

TECHNOLOGY USE AND ITS IMPACT, AND DIGITAL LIBRARY DEVELOPMENTS IN THE ASIAN PACIFIC REGION: Looking at the Flowers from the Horseback

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In conjunction with NIT '99, the Scientific and Technical Information Center (STIC) of the National Science Council (NSC) of the ROC has invited 26 leaders in library and information fields of the 13 member countries of the Association for Science Cooperation in Asia (ASCA) to a 5-day program in Taipei, August 16-20, 1999. This group is referred to as ASCA/NIT group hereafter. Together with the hosting organization, 14 countries are represented. Before the meeting, each participant was requested to prepare a written statement on the current state of the art report on his/her country and/or organization. In order to capitalize the rich information presented and share with a wider group of readers. This synopsis has been developed with considerable editing but still keeping much of information offered by the ASCA/NIT group. The themes of NIT '99 are on the use of new information technology, and the global network and digital library developments, the ASCA/NIT participants were asked specifically to address these topics. While "definition" of "digital Library" is clearly a problem, no effort is made to change the content since the very confusion reflects clearly the difficult state of developments in the region and thus is productive for the readers. They need to understand the real situation in which our colleagues in this region are operating. This edited summary can provide one the most updated bird's eye views on what is happening with the technology use and digital library developments in the Asian Pacific region.

1. INTRODUCTION

In the process of organizing the NIT '99 meeting, I came to know more about an active "ASCA" group in the Asian Pacific Region. ASCA stands for Association for Science Cooperation in Asia (ASCA). To encourage better understanding on each other's work and thus able to benefit more from each other's experience and expertise among colleagues from ASCA countries, two prior meetings were hosted by the Scientific and Technical Information Center (STIC) of the National Science Council (NSC) of the ROC in 1995 and 1997 as part of the STIC's international programs. Since NIT '99's program stresses on many essential topics related to the use of information technology, the development of national information infrastructure, and the latest developments of digital libraries around the world, it became clear that there is a great synergy between STIC's ASCA Program and NIT. Thus, in lieu of the 3rd ASCA Meeting in its conventional format, STIC has requested my assistance in designing an intensive 5-day ASCA/NIT Program. The ASCA/NIT will spend 3 of the 5 days as in active participation of the

entire NIT '99 Meeting. With the generosity of the NSC, 26 senior representative from some of the most significant library, information and cultural centers, and institutions from over a dozen countries in the Asian Pacific region have been invited. These organizations include the national scientific and technical documentation centers, national libraries, national art center, major universities, and other government agencies.

While by no mean comprehensive, one has to admit this kind of cross-border interactive opportunities for brain-storming on our future library and information developments -- regardless whether it is of networking, consortia, information or technology infrastructure, or digital library -- with so many high-level professionals is rare.

To seize these opportunities and to enhance the potential success of discussions, interactions, and information sharing among this distinguished group, each participant was asked to prepare a statement reporting on his/her country and organization following the order as described:

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|---|--|
| 1) Organizational Structure, | 2) Brief History, |
| 1) Mission, Goal and Objectives, | 4) Major Functions and Activities, |
| 1) Major Collection – Printed and Electronic, | 6) Technology Related Services, |
| 1) Latest Technologies Utilized, | 8) Current/Future Technology Related Plans |
| 1) Cooperative Programs, | 10) Additional Comments |

Clearly, given the themes of NIT '99, the group will focus in exploring the technology-related activities and development, specifically those related to the latest “digital library” developments. But, this exploration will only make sense if it can be made in the right environmental context. Therefore the general background information on the structure, history, mission/goal/objectives etc... of each organization is significant.

In total, 25 reports were received, and the scope of coverage has been wide ranging. The presentation formats and styles vary greatly as well. While there are dynamite information, most of that are most current and not available elsewhere, they can not be easily digested without a meaningful synthesis. The following represents the best attempt to provide a macro-view of the current development of the 14 countries represented (including the hosting one). In “looking at the flowers from the horseback”, as the Chinese saying goes, clearly it is not possible to offer a micro-treatment of the topics covered given the limitation of time and space. I wish to offer my advance apology for some of the significant omissions. However, this synopsis based entirely on the statements prepared by the ASCA/NIT group contains much rich information. In collapsing and summarizing information under the same category from these reports, attempts have been made, in most cases, to use much of the preparers' own words in order to preserve the authenticity of the information. Incomplete as it is, it is now possible for one to compare the information given on different countries under the same category, and thus appreciate both the similarities and differences among them. By and large, one finds substantial differences among countries when new information technologies are utilized because the wide-range scale of technology development and utilization in the countries represented.

In short, the summary provided here can and should benefit many readers of this book far beyond the immediate ASCA/NIT or even the NIT '99 groups, particularly those who are interested in international activities.

2. THE ASIAN PACIFIC SCENES¹

As already mentioned above, the following summaries are provided in the way it was told. Efforts have been made to include as much original wordings as possible. Thus confusion in

¹ Under each category, countries are arranged alphabetically, and within the country, organizations are arranged with national organizations first and then universities.

definitions, levels of sophistication, stages of technology development and utilization, etc... are bound to happen. But, that is the way it is! We collectively must understand and appreciate the real landscape of technological development in the region if any meaningful “global” collaboration is contemplated!

1) HISTORY AND BACKGROUND

Bangladesh

- ***Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)*** - After Liberation of Bangladesh the regional office of PANSDOC became the national office of Bangladesh in the name of Bangladesh National Scientific and Technical Documentation Centre (BANSDOC) and had been functioning as a branch of BCSIR, Dhaka, Bangladesh. Science and Technology Division under the Ministry of Education, Government of Bangladesh had a project named National Science Library. This project was merged with BANSDOC in 1986. BANSDOC is now under the Ministry of Science and Technology Government of Bangladesh.
- ***National Library of Bangladesh*** is of recent origin. After the Liberation in 1971, it was founded at the initiative of a group of ex-employees of the Directorate of National Archives and Libraries of Pakistan. It started functioning as an organ of the Directorate of National Archives and Libraries, which was also established in 1973. Till now it has not been established as a separate institution under an Act of Parliament. At present its legal status is based upon an ordinance of 1983. However, a new law for the National Library is under consideration of the government as part of the policy for a National Library Policy.

