TDRI Quarterly Review
Published in *TDRI Quarterly Review*
Vol. 7 No. 4 December 1992, pp. 23-28
Editor: Anne Johnson

Public Services in Thailand: The Role of Information Technology

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Information technology (IT) is rapidly gaining the center stage for future world economic growth and development. IT has become of strategic importance to the services industry, which is predominantly associated with information or knowledge-based activities. It has also enabled an increase in productivity and enhanced product quality in the manufacturing industry. IT has also been instrumental in integrating the previously distinct domains of manufacturing and service activities. As the trend of customized production gains momentum, therefore, the relative cost share of material processing per unit of output will decline, whereas the share of gathering information for R&D, design, marketing, transport, and delivery of goods and services will grow. Modern economies are thus shifting steadily toward service economies.

While IT is gaining prominence as an engine for economic growth, it also promises to have far reaching potential for the delivery of social services, enhancing the effectiveness of government administration, and generally raising the quality of life for mankind.

In government, IT can be used to improve various key areas of public-sector management and policy formulation in tune with ever quickening changing macroeconomic and social conditions. This will enhance the convenience to citizens in obtaining public services. At the same time, its misuse can easily violate personal privacy.

In education and training, IT can improve education management, provide novel approaches to learning and training, and become an effective tool to realize education for all.

In public health, IT will continue to play a considerable role in raising the standards of public health services delivery, with current applications ranging from collection and statistical analysis of data for health and family planning indicators, epidemiology, demographic and medical research to information systems for health care delivery management, such as maintaining patients' records and pharmacy logistics control.

In the future, advances in IT will enhance the efficiency of current applications, spreading the benefits to a wider section of the population, and will also open up many more novel applications for improving the quality of life of mankind. IT is likely to revolutionize the way one lives and works, with a host of new service concepts such as tele-working, tele-education, tele-banking, tele-health care, and tele-entertainment, some of which are already taking place to the greater benefit of consumers.

This paper will share some experiences with regard to the role of IT in the provision of public services in Thailand, and serve as a platform for further discussions in the three important areas of public administration, education, and health care.

TELECOMMUNICATIONS FOR ALL: THE BASIC LINKS

Most social and economic development activities require services from infrastructural networks in transport, power, water, and telecommunications; the latter is also important, but less well understood. Many thinkers

and researchers, such as Pool, Parker, Webber, Hudson and others (Saunders, 1983), contend that while commerce is about the communication of information among parties concerned, telecommunications is a prime means to achieve social and development goals, including the supply of education, health care and other social functions, and hence is a basic link to a better quality of living for all. While land, sea and air transport has lowered location barriers, it is the advances brought about by IT or the convergence of computers and telecommunications that have made location, time and distance almost irrelevant.

As in most developing countries in the world, Thailand has placed emphasis on developing transport, power, and water infrastructure networks during the past 30 years of national development. It is only recently that greater emphasis has been targeted to improving the country's much underdeveloped telecommunications network. Even so, priority in telecommunications investment has mostly been dictated by direct benefits in revenues. At present, the distribution of telephones in Thailand is highly concentrated in and around Bangkok and a few other regional centers. According to the 1990 census, 38 percent of private households in the Bangkok Metropolis had telephones, while the relatively well-off central region averaged 7.2 percent, and the poor northeast a mere 2.6 percent. As shown in Table 1, statistics from the Telephone Organization of Thailand (TOT) for 1991 revealed that the number of telephones per 100 population nationwide stood at 2.88, of which the figure for the metropolitan area was 14.45 and the provincial area 1.08, with a waiting list of more than 1.3 million applicants.

The current projects to add three million telephone lines, two million in the metropolis and one million in provincial areas, are a clear example of how important the country views the need for better telecommunications. Many value-added services, such as cellular telephones, paging and data communication networks, have been given to private-sector operators under concessions from state agencies. A number of other major projects are well under way or being planned. They include ISDN services, a teleport to complement the Eastern Seaboard Development, an optical fibre network along railway routes, and the launching of a Thai communications satellite.

