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Strategic Planning for Cutting Edge Communications: Internet

Introduction

Internet is being adopted in many countries at a rapid rate to enhance global competitiveness. Lessons from Singapore's diffusion of Internet may be useful to other countries. Using Rogers' (1995) diffusion model, secondary data sources, observation and personal participation, this study explores the diffusion of Internet in Singapore and development of Internet infrastructure. Within Singapore's IT2000 plan, the Singapore Government (SOG) is using a systematic process for integrating Internet into the government and private sectors. The IT2000 plan outlines a strategic vision to develop a National Information Infrastructure (NII). It was followed by the Library 2000 report, a plan calling for the reengineering of library services throughout the country.

After discussion of information technology (IT) strategic planning in Singapore, the Government's diffusion of Internet is analyzed. Within the context of strategic planning, a stage approach for observing and planning Internet dispersion within an organization is described. Using the stage approach called Internet Life Cycle, managers can identify key issues that need to be addressed in the systematic planning for using Internet as a prototype for an information superhighway.

The Singapore Government (SOG) IT Planning

Singapore is a small and relatively young country with a multiracial population of 2.8 million. Located in Southeast Asia, it has limited natural resources. The Singapore Government (SOG) has used information technology (IT) to stimulate economic growth and achieve national competitiveness.

Studies by Liang (1993) and Soh et al. (1995) analyzed the government's roles in information technology (IT) planning and implementation in Singapore. They classified IT planning and development into three distinct phases. The goal of the first phase was to computerize the civil service; the goal of the second phase was to promote computerization of the private sector; and the goal of the third phase is to develop the country into an intelligent island with country-wide connectivity. Each phase is framed by a national IT plan that articulates the goals, policies and resources. Table 1 lists the plans.

The first phase of IT planning, 1980-1985, saw the start of the Civil Service Computerization Programme (CSCP) and formation of the National Computer Board (NCB) in 1981, as the statutory board for computerization planning and development. By 1985 considerable progress had been made. In addition, Singapore experienced a recession. An IT planning committee, led by NCB, recommended a new strategic plan that focused on the local IT industry, IT applications to support business competitiveness, and telecommunications infrastructure (Soh, 1993 p8). These recommendations were included in the 1986 Report of the Economic Committee and accepted by the government. During this the second phase, 1986-1990, the National IT Plan (NITP) was developed and implemented.

The NITP is a comprehensive plan that transformed Singapore's newly industrialized economy into one that is high-tech oriented. It emphasized the development of the private sectors in such areas as IT industry, IT applications, IT manpower, and communications infrastructure. Five years after the formulation of the NITP, a steering committee was again convened to map out an even more aggressive plan to facilitate a higher level of IT usage. Like the previous IT planning efforts, IT2000 planning focused on increasing the competitiveness of Singapore.

In 1991, the launch of IT2000 masterplan is considered to be the third and current phase of IT planning. The objective of the IT2000 plan is to develop Singapore into an intelligent island. To

accomplish this, it outlines several strategic thrusts. The vision of IT2000 is to link every home, office, and government ministry by 2005 through an intelligent communications network called the National Information Infrastructure (NII). The components of the NII include conduit, content, and compute (A vision, 1992, p39). Although Singapore is continuously developing its IT industry and telecommunications infrastructure, more advanced industries and infrastructures are needed. Additionally, it is substantially lacking in local content.

Organized around eleven industry sectors, IT2000 proposes higher levels of integration among computing, telecommunications, business services, and social activities than the previous plans. Since it involves multi-agency participation, the different government ministries such as the Ministry for Information and the Arts (MITA) and the Ministry of Education (MOE) started to investigate the potential of IT2000 developments for their ministries.

In response, government ministries started to review their proposed services for the 21st century and roles in implementing the IT2000 vision. In 1992, the Minister for Information and the Arts appointed a Review Committee, headed by NCB, to suggest ways of restructuring and revitalizing the public library system in Singapore. In 1994, the recommendations contained in the Library 2000 (1994) report were accepted by the government. The major recommendations were to develop an adaptive public library service and set up a network of borderless libraries. Additionally, it recommended the development of an adequate supply of new age information professionals, use automation to reengineer library services and establish a new statutory board to manage and implement the recommendations. Except for the library context, the recommendations parallel those made in 1980 regarding the CSCP. Ngian (1995) study reviews a strategy for implementing the report. The reengineering of library services fits within the Media, Publishing and Information Services sector of the IT2000 plan.