India

- ***Indira Gandhi National Centre for the Arts (IGNCA)*** is a Government promoted Autonomous Trust under the Ministry of Human Resource Development, Government of India. IGNCA, established in memory of Smt. Indira Gandhi, is visualized as a center encompassing the study and experience of all the arts - each form with its own integrity, yet within a dimension on mutual interdependence, interrelated with nature, social structure and cosmology. The late Prime Minister Shri Rajiv Gandhi as its first President launched it on 19th November 1985.
- ***National Centre for Science Information (NCSI)*** - The University Grants Commission (UGC) of the government of India, in 1982 envisaged the development and establishment of regional library centers on various subject disciplines to strengthen information support for research and teaching in the Indian universities and colleges. Indian Institute of Science (IISc) in Bangalore, a premier institute of academic research and higher learning in India, was given the responsibility of establishment of UGC National Information Centre for Science. Thus, National Centre for Science Information (NCSI) was set up at the Indian Institute of Science (IISc), Bangalore, in June 1983. It is fully funded by the UGC.
- ***Indian Institute of Technology (IIT), Delhi*** is one of the six institutions of technology created as center of excellence for higher education, training, research and development in science, engineering and technology in India. The others five are Kanpur, Kharagpur, Madras, Bombay and Guwahati. All six IITs are autonomous bodies under Ministry of Human Resources Development. Established as College of Engineering in 1961, the Institute was later declared as institute of national importance under the Institutes of Technology Act of 1963 and was renamed as the Indian Institute of Technology, Delhi.

Indonesia

- ***The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)*** was formerly known as The National Scientific Documentation Center (PDIN). PDIN was established under the Decree of the Minister of National Research. It was initially the Documentation Division of the Council for Sciences of Indonesia (MIPI).

PDII is directly under The Indonesian Institute of Sciences (LIPI), which is under State Secretary (Non Department Organization) and directly report to The President of Indonesia.

- ***The National Library of Indonesia*** was established in May 1980 by a ministerial decree. The library developed as an institution under the Ministry of Education and Culture by integrating 4 libraries in Jakarta id est -- the Museum Library (1778), the history, politics & social sciences library (1950), the Regional library of Jakarta (1970), and the Bibliography and Deposit Division (1970).

In 1989 by order of a President decree, it merged with the Center for Library Development along with 26 regional libraries in the provinces to form the present National Library of Indonesia. The Head of the National Library of Indonesia directly reports to President of Indonesia; administratively is under the Minister of State Secretariat.

Japan

Japan Science and Technology Corporation (JST), formerly known as the Japan Information Center of Science and Technology (JICST), is one of the key organizations for implementing policies of the Science and Technology Agency (STA), which is under Prime Minister's Office.

In 1957, JICST was founded to serve as a central organization for Japan's S&T information activities. In 1959, the Council for Science and Technology (CST) was established within the Prime Minister's Office as one of its consultative organizations. In the report submitted to the Prime Minister in 1969, the CST recommended to establish a national distribution system by organically linking pertinent organizations in the report, "The National Information System for S&T (NIST)." As an implementing organization for the NIST plan, JICST greatly expanded its activities through developing comprehensive bibliographic database in early 70s. Since then, JICST maintains its position as a central organization for S&T information in Japan. Its function was succeeded by Japan Science and Technology Corporation (JST), after incorporated with Research Development Corporation of Japan (JRDC), and renamed in 1996.

Korea

Korea Institute of Industry and Technology Information (KINITI) is a governmental research institute under Prime Minister. In 1962, Korea Scientific and Technological Information (KORSTIC) was established within the framework of the Korean National Commission for UNESCO. In 1982, KORSTIC merged with the Korea International Economic Institute (KIEI) to form the Korea Institute for Industrial Economics and Technology (KIET) under the Ministry of Trade and Industry. In 1988, The Center for Industrial Technical Information (CITI) was set up as a suborganization of KIET. In 1991, Korea Institute of Industry and Technology Information (KINITI), originated from the CITI, was established as an independent organization under the Ministry of Commerce, Industry and Energy (MOTIE). Finally, in February 1999, moving from the MOTIE, KINITI became under the control of Prime Minister by renovation measures of the public sector.

Malaysia

- ***The Malaysian Science and Technology Information Centre (MASTIC)***, established in 1992, is a division under the Ministry of Science, Technology and the Environment

(MOSTE). It is divided into four functional units, being those of information services, indicators and forecasting, computer, and library and publications.

- ***Universiti Putra Malaysia*** traces its origins to the School of Agriculture in May 1931, but the establishment of Universiti Pertanian Malaysia (UPM) became a reality only in 1971 with the merger of the College of Agriculture, Malaya with the Faculty of Agriculture, Universiti Malaya. UPM is currently the largest science and Technology University in the country with the student enrolment of 35,000. It has 13 faculties, 5 institutes, and 2 centers, offering 39 bachelor programmes and a number of graduate programmes at Masters and Ph.D. levels. The University is government funded and is structurally under the Ministry of Education.

Nepal

- ***Nepal National Library*** is under the Ministry of Education. In 1956, His Majesty's Government of Nepal purchased private collection of His Majesty the King's spiritual preceptor, the late Hem Raj Pandey and established Nepal National Library (NNL) at Sikri Dhoka, Singha Durbar. In 1960, the Library moved to Harihar Bhawan, Pulchowk, Lalitpur. Up to 1960, it functioned as a reference library and provided the services to the limited classes of the people such as government officials, social scientists and planners. From 1961, the library was opened to general public. Today the NNL occupies 9 rooms in Harihar Bhawan, a historic palace built by the ruling Rana class at the turn of the century.
- ***The Royal Nepal Academy of Science and Technology (RONAST)*** was founded by a Royal Ordinance in December 1982 to strengthen the role of science and technology for all-round development of the nation. His Majesty King Birendra Bir Bikram Shah Dev graciously assumed the Chancellorship of the Academy for nearly a decade. In 1992 the House of Representatives passed the RONAST Act 1992 to reconfirm the status of the Academy as an autonomous academic institution. Now, his Majesty the King is the Patron of the Academy while the Prime Minister is its Chancellor who chairs the Academic Assembly, the highest body of RONAST. The Minister for Science and Technology is an ex-officio Pro-Chancellor and the second Chairman of the Assembly. RONAST's programs are conceived and executed by the Divisions led by senior staff members of the Academy.

New Zealand

Ministry of Research, Science & Technology (MRST) is a government department in the New Zealand State Sector. Government departments in New Zealand have “sharply defined roles in policy advice, service delivery, regulatory, or sectoral funding functions” (*New Zealand Official Yearbook*, 1998). Thus the role of the MRST in the New Zealand Innovation System is to provide science and technology policy advice and related services to the Government. It was established in 1989 as part of the structural reform of the Government's interest in research, Science and technology.

