

THE APPLICATION OF INFORMATION TECHNOLOGY IN ASIA AND PACIFIC COUNTRIES

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Abstract

This article presents information technology written on the country reports that have been submitted to FID/CAO 13th Congress and Assembly on Strategic use of Information Systems in Asia and Pacific Countries, held in Jakarta on 6 - 8 June 1995. The presentation of applied information technology is divided into Pacific countries that are represented by Australia, Georgia, and Papua New Guinea; while Asian countries are indicated by reports from India, Indonesia, Japan, Malaysia, and Thailand.

AUSTRALIA

At present, some professional associations in Australia took participate in developing ongoing professional education learning services for their members. The professional associations, in cooperation with Deakin University, are carrying out activities in the professional learning program to the information profession. The areas that the associations active are in the field of accounting and management. The relationship between the associations and Deakin University is that the associations own and market the program and Deakin Australia provides services, such as project management, instructional design, course writers, academic support, assessment/examination, logistics, production, and graphic design that support the development and delivery of the learning programs.

The provision of education is mainly designed capable of being accessed by a lot of associations' members throughout Australia. The carrying out of distance/open learning techniques programs is one of this application. Information technology used as a learning strategy by the Deakin Australia are utilising:

- Electronic communication network: Email, fax, telephone help desk;
- Electronic based management system: Computer Managed Learning (CML), bar coding, optical reading.

These information technology infrastructures are completed by high quality open learning teaching materials, examination network, and examination centres throughout the world.

The paper shows that professional associations have a key role in providing effective education and learning service to their members. The Deakin Australia's experience has shown that a close partnership between an association and a university can result in an excellent professional learning program.

GEORGIA

The process of economic transformation are characterized by rapid growth of the demand for industrial and business information that most of them are supported by some Scientific and Information Centres available in this country. These institutions comprising 200 state information centres are operating in the FSU (The former Soviet Union), in which 100 of them are located in Moscow.

TECHINFORMI, one of the science and technology information centres in Georgia, in collaboration with the science and technology centre of Armenia and Azerbaijan has generated a database called "Transcaucasian Enterprises" which comprises data on 4.500 enterprises. This service is carried out with the main purpose to motivate new business in these countries because most of the users come from the

industrial filed. TECHINFORMI is aimed to serve the user appropriately, therefore a well knowledge of the local industry and well-established contacts with the newly established non-governmental sector should be mastered. The database can easily provide information about a potential trade or industrial partner, the description of local enterprises, and who produces what within the territory. This industrial database is compiled in two languages, the Russian-language for inhouse circulation and the English language to be distributed outside the centres.

A network of sci-tech information centres are conducted between TECHINFORMI and the "near-foreign-countries". The centres offers services for foreign firms and companies:

a. For business interested in the former Soviet Union Countries:

1) market research on the territory of the CIS countries, 2) Search of potential partner in the CIS, 3) Intermediary services in the import export trading, 4) Conduct a negotiation and making contract, 5) Search and obtaining or required information on the CIS countrys, 6) Direct-mail advertising on the territory of the CIS.

b. For business wishing to visit any country of the CIS.

1) Reception and accomodation of visitors in any city of the CIS, 2) Organizations of business appointment with local business groups, leaders of different level, local authorities, entrepreneurs; 3) Secretarial services (including translation and interpreting, 4) car services, 5) cultural programme.

The sci-tech information centres in the FSU (Federation of Soviet Union) traditionally cooperated with STI centres in the world. The dissemination of business information in the rest of the world is carried out through other channels. In Europe, the information on potential partners is disseminated through the chamber of commerce. Recently, this has been replaced by the network of Business Cooperation Centres (BCC).

From seven BCCs established in Russia, Ukraine, Georgia, Armenia, Kazakhstan, Uzbekistan, two (In Georgia and Uzbekistan) are being formed on the base of sci-tech information institutes, while others are formed on the base of chambers of commerce and association of entrepreneurs. The project

is aimed to strengthen the information activity in the chambers of commerce and kind the sci-tech information institutes with the European network of business information.

As a sector of economy, the information sphere is experiencing rapid change in its development. TECHINFORMI is aware by this condition and creates "Infomarket" database which comprises data on governmental and non-governmental information services. Each service is described by an approximately 2 KB entry. This database competes with the existing sci-tech centres, therefore the centres must strengthen their services towards the current processes. Hence, people can conclude that the assistance to the establishment of new-governmental structures engaged in the spheres of industrial information may be regarded as one of the elements of the sci-tech centre's policy.