According to Stephen Yeo, Chief Executive of NCB, "IT2000 dream to make Singapore a fully-networked nation is becoming a reality" (*Straits Times*, Aug 9, 1995). He cites IT2000 projects such as the Student Teacher Workbench (STW). He attributes a major reason for the rapid progress to the growing popularity of the Internet. Internet has given people an idea of what IT2000 can be and how services can function in network environments.

The next section provides an overview of how the Singapore Government (SOG) is promoting the development of Internet. This is followed by a discussion of how managers can plan for Internet dispersion in an organization.

Diffusion of Internet in Singapore

As indicated in the review of IT planning, the Singapore Government (SOG) uses a proactive and direct approach in promoting IT in the economy. Also, this is applicable in the context of Internet. Using Rogers' (1995) diffusion model, tracing methodology, secondary data sources, personal observation and participation, the activities of the Singapore Government in relation to Internet were analyzed. The speeches, publications, World Wide Web (web sites), and conferences were traced over a three year period (1992-1996 April). The data were compiled and indexed in the Non-numerical Data Indexing System (NUDIST) database. Figure 1 provides a schematic overview of the diffusion study.

According to Rogers' (p35), diffusion is the process by which an innovation is communicated through channels over time among members of a social system. It is a special type of communication that is concerned with the spread of messages in which the content is perceived as new ideas. The main elements in the diffusion of new ideas are innovation, communication channels, time and a social system. In reference to Internet, it is viewed as a technological innovation that has created a lot of uncertainty. The characteristics of an innovation, as perceived by members of the social system, determines the rate of adoption. The five attributes of innovation are relative advantage, compatibility, complexity, trialability, and observability. Figure 2 illustrates the attributes and examples from Singapore.

Since Internet is consistent with the SOG policy of exploiting technology and the IT2000 plan, it is perceived as providing a competitive advantage. Early Internet projects such as the Singapore Online Guide and Singapore's InfoMap were trials to test the usefulness of the global network. The Singapore Online Guide is the interactive version of the Singapore Tourist Promotion Board's (STPB) brochure. Initiated in 1994, it was a joint project between STPB and the National Computer Board (NCB). Also introduced in 1994, Singapore's InfoMap was established as the official web site for disseminating government information about Singapore.

Activities on the web sites and the newsgroup (soc.culture.sg) were closely reviewed. By 1994, the SOG made a decision to support the diffusion of Internet. Between 1994 and 1996 (March), over 1900 newspapers articles were published in the local Singapore press. The local press includes English language papers such as The Straits Times, The Business Times, as well as Malay and Chinese language papers. All of the papers are published by the Singapore Press Holdings (SPH). In 1996, SPH became a joint owner of the third Internet Service Provider (ISP).

Internet Industries in Singapore

With support of the SOG, the Internet is evolving into flourishing business opportunities. Although in an early stage of development, it is stimulating entrepreneurship, cooperation, coordination, progressive marketing, new business alliances, and other ways of doing business. Internet statistics reported in April 1996 of The Straits Times indicate 80,000 subscribers while others mention 100,000.

According to an article in The Straits Times (March 23, 1996), the Internet has resulted in the establishment of Internet Service Providers (ISPs), about twenty new businesses and \$10 million in revenue in 1995. Table 3 lists new Internet businesses which provide Internet access, training, electronic publishing and financial services. The growth can be associated with the SOG positive promotion of Internet. The Government established policies for three ISPs to be licensed and reviewed by the Telecommunications Authority of Singapore (TAS); local companies to be involved in reselling Internet access and entrepreneurs to be encouraged as well as supported. The Government has advised all ministries to publish on the Internet and use it for prototyping more electronic services. In 1995, the National Library, Urban Redevelopment Authority, and the Labour, Defence, and Foreign Affairs ministries began putting information online (Yap, Jan 2, 1996). In announcing its Internet strategy, the Government said it will jump in as Government, as the youth division of one of the political parties, and as commercial establishments (Straits Times, Mar 18, 1995).

In Singapore, Internet developments are similar to the information revolution described in Porter's (1991, p77) study because Internet also has given birth to completely new industries in three distinct ways. First, the Government has made selling Internet access technologically and economically feasible. For example, the TAS licensed several Internet Service Providers (ISPs): Pacific Internet, SingNet and CyberWay. Each ISPs is owned by a large government-linked company such as Pacific Internet is owned by Sembawang Ventures and SingNet is owned by Singapore Telecoms (country's only domestic telephone company). Table 3 provides a comparison of the ISPs.