Philippines

- ***National Commission on Culture and the Arts (NCCA) / Committee on Libraries and Information Services (CLIS)*** was created by a Republic Act signed into law on April 3, 1992. The Commission is an independent government agency to formulate policies for the development of culture and the arts and to implement these policies in coordination with affiliated cultural agencies. The NCCA is mandated to “formulate policies for the development of culture and the arts, to implement these policies in coordination with affiliated cultural agencies, to encourage artistic creation within a climate of artistic freedom, develop and promote Filipino national culture and arts, preserve Filipino heritage and administer the National Endowment Fund for Culture and the Arts (NEFCA) which was

established to support arts and culture programs and activities throughout the country.” The Commission is composed of 22 national committees grouped under four subcommissions – Arts, Cultural Heritage, Cultural Communities and Traditional Arts, and Cultural Dissemination. Six national committees are under the Subcommission of Cultural Heritage. They are Archives, Historical Research, Independent Art Galleries, Libraries and Information Services, Monuments and Sites, and Museum.

Committee on Libraries and Information Services (CLIS) is one of the 22 national committees under NCCA. It is under the Subcommission on Cultural Heritage. The committee was created on April 24, 1987, under the PCCA, the predecessor of NCCA.

- ***The National Library of the Philippines (NLP)*** was formerly an attached agency of the Department of Education, Culture and Sports. An Executive Order on March 5, 1999 stated the “transferring the cultural center of the Philippines, Commission on Filipino Language, National Museum, National Historical Institute, National Library, and Records Management and Archives Office to the National Commission for Culture and the Arts for policy and coordination.” The National Commission for Culture and the Arts (NCCA) is mandated by a Republic Act to coordinate the implementation of policies and programs on the development of culture and arts in coordination with cultural agencies.

The forerunner of The NLP may be traced back to the last decade of the Spanish colonial period, with the inauguration of the Museo-Biblioteca de Filipinas in 1891. With its long history, the NLP has gone through several developmental stages. For example, a 1918 Act merged the Library with two other offices and named it The Philippine Library and Museums. In 1928, another Act separated the Museum from the Library - one became the National Museum, the other The National Library. In 1947, an Executive Order changed the name of the Library to Bureau of Public Libraries. In 1964, another Republic Act reverted the name to the National Library.

- ***The Science and Technology Information Institute (STII)*** is an agency under the Department of Science and Technology (DOST), created under an Executive Order. The DOST system is composed of 5 sectoral councils, 7 research and development institutes, 6 service institutes, 2 advisory bodies, and 13 Regional Offices and 73 Provincial S&T Centers. The STII is one of the DOST service institutes created on January 30, 1987 through an Executive Order and mandated to establish and develop a science and technology (S&T) databank and library; disseminate S&T information; and undertake training on information S&T.

Singapore

- ***The National Science and Technology Board (NSTB)*** is one of the nine agencies under the Ministry of Trade and Industry and works with other sister agencies including the Economic Development Board, Singapore Productivity & Standards Board, etc... The NSTB was formed in 1991 to promote the development of science and technology for the enhancement of economic competitiveness. The National Technology Plan (NTP), formulated also in 1991, committed a \$2 billion R&D Fund, to be administered by the NSTB for the period 1991-1995. In 1996, the National Science and Technology Plan (NSTP) was formulated to further the objective of promoting economically relevant scientific and technological development in Singapore. It built upon the experiences and the achievements resulting from the first Plan. The NSTP charted the vision, objectives and strategy for Singapore’s technological development over the next five to fifteen years. It identified key initiatives to address the challenges that face Singapore’s development in science and technology.
- ***The Singapore Productivity and Standards Board (PSB)*** is a statutory board, under the aegis of the Ministry of Trade and Industry. Set up in April 1996, it is tasked with the mission to

raise productivity so as to enhance Singapore competitiveness and economic growth for a better quality of life for the people. It aims to build world-class companies and workforce by focusing on six strategic thrusts: 1). Manpower Development, 2). Industry Development, 3). Technology Application, 4). Standards & Quality Development, 5) Productivity Promotion, and 5) Incentives Management. The PSB is led by the Chief Executive who, in turn is assisted by five General Managers (GMs). The organization is made up of 12 Divisions; each headed by a Divisional Director, and 3 Strategic Business Units (SBUs).

- ***Nanyang Technological University (NTU)*** is one of the two universities in Singapore, funded by the Singapore Government. Established in 1991, its predecessor was called the Nanyang Technological Institute (NTI) which was set up in August 1981 with the primary function of providing facilities for tertiary education and research in various branches of engineering and technology. NTI admitted its first group of 582 engineering students in July 1982, and grew rapidly to cover other fields. In July 1991, NTI was renamed Nanyang Technological University and empowered to award its own degrees. NTU aims at becoming a university with general academic excellence and niches of international eminence.

Sri Lanka

National Science Foundation (NSF) is a state-funded organization established in 1998 as the successor to the Natural Resources Energy & Science Authority of Sri Lanka (NARESA). It is one of the key institutions functioning under the Ministry of Science and Technology in Sri Lanka. Like its predecessors, NARESA (established in 1981) and the National Science Council set up in 1968, the NSF is a statutory board of the government.

Taiwan, ROC

Science and Technology Information Center (STIC) is a government-funded agency under the National Science Council (NSC). The Council is responsible for providing an infrastructure to support scientific and technical research in the ROC. The NSC to help upgrade ROC's industrial base established STIC in 1974 by providing information to the research and educational community.

Thailand

Thailand Institute of Scientific and Technological Research (TISTR) is a non-profit making state enterprise under the Ministry of Science, Technology and Environment (MOSTE). It was originally set up in 1963 by the Applied Scientific Research Corporation of Thailand Act B.E., which was repealed and replaced by the Thailand Institute of Scientific and Technological Research Act B.E. in 1979 following the establishment of MOSTE in the same year. The Thai National Documentation Centre (TNDC) is under TISTR.

Vietnam

- ***The General Sciences Library of Ho Chi Minh City*** is under the Culture and Information Department under the People Committee of the Ho Chi Minh City. The Director of the General Sciences Library reports to the Vice Director of the Culture and Information Department who is in charge of the Culture Division, including libraries, publishers, museums, etc. The Library was founded in 1868 as the Library of the Admirals and Governors. Prior to the Liberation of South Vietnam (30th April 1975), it was the National Library of South Vietnam. According to the Decision of People's Municipal Committee on 14th April 1978, the current name is assigned.

- ***The National Centre for Scientific and Technological Information and Documentation (NACESTID)*** is under the Ministry of Science, Technology and Environment (MOSTE). It was established in 1990 by merging The Central Library on Science and Technology (founded in 1960) and The Central Institute for Scientific and Technical Information (CISTI) (founded in 1972). NACESTID is the national center of Vietnam's scientific and technological information and documentation system which includes all provincial S&T information centers and ministerial S&T information centers throughout of Vietnam. It also acts as the national focal point for many international organizations in information science and management and documentation service management.
- ***Vietnam National University Hanoi (VNUH), Library and Information Center*** was established in February 1997 by merging three former libraries of the three member colleges of VNUH. The Library, with its 102 staff members, is to operate as a scientific research and service Center under the authority of the VNUH Directorate. The VNUH is the largest university in Vietnam.