PAPUA NEW GUINEA

Ms. Rhonda Lakele Eva who represents South Pacific Centre for Communication, Information in Development (SPCenCIID), University of Papua New Guinea stated that her paper indicated the utilization of information among R&D personnel in PNG. Beside this, the purpose of her paper was also to expose areas that require improvements or enhanced information access and sharing information leading to an effective information utilization.

It has been 20 years ago PNG gets its political independence. An office of Information was established with the objective of translating government policies at the grassroot level. Activities, such as extension works and repackaging information in the fields of agriculture, economic, and social are encouraged. Sources that can be utilized into the repacked information comes from:

- a. Knowledge received from training by the scientists and agricultural officers.
- b. Textbooks from the institution libraries.
- c. Textbooks from information officers.
- d. Repackaged information for extension officers.
- e. Translation into the local language compiled for non professionals.

Information processed from the above resources is called "development information" and it is also used as the basis for development plans and policy formulation.

ASIA

INDIA

Country report entitled "Utilization of Information by R & D Professionals in India" was presented by R.P.S. Dhaka. He revealed the application of information systems there by stating that information technology functioned as a main support for R & D activities. There are 3,000 R & D organizations having special libraries or information centres as an integral component of the organizations. Designed for supporting its own R & D organization, every R & D's library and information centres cannot fulfil the needs of the recent project in India which have a multidisciplinary characteristics. Consequently, India has developed a research information infrastructures which is divided into: 1) Information Resource Centres, and 2) Information Networks.

India has 7 major information centres, those are:

1. Indian National Scientific Documentation Centre (INSDOC), New Delhi.
2. Defence Scientific Information & Documentation Centre (DECIDOC), New Delhi.
3. National Information System for Science and Technology (NISSAT), New Delhi.
4. National Centre for Science Information (NCSI), Bangalore.
5. Small Enterprises National Documentation Centre (SENDOC), Hyderabad.
6. National Social Science Documentation Centre (NASSDOC), New Delhi.
7. National Information Centre, SNDT University, Bombay.

The first five of these centres deal with science and technology information and the last two deal with information on social sciences and humanities.

INSDOC is the main organization in information science, technology, services, and system in India. Library automation, design, development of databases, and library networking are specialities of INSDOC. Network of regional centres is located at Bangalore, Madras, and Calcutta.

The National Information System for Science and Technology (NISSAT) is another big information centres in India. The major instrument for information resources development and dissemination are Sectoral Information Centres (SIC) which have been

established by strengthening the existing information facilities at different institutions. There are ten SICs operated within NISSAT. Each of them functions as a National Information Centre with different subject, those are: for leather and Allied Industries (NICLAI), for food science and Technology (NICFOS), for Machine Tools and Productions Engineering (NICMAP), for Textiles and Allied Subjects (NICTAS), for Chemistry and Chemical Technology (NICHEM), on advanced Ceramics (NICAC), on Bibliometrics (NCB), for Crystallography (NICRYS), and on CD-ROM Technology.

In India, there are three major information networks operating in this country:

1. Education and Research Network (ERNET)
2. Scientific and Industrial Research Network (SIRNET)
3. National Informatics Centre Network (NICNET)

ERNET and SIRNET are mainly connecting the academic and R & D Organizations with certain services like Email, FTP, Telnet, Gopher and World Wide Web. They connect more than 600 organizations and their users are estimated to be about 40,000 persons. At present the networks are operating on telephone lines using dial-up and leased lines with data rates ranging from 9.6 to 64 kbps. NICNET is a government information network and links all the District Headquarters, State Capitals and the National capital. The networks has satellite connectivity and provides various services to the users like Email, file transfer facility, remote database access and internet access.

Due to the rising prices of periodicals and other information materials, a number of organizations are pooling their information resources. The library networks have emerged in some cities to facilitate the resource sharing:

1. CALIBNET (Calcutta Library Network), Calcutta
2. DELNET (Delhi Library Network), Delhi
3. MALIBNET (Madras Library Network), Madras
4. BONET (Bombay Library Network), Bombay
5. PUNET (Pune Library Network), Pune.

Besides above information centres, the India government has established an Information and Library Network (INFLIBNET) for sharing information resources of about 200 universities and academic institutions through the facilities of a high speed network.

