector research and development. (Ee, 1993)

NSTB has developed Technet, which is a national communication network. It is designed to be Singapore's link to the international research and development community via connection to the worldwide Internet. (Malamud, 1993) Thus, Technet enables Singaporeans to link to nearly 8,000 networks around the globe and vice versa. Technet's services include: electronic mail; Netnews, which is an extensive bulletin board for the research and development community; local source archives and public domain software; global databases, data and information sources; library catalogues; permission-based access to host computers, including supercomputers; and electronic publications. (Technet Unit, 1992)

Singapore's explicit and operational IT strategy may be marked by the 1981 initiation of the Civil Service Computerization Program and the formation of the National Computer Board (NCB). The NCB is Singapore's lead and coordinating IT body; its existence, its centrality and its continued support is a reflection of the government's strong leadership and sustained commitment to IT and related technologies development.

In the midst of Singapore's first severe recession, the national IT plan was developed. (National IT Plan Working Committee, 1985) It was inaugurated in December 1986 and it was concluded in March 1992 with the announcement of IT 2000. In less than six years, Singapore's principal IT actors in business, industry, academe and government operated from, and accomplished the seven national IT plan elements of: (1) up-grading telecommunications infrastructure; (2) developing IT and information communication personnel (National Computer Board, March 1992a and March 1992b); (3) promoting an IT

culture; (4) IT applications; (5) building a Singapore IT industry; (6) creativity and entrepreneurship in IT; and (7) coordination and collaboration in implementing the IT plan. For an assessment and elaboration of the results of the national IT plan (see Corey 1993). Infrastructure, human resource and coordination investments have been particularly instrumental to the accomplishments of Singapore's national IT plan.

One of the many outcomes of Singapore's IT planning and implementation of the 1980s has been the development of a number of sector-specific electronic data interchanges (EDI). In international trade, there is TradeNet, which enables users of the network, both from business and government, to exchange trade information and trade documents electronically. TradeNet has been well received and is well subscribed; it draws on Singapore's historic ties to maritime trade and commerce (Corey, 1993). In the law and judicial processes, there is LawNet; in health care and medicine, there is MediNet, and so on.

With the 1992 announcement of IT 2000, Singapore has moved into a new phase of its IT development. This stage is marked by increasing integration of IT, telecommunications and Singapore society's full political economy both locally and physically, and regionally and globally by means of networking and locationally complementary investments.

Physically and spatially within the country, Singapore has begun to plan for technology corridors in the southwest and northeast quadrants of the island. The southwest corridor is designed to connect the Science Park and the National University of Singapore complex at the eastern end of the corridor to the Nanyang Technological University at the western end of the corridor. (Singapore Institute of Architects Team, 1992) The northeast corridor is planned to link the Changi airport and related complex at the eastern end with the high technology industries at the western end near the causeway to Malaysia. By means of a series of individual development guide plans (DGP) for critical areas throughout the island, Singapore increasingly will integrate its physical development using IT to enhance the quality of life in industrial, business, government, educational and recreational sectors.

The IT 2000 vision for realizing an intelligent island is based on five component visions: (1) developing a global hub; (2) transforming the economy; (3) enhancing the potential of individuals; (4) linking communities locally and globally; and (5) improving quality of life. The planned implementation framework for IT 2000 has the NCB being the NII master planner and Singapore

Telecom and Singapore Broadcasting Corporation continuing to improve and maintain the foundation of the NII. The organizational framework for the NII includes: a legal and policy element, technical standards, national application project by project specification teams, and common advanced network services.

In March 1994, the Library 2000 committee released its two-year study as its response, on behalf of the "information community" to Singapore's concept for the future, The Next Lap. (Government of Singapore, 1991) In the Library 2000 report, libraries in the information age are conceived as means of achieving a "learning nation."