Pacific Internet is the most experienced Internet access provider in the region. In 1991 it was set up as the Technet Unit at the National University of Singapore (NUS). It was funded by the National Science and Technology Board (NSTB) to provide Internet services to the education, research and development communities. In keeping with the government's approach of privatizing government services, it was acquired by a consortium of three companies in 1995. The SOG believes that privatization will make an organization more competitive, innovative, and efficient (Straits Times, Oct 95). After the acquisition of Technet in June 1995, it was renamed Pacific Internet Pte Ltd.

Second, the Internet has spawned new businesses by creating derived demands for new products and services. One example is Pacific Internet. The companies that purchased Technet are Sembawang Media, ST Computer Systems and Singapore International Media. Sembawang Media had already purchased 75% of Silkroute Ventures Pte. Ltd. Silkroute Ventures was a project that originated in the Digital Media Centre (DMC) of the National Computer Board. Personnel at the DMC and the National University of Singapore were actively setting up gopher and World Wide Web servers as

well as designing home pages. Additionally, they were being asked to design Web pages for commercial companies. Since the Web was so new, Singapore did not have any Internet publishing companies. In 1994, members of the DMC initiated a project to start the first commercial Internet publishing company called SilkRoute. SilkRoute established an electronic storefront called Asia Online. For its Web publishing venture, it secured contracts with several companies such as Reed Exhibition Company and Singapore Tourist Promotion Board (STPB). Reed Exhibition handles major trade fairs such as Asian Aerospace and Asia Travel Mart.

Third, the Internet, like the information revolution, has created new businesses within old ones. A company with telecommunications and information processing embedded in its value chain may have excess capacity or expertise that can be sold in a new market. In 1994, Singapore Telecoms used its telecommunications expertise to secure a license to operate the first commercial ISP in Singapore. Singapore Telecoms was just privatized in 1993. The concept of creating new businesses within old ones also applies to CyberWay, the third ISP. Singapore's only newspaper company, Singapore Press Holdings (SPH) and the Singapore Technologies used their publishing and technological expertise to successfully win the tender for the third ISP. The major advantages of CyberWay are its business-focus, local content (Singapore newspapers) and a pledge to sign up new subscribers within ten minutes.

Trends in Internet Industries

Within the emerging Internet industries in Singapore, the rules of competition are changing in several ways. The trends that were identified are in line with Drucker's (1995, p65) analysis of managing in network society. According to Drucker, countries are progressing towards a network society in regard to the relationships between organizations and individuals who work for them, and in respect to the relationships between different organizations. Managing will require different behavior, skills, and attitudes.

A visible example is outsourcing in which an organization contracts out an entire function to an independent firm that specializes in that work. There are many incidents of outsourcing in Singapore. At the Nanyang Technological University, the information processing and help desk functions are outsourced to Digital Equipment Company (DEC). CyberWay outsource its new subscriber registration and training to Informatics Computer School. Informatics is an international franchise in IT training and education with over 75 centres in 16 countries in the Middle East, Southeast Asia, India and China (*Straits Times*, Jan 9, 1995). Singapore Tourist Promotion Board, Reed Exhibition Company, Holiday Tours and Westin Plaza Hotel outsource their Web publishing and maintenance to SilkRoute.

In addition to outsourcing which has become routine for some businesses, Drucker (p69) emphasizes another trend is toward alliances as the vehicle for business growth. Internet industries are stimulating alliances and joint partnership such as with Pacific Internet, CyberWay and several cybercafes. CyberWay and the newly privatized National Computer Systems (NCS) have formalized an agreement where NCS will be a reseller of Internet access and recommend that all of its new clients use CyberWay. NCS offers a full range of Internet services including Web publishing, electronic commerce, intranet consultancy, helpdesk services and training (*Straits Times*, Apr 9, 1996). It is a new company formed from the National Computer Board. Of the 900 employees needed for NCS, 700 were formerly NCB employees. This is in line with the SOG policy of privatizing government services.

The ISPs are using their alliances to differentiate their services and products. CyberWay is offering access to Internet and several specialized regional database services. It seems to be designing service similar to commercial online companies such as CompuServe and America Online (AOL). AOL and rival commercial online services, including Prodigy and Microsoft Network, also serve as gateways to the Internet for their customers. For example, CyberWay offers business information that is published in local and regional newspapers such as *Business Times* and *The Straits Times*. This service is called AsiaOne and provided by the Multi-media Division of the Singapore Press Holdings (SPH). The current manager of CyberWay is the former head of the Multi-media Division of SPH. AsiaOne plans to establish itself as the premier place for business news and information on Singapore and its

Asian partners. In addition to newspapers, several business directories, bulletin boards, and white pages are also available.