INDONESIA

To day, the National Program on Information System is based on the second long-term development program, commenced in April 1994. Science and technology becomes one of the nine principles of the national development program. The role of documentation, information services, and libraries is increasingly emphasized.

Details of the national program on information system included in the sixth Five-year Development Plan (Repelita VI) are as follows:

Development targets:

- establishment of information system with the capability to increase the efficiency and productivity in any sector of development;
- establishment of information networks in various fields at the national level as well as at international level.
- establishment of information technology industry to meet the national needs.

Development policy:

- The development of the operation of information system.
- The development of information technology industry capability.
- The development of the use and the dissemination of information resources.
- The development of the quality of human resources.
- The development and reorganization of institutions.

Based on the development target and policy, program activities which is divided into main program and supporting program can be mentioned as follows:

- Main Program:

1. To standardize: structure, format, and data classification;
2. To develop and maintain databases;
3. To develop application program;
4. To increase of the use of application packages;
5. To implement office automation;
6. To develop and reorganize data communication networks;
7. To increase information acquisition capability;

8. To widen the dissemination of information services;
9. To increase the coordination among network nodes.

- Supporting Program:

10. To publicise information system program;
11. To strengthen information technology industry;
12. To conduct education, training, and extension work;
13. To maintain institutional capability.

The objectives of the national information system is to increase the efficiency and productivity of the 20 development sectors, those are: industry; agriculture and industry; irrigation; work force; trade, domestic products, finance and cooperatives; transportation, meteorology and geophysics; mining and energy; tourism, postal and telecommunication; regional development and transmigration; environment and space planning; education, culture, believe in one God, youth and sport; population and family welfare; social welfare, health, women role, and child care; housing and settlement; religion; science and technology; laws; government employee and inspections; politics, international relation, information, communication, and mass media; defence and security.

Documentation and information works had been developed with the support of information technology. Sophisticated information system can be developed to meet the ever increasing needs of the users. Information system is continuously enhanced to be more user friendly. Also, information professional is always required to work harder to produce easier system to be used by customers and to understand information technology.

It has been noted that agriculture plays a very important role in developing people in Indonesia in which 80 percents of them live in the rural areas. At present the use of information to develop agricultural sector is very crucial.

The present status of agricultural information services is conducted by Center for Agricultural Library and Research Communication (CALREC/ PUSTAKA) with the following services:

1. *Information searching*

It is served on users' requests, provided in the form of bibliographic list of information concerning

the request subjects. The information searching is served both manually and computerized by using CDROM.

2. Current Awareness Service (CAS)

CAS is designed to maximise the use of serial holdings, especially periodicals by sending photocopies of tables of contents from the current journals to the users.

3. Selective Dissemination of Information (SDI)

It is designed to meet the need of agricultural researchers with selective information based on the research programs and user profile.

4. Library and Document Delivery Services

This service is designed for users having geographical constraints to come to the library. The library will send agricultural information to them.

5. Technical Guidances

It is given to junior librarians and individually on how to improve the library and information services and to be a professional librarian.

Information on the specific commodities and geographic are available in different institutions. For instance, information centre for soil and agroclimate is located in West Java, while the information centre for upland rice is available in West Sumatra.

Future development of the local information system is developed by providing technical guidance on how to manage a local information centre, to use computer in data processing and searching, as well as how to maximize the use of agricultural information services. This technical guidance is disseminated in 27 provinces in Indonesia.

In a national system, CALREC (Centre for Agricultural Library and Research Communication) is one of the information network centres of the National Information Network for Science and Technology (Ipteknet) specializing in agriculture and related sciences.

The national information system is developed through Ipteknet (National Sciences and Technology Information Network). CALREC is allowed to participate actively in the use of S & T information resources by using electronic communication via global computer network.

CALREC is also appointed as the National Cen-

tre for the International Information System for Agricultural Sciences and Technology (AGRIS), Network for Fertilizer Information System (NFIS). The activities are done through network by sharing databases to improve information services to users. The available databases are:

1. AGRICOLA (Agriculture Online Access)
2. AGRIS (Scientific Information System for Agricultural Science and Technology)
3. SCI (Sciences Citation Index)
4. CABI (Center for Agriculture and Biosciences International)
5. NTIS (National Technical Information Service)
6. Journal of Biological Chemistry (full text).

The international system is developed by cooperating with some international organizations, such as the Scientific Information System for Agricultural Sciences (AGRIS), FAO, Network for Fertilizer Information System (NFIS).