2) MISSION, GOAL AND OBJECTIVES

Bangladesh

- ***Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)***'s mission is to provide the working scientists with up-to-date S&T information whenever and wherever they need them for their research work. The goal is to collect, store, preserve and disseminate information on real time basis via the Bangladesh National Scientific and Library Information Network (BANSLINK). To accomplish the above, main objectives are to:
 - Collect, process and store information and data on scientific research and experimental development in all branches of science and technology;
 - Disseminate such information to researchers irrespective of their affiliations; and
 - Assist researchers to make contact with researchers of other countries working in the same field of interest.
- ***National Library of Bangladesh*** intends to be a central institution of information service and reference as well as the depository of the creative literary works of the nation, with a goal to assist the process in building up a knowledgeable and educated public through providing reading as well audio-visual materials. In order to achieve these, a copyright law was enacted to facilitate the drive for collection of all the publications within the country. The library is also building actively a collection of national and international publications on any aspect of the nation's history and life.

India

- ***Indira Gandhi National Centre for the Arts*** has several concrete aims:
 - to serve as a major resource center for the arts, especially written, oral and visual source materials;
 - to undertake research and publication programs of reference works, glossaries, dictionaries and encyclopaedia concerning the arts and the humanities;
 - to establish a tribal and folk arts division with a core collection for conduction systematic scientific studies and for live presentations;
 - to provide a forum for a creative and critical dialogue through performances, exhibitions, multi-media projections, conferences, seminars and workshops between and amongst the diverse arts, traditional and contemporary;
 - to foster dialogue between arts and current ideas in philosophy, science and technology, with a view toward bridging the gap in intellectual understanding between modern sciences and arts and culture;
 - to evolve models of research programs and arts administration more pertinent to the Indian ethos;

- to elucidate the formative and dynamic factors in the complex web of interactions between diverse social strata, communities and regions;
- to promote an awareness of historical and cultural linkages between India and other countries;
- to develop networks with national and international institutions; and
- to conduct related research in the arts, humanities and culture.
- ***National Centre for Science Information (NCSI)*** was set up for meeting the information needs of user community in the major fields of science and technology at the national level. Its primary objectives are:
 - To create current awareness in scientists;
 - To provide its users photocopies of needed full-length papers listed in abstracting services; and
 - To educate the users, in generating queries for their needs, for an optimal utilization of the information services.
- ***Indian Institute of Technology (IIT)*** has many major objectives including:
 - offering instruction in engineering and applied sciences at a world-class level;
 - providing leadership in curriculum planning and laboratory development;
 - developing programmes for faculty development
 - developing close collaboration with industry
 - developing strong collaboration links with other academic and research institutions in the country and abroad;
 - anticipating the technological needs for India and to plan and prepare to cater to men;
 - preparing instructional resource material in the conventional as well as the audiovisual me video and the computer based modes.

Indonesia

- ***The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)*** has the tasks "To carry out the maintaining of and providing scientific documentation and information services", in accordance with policies laid out the tasks, PDII has aim for the following:
 - To provide scientific and technical information (STI) services,
 - to document activities of scientific and technical results published in the country and those of foreign publication on Indonesia,
 - to collect Indonesian scientific publications,
 - to develop a national scientific bibliographical data base,
 - to publish special publications to support the dissemination of information, and
 - to develop network systems, and scientific documentation and information infrastructure
- ***The National Library of Indonesia*** is to strive to become a world class library and to empower all kinds of libraries throughout Indonesia to enlighten the nation's life. Its objectives are :
 - To formulate policies in promoting and sustaining the growth and development of all types of libraries in Indonesia.
 - To advance library manpower, to prepare all kinds of standards and strengthening cooperation with library institutions within the country and abroad as well.
 - To administer the legal deposit act concerning the submittal of all printed and recorded materials produced by Indonesian publishers - private or government, and undertakes conservation of library materials.

Japan

Japan Science and Technology Corporation (JST) - In line with goals of the Basic Law of Science and Technology (Nov. 1995), its mission is to promote Japanese S&T, through research exchange, basic research, and technology transfer, as well as through S&T information dissemination.

Korea

Korea Institute of Industry and Technology Information (KINITI) is mandated to play a significant role in establishing a nationwide information dissemination system to support industrial and technological development in Korea. Thus, its objectives are:

- facilitating access to and utilization of information,
- running on-line information system with various information search tools,
- increasing public awareness of information services, and
- training information specialists.

Malaysia

- **The Malaysian Science and Technology Information Centre (MASTIC)** is to be the primary, authoritative provider of science and technology management information in Malaysia. Its goals are to support:

- public S&T policy development, analysis, administration and management;
- S&T education, R&D undertaken in Malaysia; and
- economic activities that combine to produce innovation, entrepreneurship and competitiveness in Malaysian industry.

The major objectives of MASTIC are to:

- establish an enhanced and permanent ability to service S&T related policy development, analysis and measurement,
- facilitate the transfer of information between the producers and users of S&T information in all sectors of the S&T infrastructure in Malaysia, and
- acquire partnerships with, or develop the expertise and skills required to service S&T information and analysis as required by Malaysian industry in their conduct of S&T activity in Malaysia or by Malaysians.

- **Universiti Putra Malaysia Library's** mission is to provide excellent resources, facilities and services in fulfilling the information needs of users in their learning, teaching, research and consultancy activities in the University. Its goal is to strive towards becoming a leading digital library in the country. Its immediate objectives are:

- To support the learning, teaching, research and consultancy activities in the University.
- To promote the use of various sources of information in the library as well as those that are accessible through the Internet.
- To meet the information needs of the University and participate in the process of information dissemination to the community.
- To collect and organize all materials pertaining to the history and development of the University.

Nepal

- **Nepal National Library's** main objectives are:
 - To set up adequate central services such as creation of National Union Catalogue National Bibliography, Union List of Serials and reference tools
 - To collect all published reading materials within the country
 - To organize and preserve all the collections of materials published in or about Nepal
 - To provide the library services to the general public
 - To promote literacy through a network of mobile libraries
 - To promote the publication of Nepali literature
 - To assist the public libraries of the country for their development
 - To acquire all publications according to the proposed Legal Deposit Act.
 - To protect intellectual property of the authors under the Copyright Act.