The trend towards alliances extends across local, regional and international boundaries. ISPs have formed alliances to resolve some technological issues such as congestion, slow response time and US centric network. One strategic alliance is the Asia Internet Holding (AIH). AIH is a consortium comprising Pacific Internet, Internet Initiative Japan, Hong Kong Supernet and Sumitomo Corporation. The objective of AIH is to build and operate the Internet backbone for ISPs in Asia, in place of direct connections from the various ISPs to the US or Europe. It is developing a distributed high-speed hub with Tokyo as the main network node.

At the same time, SingNet is setting up its own version of an Asian Internet backbone which may promise faster and cheaper access for regional users. It is planning a backbone which routes Asia Pacific traffic directly within the Asia Pacific region, instead of being channeled to the US first and then back to the region. Additionally, SingNet is further enhancing its differentiation strategy by using a regional approach. It has entered into partnerships to be the service provider for fourteen regional customers including ISPs located in the Philippines, Vietnam, China, Sri Lanka and Brunei (SingNet, 1996).

Challenges to Management

After reviewing the trends in the development of Internet in Singapore, an immediate response is to ask how are managers responding to the challenges of a global network. Since Internet is having a significant influence on managers, a framework for planning and analysis of Internet usage in an organization has been proposed. In Reid's (1996, p20) earlier study, she outlined a stage approach called the Internet Life Cycle. The Internet Life Cycle provides some general conditions that prevail in the growth of Internet. However, the framework is descriptive and therefore can serve as a guide to observe and analyze Internet development. Additionally, it outlines an approach for strategic planning of Internet as a prototypical model for designing and testing services for network environments.

Figure 3 presents an overview of the stages in the Internet Life Cycle. They have several similarities to Gibson and Nolan's (1976) stages of data processing developments and Huff et al (1988) stages of end user computing. For the Internet Life Cycle, the stages include Introduction, Exploration, Integration, Diffusion, and Strategic Exploitation. In the first stage, Introduction, the organization has some computers and networking facilities. There is limited managerial support for Internet use.

In the Exploration stage, the organization secures some type of Internet access. Managerial support is evolving but there are concerns regarding security, time management and control. Management starts to investigate information to reduce uncertainty about Internet. The Integration stage involves a progression in Internet knowledge and applications. Management starts to evaluate Internet usage and makes a decision to reject or accept the new innovation. The fourth stage, Diffusion, involves a wider dispersion of Internet usage throughout several functional areas. Finally, the Strategic Exploitation stage involves using Internet for transforming business processes. This can help companies address some of the complex issues of globalization, technological developments, and client-focused services. This approach is being tested in several organizations in Singapore.

Conclusions

In Singapore, the Government recognizes the importance of Internet in its information technology planning and implementation. Within Singapore's IT2000 plan, the Singapore Government (SOG) is using a systematic process for integrating Internet into the government and private sectors. The IT2000 plan outlines a strategic vision to develop a National Information Infrastructure (NII). It was followed by the Library 2000 report, a plan calling for the restructuring of library services throughout the country.

With extensive Government support for Internet services, managers must review the organization's capabilities for providing more network-based services. Although Governments are leading the effort,

managers must design strategic and operational plans for integrating Internet into the organizations. A stage approach for analyzing and planning Internet dispersion within an organization was described. Using the stage approach called Internet Life Cycle, managers can identify key issues that need to be addressed in the systematic planning for using Internet. In the Internet Life Cycle, the stages include Introduction, Exploration, Integration, Diffusion, and Strategic Exploitation. Important aspects of the stage approach are the development of managerial support and employees knowledge regarding Internet services. Managers must develop an understanding of the competitive advantages and disadvantages of Internet services as well as how to integrate them into business operations. They must monitor the activities and strategies of governments so that they are proactive players in the development of the information superhighways.

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Table 1 - IT Plans

Figure 1 - INTERNET DIFFUSION in S'PORE

*Figure 2 - Characteristics of Internet as
Innovation*

Table 3 - Internet-related Companies Set up in Singapore (as of 20 April 96)