JAPAN

Information system in 21st century require innovative functions. It is mainly aimed for the utilization of multimedia and composite information by understanding and processing meaning of information stored and managed in self organized information base system.

Conventional Database Management System and Expert System are useful only to close world problem solving such as information retrieval and deductive inference. On the other hand, open world problem solving is mainly needed to support high performance information systems. These functions consist of analogical reasoning, inductive inference, and abductive inference that are supposed to establish the methods of information retrieval, numerical calculation, and deductive inference used in closed world solving problem.

Semantic processing is also necessary for solving open world problem, for example operations on similarity and on associative relationship. Both semantic processing and management of composite and multi media information require flexible and evolutionary vehicle for storage.

Procedure to get the New Information System is as follows:

1. To collect comprehensive information required.
2. To extract meaning into fragmental semantic re-

- relationship by using C-TRAN.
3. Integrating fragmental relationship.
 4. Using SS-SANS (Semantically Specified Syntactic Analysis of Natural Sciences).
 5. SS-KWIC (Semantically Structured Key Word Element in Terminological Context)

This New Information System are applied to science and technological information. Examples of the application for research and development are:

1. CORES (Computer Aided Organic Syntheses Research System)
This system consists of 50.000 reactions of organic compounds used for synthesis design.
2. CAPDAS (Computer Aided Polymer Design and Advanced Development System)
It is used widely in Industries and traditional activities. NMR is a powerful method for analysing polimer structure and induction is the main function for structural analysis.
3. NLOM (Information Base System for Non Linear Optical Materials Research and Development). Non Linear optical materials are important for optical devices including computers and communication technologies. Material design and development of new uses of materials need abductive inference.

THAILAND

At present a Paperless Information System is introduced to the private enterprises in Thailand. This system allows users to work directly with computer-based information system that is called Visual Information Access (VIA).

For developing Paperless Information system, information infrastructures in the forms of telecommunication and computer are mainly needed.

It cannot be denied that information technology (IT) plays an important role to economic and social development in Thailand. therefore the National Information Technology Committee (NITC) was set up in March 1991.

To carry out daily activities NITC is comprised into some subcommittees: 1) Thailand EDI Council (TEDIC), 2) The Subcommittee on IT Policy and Planning, 3) The Subcommittee on Human Resource Development, 4) The subcommittee on IT Utilization in Public Sector, 5) The subcommittee on IT Public

Awareness, 6) The subcommittee on IT Research and Development.

ThaiSarn (Thai Social/Scientific, Academic and Research Network) is the internet connecting universities, research, institutions, and public agencies for academic and research purposes. This network is administered by the National Electronics and Computer Technology Center (NECTEC). Available services are electronic mail, online information retrieval, and sharing of computer facilities.

THAI-net (Thailand Access to Internet) also provides access to Internet. This network comprises Chulalongkorn University, Assumption University, and Chiang May University.

Multimedia Technology application in Thailand can be described as:

1. CAI (Computer Aided Instruction)
It assists students to learn in interactive mode with images, sound, video, and animation. Several CAI lessons are available in CDROM.
2. Personnel Information System
Including pictures, voice, and signature of the staff, used for security purposes.
3. Patient Information System
It is similar to Personnel system database with additional information on Xray, ultra sound, and doctors diagnosis.
4. Inventory Control System
It contains picture of the inventory and its storage location.
5. Geographical Information System (GIS)
Recording geographical details such as maps, geographical locations, and population settlement.
6. Electronic Documentation
It is a computer application for document storage instead of filing cabinets.
7. Criminal Database System
It has been set up by the Police Department. Using a large computer system, the information includes pictures, finger prints, and crime histories of the criminals.

Document Image Processing (DIP) Technology has been developed in Thailand to solve the problem of storage and retrieval of documents.

Due to the use of bitmap data on some parts information that consequently need a large storage of space, the DIP system uses optical disks as storage

medium. This optical disk can be divided into Compact Disk Read Only Memory (CDROM), Write once Read Many (WORM), and Write Many Read Many (WORM).

The major DIP application is to assist the document management storage and retrieval process, searching, copying losses, and lessen the storage space for document. This document management uses Keyfile software that operates under Microsoft Windows.

MALAYSIA

The first paper from Malaysia reported on the information seeking and utilization among R & D people in Malaysia. Generally, this paper highlights some activities in the fields of Research and Development, information needed for research, and information seeking behaviour of the researchers.