However, we also see the serious constraints and difficulties in fulfilling these objectives. They include:

- Low levels of funding for collection development, both for preservation of the nation's publishing output and for building up stock suitable for lending services.
- Effective legal deposit legislation has not yet been enacted.
- Limitations on public access to NNL and opening hours since the NNL is at present housed in a building occupied by government ministries. NNL is seeking land for construction of its own building in a central position.
- ***The Royal Nepal Academy of Science and Technology (RONAST)*** has been playing a catalytic role since the beginning in creating a conducive environment for the development of S&T and formulating thereby a broad strategy for advancement of scientific and technological capabilities in the country. In the national S&T capability development, RONAST is envisaged as a think tank, an innovator, a facilitator and a catalyst. The main objectives of the Academy are:
 - Advancement of science and technology for all round development of the nation,
 - Preservation and further modernization of indigenous technologies,
 - Promotion of research in science and technology, and
 - Identification and facilitation of appropriate technology transfer.

New Zealand

Ministry of Research, Science & Technology's Strategic Plan, July 1997, clearly states its mission: "To be leaders for New Zealand's future as a knowledge society." This statement confirms the Ministry's ongoing commitment to the goals articulated in *RS&T: 2010: The Government's Strategy for Research, Science and Technology to the Year 2010*. The mission also recognizes that the Ministry's activities must be consistent with the fundamental changes to our institutions, businesses and jobs that will be caused by the knowledge revolution. This is represented in the Mission's principal elements.

- 1) *Relevant Government Outcomes* - The Government established a set of Strategic Result Areas (SRAs) to guide the activities of departments over the three-year period 1997-2000. These SRAs, while not exclusive to the Ministry, are guiding its strategic direction and are therefore linked to the Ministry's Key Result Areas (KRAs). The SRAs are: Enterprise and Innovation; External Linkages; Education and Training; and Protecting and Enhancing the Environment.
- 2) *New Strategic Plan* - A highlight for 1997/98 was the introduction of the Ministry's new strategic plan, built on the mission - '*To be leaders for New Zealand's future as a knowledge society*'. This knowledge revolution is driving: shifts in our culture; developments in our science and technology; and changes in our society and institutions. This change is on a far greater scale than anything since the Industrial Revolution. New Zealand science and technology must be properly positioned to take full advantage of the opportunities that will arise in the coming years.

Philippines

- ***National Commission on Culture and the Arts (NCCA) / Committee on Libraries and Information Services (CLIS)*** is mandated to "formulate and maintain the national policies on libraries and information services. Its primary responsibility is to develop and recommend overall policies and plans regarding the provision of library and information services." The vision of CLIS is "a progressive Philippines with a network of public, school, academic and special libraries serving all groups of users down to the grassroots level, an automated library and information services that will facilitate access to global information, and professionals serving the information needs of the people". The mission of CLIS is to "promote the use of books and libraries at all levels, encourage reading among the youth, strengthen, enhance, improve library and information services, and develop the corps of professional librarians and information personnel who are committed to the ideals and objectives of the library profession. The objectives of CLIS are to "formulate policy guidelines for the further development, expansion, and enrichment of library and information services nationwide and

to conceptualize, develop and implement programs and projects that will upgrade the knowledge and skills of people engaged in library, information and communication services; promote networking and resource sharing among institutions engaged in information and communication activities; facilitate access to information found in libraries and information centers; and strengthen, expand, enrich library and information resources and services”.

- ***The National Library of the Philippines (NLP)***'s vision is “service to the nation through the collection and preservation of the country's historical and cultural heritage and development and utilization of library information technologies to provide the research needs and linkages of individual and institutional users both inside and outside the country.” Its mission is to provide access to cultural heritage resources for the people's intellectual growth, citizenship building, life-long learning and enlightenment. To fulfil this mission the Library provides facilities and resources; national bibliographic services, and a system of public libraries and information centers throughout the country. Its immediate objectives are:
 - To acquire and preserve all Filipiniana materials,
 - To provide national bibliographic services,
 - To develop, in cooperation with the local government units, a system of public libraries and information centers throughout the country,
 - To provide information, reference and research resources to the public, and information needs for the blind and visually impaired,
 - To promote, establish and maintain national and international standards in library and information technology services; and
 - To implement the provisions of the Intellectual Property Code and the Legal and Cultural Deposit Law.
- ***The Science and Technology Information Institute (STII)*** serves as the information and marketing arm of DOST, and the national depository of science and technology data. Its areas of concern include: sourcing and delivery of science and technology information and news; referral services; library operations; information technology training and consultancy services; and science and technology marketing and promotions.

Singapore

- ***The National Science and Technology Board (NSTB)***'s mission is to champion and facilitate initiatives to develop a conducive environment, stimulation knowledge creation in, and the enterprising use of science and technology. NSTB is the lead government agency providing focus and direction to Singapore's technopreneurship drive, and spearheading the nation's capability in development. The main goals are to promote and develop a technopreneurial environment in Singapore, which will lead to a vibrant and thriving sector of high growth technology-oriented companies; and to develop capability through promoting and strengthening Singapore's technology infrastructure. This involves developing research capabilities in the research institutes and centers, universities, polytechnics and government-funded institutions, which have economic relevance for commercial exploitation of technology and innovation
- ***The Singapore Productivity and Standards Board (PSB)*** is for servicing the productivity information needs of the business community. Its Information Resource Centre (IRC) stands out in terms of its wide array of resource materials, customized information services, publishing capabilities, user education and outreach programmes. The center strikes to be a one-stop business information center for productivity improvement in Singapore. The IRC adopts the following strategies to serve the business community:
 - Strategy 1: Formulate plans and policies to guide the development and management of PSB's information resources
 - Strategy 2: Provide the content and platforms for information sharing and use

- Strategy 3: Add value to the information gathered through synthesis and analysis
- Strategy 4: Integrate and deliver information products and services
- Strategy 5: Provide specialized information services
- **Nanyang Technological University (NTU) Library's** mission is to bring to the NTU community information resources to enhance teaching and learning, and to promote innovation and research. To achieve this, the goals are:
 - to be a quality-client-centered service relevant to the information needs of our users;
 - to empower our users to become information literate and independent in the use of information;
 - to empower our staff to serve our users; and
 - to serve better by being innovative in the use of resource and technology.

Sri Lanka

Sri Lanka Scientific & Technical Information Centre (SLSTIC), under the National Science Foundation (NSF) was established as the focal point for dissemination of information in the field of S&T. SLSTIC does not intend to build up a comprehensive collection of books, periodicals etc. Instead it pays more attention to developing a collection of reference books which are not available in most other local libraries. The main objective of SLSTIC is to collect, process and disseminate information relating to Science and Technology.

Taiwan, ROC

Science and Technology Information Center (STIC) - For more than two decades after its creation, STIC has been providing assistance to libraries and research institutions that need information services from domestic and international resources. In a new digital era, STIC has made adjustments to better meet the needs of library users. Under the current policy, STIC will focus on: 1) producing electronic databases about local information resources and providing the public with free access, 2) introducing world's most useful electronic databases to the country's research community, and 3) developing a national interlibrary loan system to improve the efficiency and the speed of document delivery in each individual library.