<u>Name</u>	<u>Type of business</u>	<u>Date & partners</u>	<u>Activities</u>	<u>Address</u>
Accel	Internet publishing	1994	Set up Singapore Online	
Canada Asia ?	Internet consultancy	?	Offers Internet consultancy in public relations	
Cybercafé at Boat Quay	Cyber café, reseller, training	1996/ Owned by Sembawang Media. Café located in financial district	Offers Internet training. Can sign up for Pacific Internet	
Cybersource Pte Ltd	Software publishing	1995/Dec. W.Thean Soon, Dir.	Designed software called PictureMall. Email software allows incorporate graphics & multimedia.	
Cybertrek Pte Ltd	Cyber café, reseller, training & publishing (pioneer Internet café in S'pore)	1995/Aug. Owned by 4 persons (Chan Cheng). Invested \$200,000.	Owens - CyberNet Café Alliance - CyberWay	www. 57 Tanjong Pagar Road
Cyberville Technologies Pte Ltd	Internet training, publishing	?/T. Wee, Managing Dir.	Offers popular training "Connecting to Cyberspace". Manages web site "Asiaville"	www.asiaville.com 130 Joo Seng Rd #07-02, Olivine Bldg
Cyberway Pte Ltd	Internet service provider (ISP)	1996/March	ISP services	
Information Frontiers Pte Ltd	Financial info services via Internet (manage personal finance)	1995/Sept, Sembawang Media took 75% stake (\$350,000).	Offers Financial Interactive Services Hub (FISH)	www.fish.com.sg
NetCentre	Networking	1995/ Dr. Tommi Chen	Consultant - IDRC Consultant - NetworkAsia Author - Internet series in BT	
Online Oasis	Cyber café, reseller, training		Offers Internet usage, training	Holland Village
Pacific Internet Pte Ltd	Internet service provider (ISP)	1991 - was Technet 1995 Jun - acquired by Sembawang	ISP services	89 Science Park Drive #04-09/12 Rutherford

Table 4 - Singapore's Internet Service Providers - Comparison

	Cyberway	Pacific Internet	SingNet
Date of operation	March 1996	Jan 1992 (as Technet for R&D communities)	July 1994
Initial - basic cost for dial-up	Set up cost ?	NSTB set up cost 3.53 mill	Set up cost 1.2 mill
No. subscribers (as of Apr 96)	\$17.99 - 12 hrs	\$40.00 per mth/unlimited	\$35.00 - 10 hrs (off peak)
" " Mar 95	300	60,000	20,000
		78 organisat. (Technet)	4,000 (1300 companies)*
			10,000 (Sept 95)
Background: parent companies	SPH & S'pore Technologies	Sembawang Media, S'pore Intl Media & ST Computer Systems purchased Technet in Jun 95.	Singapore Telecomm. (also offers Teleview-Internet, Dec 94)
(Parent companies - largest ...)	(publisher & computer.)	Cost 2.5 mill (online service, media & computer)	(telecommunications)
Basic Dial-up Costs for off-peak (as of Apr 96)	\$12.95 for 13 hrs \$ 2.00/each hr beyond	\$12.95 for 12 hrs \$ 2.95/each hr beyond	? \$16.00 for 12 hrs \$ 3.50/each hr beyond (includes toll-free)
Other pricing plans	Individual & network rates Student rates ISDN rates Leased line packages	Unlimited access Student rates ISDN Leased line packages	Individual & network rates Student rates ISDN Leased line packages
Create personal home page	Yes - ?	Yes - no addtl charge	Yes - no addtl charge
Electronic storefront	Asia One (launch 6/95)	Asia Online (launch ?) (former NCB project)	CommerceAsia (launch ?)
Email	Yes	Yes	Yes
Help desk or (On-line help)	Help desk (? hrs) Email help	Help desk (10 hrs) Email help	Help desk (? hrs) Email help

Figure 3 - Internet Life Cycle in Organization

	Network and/or PCs may be available. Unaware if have Internet access.	Secure Internet access.	Full Internet access.
1. Technology (Access)			
2. User Awareness (Knowledge)	Enduser - aware of Internet.	Enduser - acquires declarative knowledge.	Enduser - acquires procedural knowledge.
3. Application/ Services	Enduser - aware of email, WWW	Enduser - adopts some of Internet services	Enduser - applies some services in work areas
4. Management (Innovation decision)	Uncertainty in minds of potential adopter	Investigates opportunity to reduce uncertainty. Allocates resources.	Evaluates innovation within organiz/depts goals. Makes decision to accept or reject innovati.

Figure 3 - INTERNET LIFE (cont)

	Full Internet access.	Upgrades speed, bandwidths, access options, etc.
1. Technology		
2. User Awareness	Enduser - integrates procedural knowledge	Enduser - acquires proficiency. Enduser - functions as facilitator, designer & evaluator.
3. Application / Services	Enduser - diffuses Internet services in organization. Lack systematic plan.	Enduser - modifies innovation & designs own local applications. Restructure processes.
4. Management	If accepts, tries to exploit innovation for organiz goals. Makes decision to accept or reject innov	Attempt to identify niche areas & how to use innovation for strategic advantage.

STAGE 4 - DIFFUSION

STAGE 5 - STRATEGIC EXPLORATION