The development of various databases is proved to be useful for the development of R & D in Malaysia. National Library of Malaysia has developed a number of databases:

- MENTARI: indexes more than 300 Malaysian periodicals.
- PANCARAN: a database version of the index to Malaysian Conferences.
- BINAR: a database of National Library Collection from 1991 on ward.
- SURIA: a database version of the Malaysian Newspaper Index.

The Science University of Penang has developed MIDAS, a database information for industries; BRC Database which records all research and consultancy projects undertaken by R & D of MARA Institute of Technology.

The development of networking systems, supported by telecommunication facilities also supports the development of R & D in Malaysia. Communication among institutions and agencies has been made possible through direct dial and Email. The development of networking has initially focused on the specific and system, such as

- Joint Advanced Research Integrated Networking (Jaring);
- Civil Service Link (CSL);
- Standard Industrial Research Institute Malaysia Link (SIRIMLINK);

- Knowledge Resource Centre (PSi);
- The NSTP Library Online Reference Service (new Straits Times Press);
- Palm Oil Research Institute Malaysia Link (Palmoil);
- Agriculture Information System (AIS);
- Rubber Research Institute of Malaysia (RRIM);
- Price Information System (PIS);
- South Investment Trade and Technology Data Exchange Centre (SITTDEC);
- Medi*Link;
- Jaringan Ilmu (a national networking system which is in the pipeline).

Meanwhile, the National Information Structure involved in R & D activities are:

- Ministry of Science, Technology and the Environment.

This Ministry lays the foundation of R & D reformation in the public sector.

- Malaysian Science and Technology information Center (MASTIC)

It has authority as provider of science and technology management information in Malaysia for the support of public science and technology development; science and technology education; and further economic activities in innovation; entrepreneurship and competitiveness in Malaysian industry.

The information services and products provided by MASTICS are:

- Science and Technology statistics and information analysis services
- Education, promotional and coordinating services
- S & T management information reference library and directory services
- S & T analytical services
- Information networking system accessible online.

“Environmental Information for Sustainable Development: Improving Access, Use and Exploitation of Information Resources” is the second presentation from Malaysia.

This paper emphasized the need of environmental information on the pre-industrialisation and post-industrial development in Malaysia that can be adopted to other countries. Many countries of the world are experiencing environmental transformation. It means that ecosystem disaster is likely happened

caused by either formal and informal development. Disasters happened are in the forms of flash floods, landslides, soil and vegetation erosion, deforestation, haze, water, air and noise pollution, and river pollution. Based on these condition, information pertaining to environment hazards and control should be developed and disseminated in Malaysia.

It is true that the Malaysian government is very concern with environmental problems and issues. This is reflected in the third Malaysia Plan and the Environmental Quality Act 1974 which contains appropriate measures to protect environment. The establishment of Environmental Quality Council in 1977 is the next important action dealing with environmental regulation and acts. Kuala Lumpur Declaration 1992, Langkawi Declaration 1989, and the guidelines on Environmental Impact assessment Procedure in 1987 are all regulations for monitoring environmental conditions.

On the regional and international level Malaysia is actively involved in the cooperation through membership in:

1. As designated National Authority (DNA) for International Register of potentially Toxic chemicals (IRPTC).
2. Malaysia-Singapore Joint Committee on the Environment (MSJCE).
3. ASEAN Cooperative Programmes on Marine Science (ACPMS).
4. Indonesia-Malaysia Joint Committee on the Environment (IMJCE).
5. ASEAN Senior Officials on Environment (ASOEN).

The globalisation of the environmental information can be gathered by:

1. Meetings of experts and participants to exchange ideas and communication through conferences and seminars.
2. Access to electronic information through networking using the Internet.
3. Coordination of activities through international organisations, e.g. UNEP.

It is true that in improving access to information generated at national, regional and international level, this activity demands strong commitment and efforts from the Governments, organizations, and information providers to proactively strengthen and

develop information system capacities of information collection, processing, exchange and utilization.

The description of Information Technology utilized in Asean and Pacific countries have been clearly presented in this paper. It seems that Australia, India, Georgia, and Japan are more leading in processing and marketing information for industries, education, and recovering environmental problems. Other countries are still in the process of developing their information infrastructures to maintain an effective and efficient information centres that are able to support government, educations, industries and cooperate with other regional and international organizations to exchange useful information by networking activity.

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