Almost all of these projects and plans, however, will primarily benefit the Bangkok Metropolis and to a lesser extent provincial cities and district towns. There has been little focus or discussion of the role of telecommunications in promoting the development of rural areas. Of over 60,000 villages within some 5,300 tambons (sub-districts), only 1,813 tambons and about 3,000 villages have access to public telephone services. Over the next five years, a further 4,500 locations, covering the remaining 3,500 tambons, will be provided with public telephone services. The remaining villages, numbering more than 50,000, will have to wait until 2001, according to the Ministry of Transport and Communication's Ten-year Master Plan. The Plan specifies that public telephone services should penetrate nationwide, raising availability from 0.05 per 100 population in 1991 to 0.86 per 100 population in 1996. In contrast, at the end of South Korea's 10-year rural telephone network modernization program (1978-1987), all villages with more than 10 households (some 24,111 villages in total) and all 491 islands with more than 50 inhabitants each were connected to the nation's automated direct dialing telephone network. In so doing, South Korea achieved a more balanced social development and a more equitable distribution of economic activities and income (Jun, 1991).

With recent advances in satellite technology, it is now both economically feasible and justifiable to provide the benefits of telecommunications to a wider segment of society—even if they are small and remote villages or difficult to reach mountain communities (Hudson, 1990)—because of certain technical and economic advantages of communication satellites. One advantage is the ability to provide reliable telephone and data communications between two points anywhere in the world, irrespective of intervening oceans or terrain. Also, low cost satellite earth stations have been developed that can be installed wherever needed, on customer premises, in isolated and remote villages, at disaster sites, or even on trucks and ships. Another advantage is that satellite communications are cost-insensitive to distance, unlike land-based communications technologies. In addition, communications satellites are particularly appropriate for such broadcasting services as current and financial news, weather reports, and so on.

In the future, optical fiber systems are destined to replace copper cable in existing telecommunications networks and become the backbone for the very heavy traffic routes of future telecommunications

networks around the world, while satellite systems are clearly cost-effective solutions for international telecommunications services in developing countries (Saunders, 1983). Satellite communications have also been used by some developing countries, such as Indonesia, to extend domestic service to otherwise inaccessible locations. Also, the wide broadcasting ability of a satellite makes it a cost-effective means to deliver education to all, whether formal curricula from primary to university education, or non-formal and continuing education programs.

It can only be hoped that, by 1994, after the launch of the first Thai communications satellite, the government will make serious efforts in using it to extend basic telephone services, as well as to broadcast useful information services, and not just entertainment programs, to all parts of the country.

Finally, although the country so far has clearly demonstrated its resolve to improve communications and seems well on its way to building up a much needed modern telecommunications infrastructure—albeit aimed primarily at the economic sector residing mainly within the Bangkok Metropolis and a number of regional centers—plans or intentions for other equally if not more important and pressing requirements are, however, unclear at present. Notable is the severe shortage of IT and a wide range of other technical professionals that threaten to place a serious constraint on the country's ability to reach its economic and social development goals.

INFORMATION TECHNOLOGY AND PUBLIC SERVICES

An Overview

Government, at one time the leader in the use of IT, has now been outpaced by the private sector and the gap is likely to widen further. Leading firms, particularly within the services and financial sectors of the economy and some of the larger industrial firms, have been investing substantially in IT to improve productivity and to enhance or maintain comparative advantages over rival firms. In contrast, only a few large public agencies have come close to the forefront in exploiting available state-of-the-art technologies in IT. Moreover, the nation's overall growth in IT investment seems unsatisfactorily low, compared with its outstanding economic growth performance throughout the past decade. For example, based on a sample of 13 leading private firms and 16 public sector organizations, about every three employees share one telephone line in the sample firms, and eight share one in the public organizations. This compares to the national average of 40 persons per telephone. Similarly the number of employees per one personal computer (PC) in 1988 was about four for the sample firms and 40 for the public organizations, compared to over 300 persons nationwide (TDRI, 1992).

Public Administration

There are instances where the potential of IT have been or could well be exploited in public services provision (Table 2). Foremost among these is the example of the Central Population Database (CPD), a project which began in 1983 and is currently being undertaken by the Local Administration Department (LAD) of the Ministry of Interior. The project gained wide recognition recently when it won the 1990 Computerworld Smithsonian Award in Washington, D.C., as "the world's first population database" and "for the transformation of IT to the benefit of mankind." By 2006, CPD mainframe computers will be linked to some 12,000 terminals across the country, providing instant access to files on an estimated 67 million people for such personal data as details of immediate family members, names of all people who share the same family name, records of marriages and divorces, details of adopted children or persons under custody, records of firearms in possession, and details of eligible voters, among others. The CPD system will also be linked to databases maintained by the Policy Department for Criminal Records, the Finance Ministry's Revenue Department, the Foreign Ministry's Passport Division, the Interior Ministry's Land Department, and the Land Transport Department's Driver Licensing Division.