Singapore's national automaton master plan (NAMP) was designed in 1989 and is in its fourth year of implementation. NAMP has five components: (1) human resources; (2) technology development; (3) infrastructure development; (4) automation culture; and (5) coordination. The objectives of NAMP are to promote factory automation and to develop a local automation industry and thereby have the capacity to export automation services. With Singapore's chronic shortage of labor and human resources, automation represents a useful means to substitute technology for personnel, and to achieve greater production efficiencies in the process. By increasing its manufacturing value added with automation, Singapore is able to maintain a comparative competitive edge internationally.

The Singapore Economic Development Board has drawn on its long-term and effective experience in the promotion of Singapore's investment advantages in implementing the Singapore biotechnology master plan. Singapore's state-of-the-art telecommunications has been heavily touted for biotechnology investors, as have the many other development attractions of Singapore. These include such instruments as venture funding availability, the conducive incubator environment of the Singapore Science Park, modern airport and seaport services, and the many financial, business and human resources development attributes that are part of the NBP.

C. CONCLUDING REMARKS

Looking at IT policy in these 4 ASEAN countries, one is struck by the different IT and related policies that have been adopted by these near and interdependent neighbors.

Given Singapore's unique small size, shortage of human resources, lack of space and natural resources, besides its history as a point of trade and interaction, its government early embraced technology and rational scientific approaches for its national

development. Indeed, after several decades of IT and telecommunications policies, planning and investment, Singapore is positioned now to function as a "wired and intelligent city" in the global IT network. Singapore's planned and strategic commitments to IT infrastructure, human resources and coordination can be expected to have the city-state be the "Silicon Valley of the Far East." (Johnson, 1990, p. 150)

In contrast, Indonesia is one of the world's largest and most populous countries, with great variations in urban and rural development. It has chosen a different technology development path. Indonesia early adopted an high technology policy, but it has invested heavily in big aero-space technology programs.

Malaysia's IT development strategy in many ways is the next most developed in the region after Singapore. It has relied heavily and initially on government-led microelectronics investment programs and civil service computerization programs. From those foundations, it has recently begun to actively integrate private-sector capabilities and more widespread privatization opportunities into its IT and telecommunications policies and programs. Malaysia's foreign investment growth and the government's commitment and vision into the next century strongly suggest continued IT-related expansion.

Thailand's development, based on IT and telecommunications, has been characterized by a relative lack of recent highest-level public sector leadership and resultant fragmentation within government and between government and the private sector. Currently however, with the active encouragement and support of Thailand's dynamic private sector, the government has set into motion the steps necessary to realize greater coherence and planned strategic impact for the country's investment in IT and telecommunications. Thailand's central position and close affinities with its neighbors in Indochina and Myanmar make it a likely prospect for solid long-term expansion and extension of IT and telecommunications. The sooner Thailand can overcome its various communications and transportation infrastructural congestions and its severe need for planned and coherent government policies and programs, then one can expect even greater IT performance from Thailand.

Infrastructure in IT and telecommunications are similarly critical. (cf. World Bank, 1994) Singapore, with its long-standing investment in telecommunications facilities and its practice of constant modernization has demonstrated the fundamental importance of IT and related infrastructure to national

development. Neighbor countries, with the added problems of serving distant countryside and hinterlands, understandably need to make more extensive IT and telecommunications investments. Thus, Indonesia, Malaysia and Thailand recently have begun to liberalize their respective investment and regulatory environments in efforts to privatize and/or facilitate enhanced investment from the private sector. Thereby, speedier infrastructure expansion and development have begun to result, principally because of increased competition and private-sector investment and partnering with public organizations. With greater infrastructural capacity being realized, then increased attention to IT human resource development will be occurring by initiatives both from the public and private sectors. The educational systems of Malaysia and Thailand will require renewed investment and effectiveness to achieve their respective technological development aspirations. In Indonesia, much more investment in and modernization of educational systems will be required. It may result in further growth in the development of people, and in turn, the further development of the state.

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