STIC will continue to integrate scientific and technical information resources but it now also provides them to the research community by using Web-based information systems.

Thailand

Thailand Institute of Scientific and Technological Research (TISTR) - The Thai National Documentation Centre (TNDC) of the TISTR aims to contribute to the promotion of science and technology in national development through providing documentation facilities to scientists, research and industrial entrepreneurs.

Vietnam

- **The General Sciences Library of Ho Chi Minh City** – The Library's mission is to be responsible for “selecting and maintaining the materials of all kinds published both in and out of the country, and for organizing and providing document and information to users.” Thus its goals and objectives are:
 - To support and promote the national culture, industrialization and modernization of the country.
 - To provide crucial support to the mass drives for education with the aim of eradicating illiteracy and then maintaining functional literacy.
 - To contribute to the “3rd revolution” of the country (the scientific and technological revolution), in pursuit of economic development, to provide scientific, technical, economic and social information to people. This means the library has to support the priorities of the Fifth Five-Year Plan 1995-2000 of the city, currently agriculture, and consumer and export industries. The library

has to provide library services and resources, which take into account the information needs of special interest groups, particularly of economical researching groups.

- ***The National Centre for Scientific and Technological Information and Documentation (NACESTID)***'s goals and objectives are:
 - coordinating the national science and technology information infrastructure and services development in the whole country
 - acting as the leading national information and documentation center in the field of science and technology;
 - Providing the information and documentation services to targeted decision-makers, R&D workers, university teaching staff and students as well as entrepreneurs; and
 - Enhancing science and technology diffusion by focusing on technology transfer and promoting the application of scientific and technological achievements in the socio-economic and cultural life of the country.
- ***Vietnam National University Hanoi (VNUH), Library and Information Center*** is responsible for providing library and information services to facilitate undergraduate and graduate training, scientific research, technology transfer and application, as well as management affairs of VNUH.

3) MAJOR FUNCTION AND ACTIVITIES

Bangladesh

- ***Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)***'s activities include: Bibliographic Service; Document Procurement Service; Reprographic Service; Scientific Contact Service; Translation Service; Computer Service; Library Service; and Publications Service. Currently, computerized databases on various fields of importance are being developed to provide offline/online-searching facilities to its users. In addition to the regular newsletters, other major BANSDOC Publications are :
 - *Survey of Research and Development Activities of Bangladesh;*
 - *Current Scientific and Technological Research Projects of Bangladesh;*
 - *Directory of Scientists and Technologists of Bangladesh;*
 - *Directory of Scientists and Technologists of Bangladesh Living Abroad;*
 - *Bangladesh Science and Technology Abstracts;*
 - *National Catalogue of Scientific and Technological Periodicals of Bangladesh;*
- ***National Library of Bangladesh*** – “Despite its humble origin and weak legal foundation, the National Library from the very beginning has performed significant functions, which include the most complete collection possible of the national literature. In addition to books in the orthodox sense of the word, it has also acquired pamphlets, periodicals, newspapers, the documents of national, provincial and local governments, leaflets and certain posters, manuscripts, pictures and prints, maps and the official publications including annual reports of all important organizations throughout the nation. All of this form part of the record of a nation’s creative works and life and when gathered and arranged for the purpose, form an irreplaceable source of the primary raw material for social, economic and historical research.”
To encourage the writers, publishers and booksellers it gives a National Award annually to the best works on arts, science and literature.

India

- ***Indira Gandhi National Centre for the Arts*** – Emerging logically from the conceptual plan of the Indira Gandhi National Centre for the Arts, the five divisions of the institution are autonomous in structure but inter-locked in programming. These are: 1) a cultural reference library of multi-media collections to serve as a major resource center for research in the humanities and the arts; a research and publication division; a division for building a core

collection of material and documentation on folk and tribal arts and crafts and launch multidisciplinary lifestyle studies of tribal communities for evolving alternate models for the study of Indian cultural phenomenon in its totality and the interwebbing of environmental, ecological, agricultural, socio-economic, cultural and political parameters; a forum for interdisciplinary seminars, exhibitions and performances on unified themes and concepts; and the administrative, managerial and organizational support unit.

- **National Centre for Science Information (NCSI)**'s services can be broadly classified into three types:
 - 1) Database Search Service
 - Current Information services:
 - Current Awareness Service (CAS) in various disciplines
 - Contents of Periodical in Science and Technology (COPSAT)
 - Contents of Periodicals in Biomedicine (COPSMED)
 - *On-Demand Information Services* - This is a one-time, retrospective search in searching CD-ROM Database Search Service (CDRS), Online Search Service (OSS), and Factual Data Search Service (FDS)
 - 2) Document Delivery Service
 - 3) Network Information Service – This includes Web Services, Internet Search Service, InfoWatch (an electronic newsletter), LIS-Forum (an e-mail based discussion forum), and CD-ROM databases on the campus network
- **Indian Institute of Technology (IIT) Library** – See Arora's article on pp. 7-16 of this book.

Indonesia

- **The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)** - The major activities include STI service, library services, information desk services, current aware services, literature searches, continuing education courses for librarians and information workers, and well as provision of practical training. Most of these are quite similar to many other national centers in the region. In response to the government programs concerning the autonomous provinces/districts, the PDII has collaborations with the Provincial/District Planning Board to set up the unit or center in the provincial/district level in gathering indigenous of local information. The center/unit activities in the district level are also responsible for providing local communities with the development of technology by using the available of information. Using Internet or direct training activities could access the information itself.”
- **The National Library of Indonesia** – In addition to the conventional collection services, the current NLI's activities include:
 - To formulate National policies and develop national plan and program in the field of library development, maintenance and effectiveness. This include the provision of guidance to all types of libraries in the country;
 - To collect, store and process library materials from local and foreign source and also to conserve and preserve library materials,
 - To develop the national bibliography; the national union catalog, indexes and abstracts; and subject bibliographies. Also to develop the national library automation systems,
 - To provide education and training for library human resources,
 - To collaborate with other significant library and information institutions both locally and abroad,
 - To execute other tasks provided by the President.