Ultimately, the system when completed will be able to identify any citizen, anywhere, through his or her fingerprints and will give instantaneous information on whether a person is legally eligible to, for example, buy a piece of land or to register for marriage. It will drastically cut the time it takes for a Thai to get a

citizen's ID card from about two months to only 15 minutes at any local administration office nationwide. Household registration will also be easier, as people who move from one house to another can register their new addresses with local offices in their new neighborhoods, without having to return to their former local offices to have the old registration deleted as they do now.

In principle, the system should maintain accurate demographic information and statistics useful for population control, voter registration, and other social and economic planning.

While the director of the CPD claims that the nationwide computerized information system is for the protection of Thai citizen's rights, many local and international human rights groups have strongly expressed concern over possible abuse of personal information and invasion of privacy, and over the possibility that the information could be abused for political purposes (Tunsarawuth, 1991). Such key questions as "Who, and to what extent, has the authority to access this information?" and "What safeguards are there to ensure the integrity of the information and to prevent abuse of authority?" need to be raised and openly debated by the public.

Nonetheless, it is hoped that public service agencies, dealing with less controversial areas of information, will at least be prompted by the current CPD effort to begin to seriously examine their own information systems and how best to exploit the benefits of IT to enhance productivity and improve public services. Currently, public information is scarce, outdated, or inaccurate either for the agencies own or for public consumption. Available information is often difficult for the public to access; and frequently the public simply does not know to whom to turn for the information needed. One rural development non-government organization (NGO), for example, has complained about the great difficulty it faces in obtaining information needed to carry out work to improve the living conditions of the country's poorest northeastern villagers.

Another good example of the use of IT lies with the employment of satellite technology in remote sensing for land title surveys and mapping. Through a 200 million baht grant from the Australian Government in 1985, the Land Department is aiming to complete, by the year 2000, the task of issuing land titles to all rightful owners and to build up a "Land Information System" database that will give details of current land prices throughout the nation. Satellite remote sensing is also being employed in numerous other applications. Data from three satellites—Landsat 5, SPOT, and MOS 1—currently provide information on soils, climate, land use, forest reserves, vegetation mapping, water resources, and other natural resources. As a result, Thailand realized that on-going deforestation would be unsustainable, prompting the Royal Forestry Department to first implement a reforestation program and later, in 1989, a total ban on logging following the flood disaster in the south.

Education

Currently, the Ministry of Education relies on TOT's microwave communications networks to relay up to 56 hours per week of educational programs to its 11 regional radio network stations. The Ministry claims that its radio educational program is gaining in popularity over its other two programs of self-study and attending evening classes.

While the Ministry of Education uses radio broadcasting networks to provide up to secondary-level education, two open universities use both radio and television broadcasting to deliver selected undergraduate courses, as well as general adult education on a much smaller scale. Ramkhamhaeng University uses a radio network of 38 AM/FM stations and the state television Channel 11 to provide lessons for selected subjects with large enrollments.

Ramkhamhaeng University, the larger of the country's two open universities, is also using IT extensively to cope with the administration of student enrollments, now in excess of 300,000. Apart from using computers to develop and provide computer-aided instruction (CAI) packages, the university has fully computerized its registration, examination, and library services. With an ID card, a student can obtain such information and services as registration, examination timetables, examination results or grades, and library and campus

news from the five terminals currently on campus. In addition, the university has developed a voice-response system so that students outside the campus can access the same information via telephone. The university is also in the process of negotiating with one or more participating banks to offer tele-registration by telephone.

The other open university, Sukothai Thammathirat Open University (STOU), is making greater use of distance education for teaching at the certificate and Bachelor degree levels. Apart from mailing texts, exercises, audio tapes and pictures, radio and television programs are broadcast for most subjects. The STOU plans to establish one-way video and two-way audio classes at a number of Education Service Centers throughout the country in the near future.

A nationwide cable and wireless information infrastructure firmly in place would not by itself be sufficient to ensure good education for all. The country has to tackle the other major bottleneck, that of manpower and the expert skills required to produce educational materials (or software) for electronic delivery on demand to the home, workplace, or school. It has been estimated that the preparation of programmed educational material is perhaps two orders of magnitude as involved as the more conventional method of teaching in front of a class. It takes up to 100 hours to prepare an hour of software instructional material; and it requires special skills, not merely knowledge, to prepare quality software. Most of all, acceptance of this concept by the education administration and the public is the first and very important step.