Japan

Japan Science and Technology Corporation (JST) performs six main activities. They are:

- 1) S&T Information Dissemination
- 2) Basic Research
- 3) Research Cooperation
- 4) Technology Transfer
- 5) Research Support
- 6) Public Understanding of Science and Technology

Korea

Korea Institute of Industry and Technology Information (KINITI) implements the following activities for the purpose of enhancing industrial and technical information work in Korea:

- Collecting industrial and technical information resources;
- Running a on-line information service system (KINITI-IR);
- Processing information and creating databases - Information processing performed in KINITI includes indexing and abstracting scientific and technical literatures for producing BIST (bibliographic information of science and technology) and Korean patent databases, which are on the KINITI-IR. These databases are repackaged into several CD-ROM products. KINITI also provides access to international databases such as World Patent Index, COMPENDEX Plus, Food Star etc... on the KINITI-IR;
- Retrieving and analyzing information; and
- Offering information-related training and continuing education courses.

Malaysia

- ***The Malaysian Science and Technology Information Centre (MASTIC)*** collects and disseminates science and technology (S&T) management information. It assists policy makers in the analysis, administration and management of the S&T system, in support of S&T activities of the nation. As part of its information collection activities, MASTIC undertakes surveys on the National R&D, Public Awareness in S&T and compiles the National S&T Indicators. MASTIC also acts as a linking mechanism between the three major groups of players in the Malaysian Science and technology system - the policy makers and research funders; the researchers that make up the S&T infrastructure; and the developers and users of research results.
- ***Universiti Putra Malaysia Library*** is organized with 3 layers of management, namely the Chief Librarian, Heads of Departments, and Units comprising individual librarians and their supporting staff, who are responsible for specific areas of library work in the following Departments/Units:
 - 1) Department of Resource Development - Monograph Unit and Serials Unit,
 - 2) Department of Information Resources Management - Loan Services Unit, Media Services and Archives Unit, and Special Collections Unit,
 - 3) Department of Information Management and Use - Science and Technology Information Unit and Social Sciences Information Unit.

Nepal

- ***The Royal Nepal Academy of Science and Technology (RONAST)***'s major functions are to:
 - advise His Majesty's Government on the formulation of technology transfer policy and its implementation, S&T development programs, the establishment and development of new S&T institutions/laboratories, provide financial and technical assistance for the establishment and development of new S&T institutions/laboratories, set up exhibit centers for S&T related innovations and innovative models, and undertake all necessary measures to achieve the goals and objectives of the Academy,
 - promote the development and application of S&T, and to increase public awareness of the importance of S&T,

- implement S&T programs in collaboration with national and international organizations?
- collect and disseminate S&T information through a central S&T Information System, and
- organize seminars and conferences on S&T topics and facilitate S&T publications.

Thus, RONASt's activities are involved in the

- planning for science and technology, and conducting assessment studies,
 - building of S&T capability and developing infrastructure,
 - promoting S&T – running projects such as Science for the Common Mass and Science Popularization Project,
 - collecting, organizing and promoting the use of S&T information,
 - providing grants and fellowships, and offering recognition to the nation's talents
 - offering conferences/workshops/seminars/trainings.
- **Nepal National Library's** major function is to collect and preserve all national and international intellectual properties written on Nepal for present and future generations, and to render library services to the general public of the nation including both adults and children. Thus its activities, aside from the usual reference, reading and information service, The NNL also do the following:
 - Performing the work of copyright registration to protect the intellectual heritage of materials such as books, periodicals, films, fine arts etc. With the passing of the Legal Depository Act in Nepal in March 1998, NNL is building a more comprehensive collection of reading and A/V materials, and NNL is also the national agency for the distribution of ISBN for published materials in Nepal.
 - Strengthen the library service system in Nepal with a five-year project, "The Reorganization of the Nepal National Library in Support of Literacy Programmes." This has been implemented since 1994 by UNESCO with the financial support of DANIDA and has supported four public libraries, one in each of four development regions.

New Zealand

Ministry of Research, Science & Technology's core business include:

- *Policy Advice for Science and Technology* - Providing advice relating to New Zealand's science and technology system and, in particular, on the nature, scope and effectiveness of the Government's investments.
- *Scientific and Technical Advice and Coordination* - Ensures that the development of public policy is well informed by science and technology and that S&T "interests" are coordinated and linked, including New Zealand's integration with global technology.
- *Management of Contracts for Non-Departmental Output Classes* – Negotiating purchase agreements with purchasers/providers of non-departmental outputs, and ensures appropriate performance/accountability arrangements are in place and met.

Philippines

- **National Commission on Culture and the Arts (NCCA) / Committee on Libraries and Information Services (CLIS)** - To fulfill CLIS's objectives, CLIS created the Library and Information Bank (LIB) that will serve as a coordinating center for information in libraries. To produce the database for the LIB, CLIS conducted three national surveys of academic, school and public libraries. It's other activities include:
 - Develop a corps of professional librarians who will be involved in networking and resource sharing. CLIS conducted numerous seminars/workshops on Information Technology and other needed topics. It organized three national congresses for librarians, and conducted several planning seminars to assess the CLIS programs.
 - CLIS completed three national surveys of academic, public, and school libraries. It is preparing a computerized catalog of rare Filipiniana materials, and several essential publications. It is actively involved in the cyberspace program of NCCA called Culture and Arts in Cyberspace, which is intended to link the Philippines with the world via the global information highway.

- CLIS is not directly involved in the provision of technology and related services, does not utilize the latest technologies since it is more of a policy-making body, but is providing information about the new technologies through seminars and workshops, conferences sponsored by the committee. Its members participate in seminars and conferences either as organizers or as speakers. Its direct activity is in providing materials about libraries and information services to the NCCA cyberspace project.
- ***The National Library of the Philippines (NLP)***'s activities, aside from the usual information reference services to the public, include:
 - Acquisition and preservation of all Filipiniana materials
 - Provision of current and retrospective national bibliographic services
 - Establishment, development and maintenance of public libraries system and information centers in cooperation with local government units throughout the country;
 - Promotion, formulation, and maintenance of national standards in library and information services in accordance with international norms and standards.
 - Provision of an efficient on-line access to the different information resources through the Information Technology Center.
- ***The Science and Technology Information Institute (STII)***'s services include library services, public relations, photo and video coverage, audio/visual production, and publishing and printing.

Singapore

- ***The National Science and Technology Board (NSTB)*** - To meet NSTB's objectives, it has focused on six key thrusts, which are aligned to technopreneurship and capability development: These strategic thrusts are:
 - Growing Technopreneurial Businesses - NSTB will facilitate the growth of the companies by proactively linking them with the industry, research institutes and centers, tertiary organizations, and financial sector to source and exploit intellectual properties;
 - Developing a Conducive Environment - comprising of hard physical infrastructure (Buona Vista Science Hub and soft infrastructure (pro-enterprise government rules, regulations and policies);
 - Promoting Finance and Investment
 - Developing Manpower for R&D and Technopreneurship
 - Enhancing International Linkages
 - Strengthening the Technology Infrastructure
- ***The Singapore Productivity and Standards Board (PSB)***'s Information Resource Centre (IRC) stands out in terms of its wide array of resource materials, customized information services, publishing capabilities, user education and outreach programs. As mentioned earlier, the center strikes to be a one-stop business information center for productivity improvement in Singapore.