A nationwide information infrastructure by the year 2001 would lay the basic infrastructure for new and exciting opportunities in education. The current development of multimedia technology, interactively incorporating computer, communications, video, HDTV (high-definition TV) and other man-machine interfacing technologies, offers varying computer-assisted instruction options, suitable to particular learning needs—individually and at a time, place, and pace chosen by the student. Advancements within IT also offer novel means to interactively present and demonstrate hard-to-grasp concepts and theories through a combination of simulations, text, graphics, diagrams, and audio and video presentation.

Health Care

In providing health-care services to over 56 million Thais, IT can play a vital role in improving the efficiency and effectiveness of delivery. Often the ability to obtain and provide prompt and accurate information can well be a matter of life and death, as with epidemics and other medical emergencies. Thus, both computers and telecommunications are imperative.

The use of IT in Thai health services, however, has been rather minimal, although the Ministry of Health is doing its best to make use of its very limited IT capabilities. Currently, the Ministry's computer system consists of two low-capacity low-speed minicomputers (installed since 1983), one super-microcomputer, two LANs, and a small number of workstations and PCs. One minicomputer is dedicated basically to the processing and statistical analysis of up to two million records a year of raw data on epidemiology, generating output reports on a weekly basis. The other serves essentially as a decision-support system, providing vital analytical and information support for planning and health-care delivery management, which includes, among others things, weekly reports that track the status of some 40 diseases, including AIDS, where details of patients, time, and location are fully documented. The super-microcomputer is used for training Ministry staff.

The Ministry submitted a computerization master plan to the government last year, for implementation in 1992, in an effort to reap the benefits of computer networking throughout the country. The plan will link, in stages, provincial health administrative offices and major hospitals to the Ministry's host computer by the year 1996, in an effort to raise the standards of public health services and significantly contribute to the Ministry's goal of achieving "Good Health Care for All by the Year 2000."

In the future, one can expect to see new ways of bringing health care directly to the homes of the aged, of the handicapped, and to other patients. Through remote monitoring of attached sensors, patients can go about their daily routines or rest at home, while being constantly monitored. Thus, they will be able to

receive immediate attention and aid when necessary. In emergencies, two-way voice and video communications can provide, on a case-by-case basis, step-by-step instructions while awaiting the arrival of ambulances or health officers. A nationwide information infrastructure can be an effective vehicle to raise public awareness and knowledge of preventive health care, provide step-by-step first aid, or rescue the injured. It can also be effectively used in distant-learning programs to upgrade the skills of and provide up-to-date knowledge to rural health workers, nurses, and physicians. For instance, a U.S. company has developed a courseware based on personal computers, robotic sensors, and video disc that teaches doctors how to perform orthoscopic surgery on joints. With video-conferencing, expert surgeons can assist counterparts at rural or remote hospitals in performing difficult operations remotely from their own hospitals. These and many other possibilities are just part of the future scenario of medical and public health services attainable through IT to help "Good Health Care for All by the Year 2000" become a reality.

GETTING FROM HERE TO THERE

The scenarios depicted are not impossibly futuristic. With a few exceptions, the technology is already available. In the exceptional instances, it will be available within the century.

On the cost side, a major component will be the modernization and, above all, the expansion of the current communications system in Thailand. This is where a major commitment of resources will have to take place. Current plans for the massive expansion of the telephone network will merely make up for the backlog of demand for voice telephones. It appears that the government has become exhausted by the effort that went into launching this expansion plan, and into resolving some of the controversies that surrounded it. However, given the rapid pace of technological change and the growth in demand, another period of expansion should fall due within the next few years, and the government should ensure that it does not allow another backlog to develop. Given the expected high return from such an investment, it is not expected that there will be any financial constraints to the needed expansion.

The central bottleneck lies with the human resources needed for the technology to yield fruit. IT is not completely "footloose"—the hardware may be, but not the software. There is need for adaptive development on the software side. Currently, there is a severe shortage of technical personnel to implement the new technology.

Overriding these problems is an inadequate understanding among policy-makers of the new technology and the benefits that it can bring. A better understanding is needed so that resources can be more adequately committed to upgrading the communications system and to developing the human resources necessary to utilize the new technology.

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