Sri Lanka

- ***Sri Lanka Scientific & Technical Information Centre (SLSTIC)*** has developed some local databases by using the latest version of Micro CDS/ISIS that can support a local Area Network (LAN) – including ULIST (Union List of Periodicals held in SLSTINET Libraries), DBOSR (Ongoing Research on S & T in Sri Lanka) etc... The Sri Lanka Scientific & Technical Information Network (SLSTINET) has been established to include over 100 libraries of Universities, Research & Development Institutes and NGOs in the field of S & T. SLSTIC coordinates activities related to database development, training on library automation, development of systems to be used in libraries (PURNA), and publish reference tools.

Taiwan, ROC

Science and Technology Information Center (STIC)'s main activities can be summarized as:

- During its first decade, STIC concentrated on building union catalogs, publishing abstracts and indexes, and providing document delivery services to libraries and research institutions in ROC. In order to produce indexes and abstracts and to provide document delivery services, STIC subscribed to thousands of scientific and technical journals. Additional materials, such as books, conference proceedings, research reports and degree dissertations, were gradually acquired to serve the growing population of library users. In 1979, STIC set up an information retrieval service by using such services as DIALOG, ORBIT and BRS, and at the same time allowed the general public to come in and use its resources and services.
- STIC in 1988 launched its first online database network system: STICNET. It allowed users to retrieve bibliographic and directory information from a total of 13 databases -- seven self-built and six foreign leased -- through the proprietary on-line service system.
- In 1997, STIC phased out the old proprietary system that supported the STICNET database service and replaced it with a new Web-based client/server system on STIC's Website now called STICWeb. Data from some 32 databases, including 23 STIC-developed and four other local databases, plus five international sci-tech databases, was loaded and made available on the Web-based STICNET in 1998. In June of the same year, the STICNET-E (STICNET in the English language) was launched to allow international users to access information about ROC-published sci-tech papers and reports.
- In September 1998, STIC restructured itself into a center that primarily uses electronic resources to serve the local research community. With STIC's efforts, a consortium was founded later that year for group licensing of international electronic resources needed by local library users. Currently, more than 90 libraries in ROC subscribe to majority of the world's most popular information systems at affordable prices through this consortium.
- STIC also produces and integrates domestic research resources for both local and international users. For example, STIC has built up a Web-based retrieval system called GRB (*Government Research Bulletin*) that allows users to access all research reports of government-funded research. STIC has also set up an electronic journal archive called *NSCROC Electronic Journals* to preserve electronic academic journals published in ROC and to provide access on the STICWeb. There are six titles available, all published by NSC. The number is expected to grow in the future to include other e-journals in ROC.

Thailand

Thailand Institute of Scientific and Technological Research (TISTR)'s Information Service Division (ISD) - Services of ISD includes the usual reference and research services, document delivery, selective dissemination, photocopying, translation, online database searching services on DIALOG and other sources via Internet, and bibliographical compilations, and publishing. In addition, the Center also produces scientific and technological information (STI) in various forms and maintains a collection of STI concerning Thailand for further dissemination and exchange both locally and internationally. Databases produced by the Division includes:

- Databases on Scientific Serials in Thai Libraries.
- Databases on APINMAP (Asian and Pacific Information Network on Medicinal and Aromatic Plants).
- Thai Abstracts (Database and publication).
- TISTR Technical Reports Database.

The ISD's Media Production And Dissemination Division (MPD) also publishes technical reports and proceedings of conference and seminars organized by TISTR, and collect video tapes with interesting subjects in the field of science and technology for the purposes of dissemination and exchange with other institution.

Vietnam

- *The General Sciences Library of Ho Chi Minh City*, as a “national library” of the southern part of Vietnam, it provides the usual services to its users -- reference and interlibrary loan, photocopying, training and education of library personnel, exhibits, seminars and conferences, etc... Its support services in developing library personnel covers 21 provincial libraries in the South Vietnam. It publishes the Union Catalog of Books Published in the South, and other bibliographies, and is currently engaging in digitization projects for preservation.
- *The National Centre for Scientific and Technological Information and Documentation (NACESTID)* serves as the leading center of the national scientific and technological information system. On behalf of MOSTE, it exercises the state management in the field of scientific, technological information and documentation activities in Vietnam, and serves as a leading research institute in library and information sciences, and applied computer sciences. It serves as a professional and continuing education center for science and technology information professionals and information end-users. It also serves as the non-profit Internet Services Provider (ISP) and an Internet Content Provider (ICP) in the field of science and technology in Vietnam. Thus, its main activities are centered in:
 - Collecting, developing and processing national and overseas information sources on science and technology in order to meet efficiently and effectively the information requirements for socio-economic development of the country.
 - Creating and maintaining the national databank on science and technology.
 - Providing value added information products and services to the targeted users in the whole country, and providing information services to serve rural development.
 - Formulating professional guidelines and instructions for practical use in the whole national information system, including sectoral and provincial information centers.
 - Organizing training workshops and courses in order to upgrade professional skills and knowledge for information workers and librarians.
 - Promoting technology transfer by organizing technologies fair and exhibitions.
 - Providing technology and market information services for the enterprises, especially small and medium size ones.
- *Vietnam National University Hanoi (VNUH) ’s Library and Information Center* functions very much like any major academic research library. In addition to serve its own faculty, researchers and students, the Center also serve as an Information provider to individuals and organizations outside VNUH on contract basis.

4) MAJOR COLLECTION- PRINTED AND ELECTRONIC

Bangladesh

- *Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)* has more than 16,000 reference books in all branches of science and technology and 182 titles of periodical holdings on all branches of science and technology. Of them 69 titles of international periodicals. BANSDOC collects information in electronic form from INIS and also collects CD-ROM of some periodicals on payment basis. A database of BANSDOC’s own resources has been created for sharing among the members via BANSLINK.
- *National Library of Bangladesh* – See Section 2.3.

India

- *Indira Gandhi National Centre for the Arts*
 - Rare Books - A Unique feature of the library is the unique Personal Collection of eminent scholars and artists. These Include: Collections of Dr. Suniti Kumar Chatterjee, Dr.

- Thakur Jaideva Singh, Krishna Kriplani, Acharya Hazari Prasad, Nasi Heeramaneck, and many others. There is also a special Lance Dane Collection, several Area Collections, a collection of catalogue of manuscripts of indic and Asian origin published in all parts of the world, etc...
- Photographs collections include several prestigious ones. The most notable are the glass-plate negatives and original prints of Raja Deen Dayal, the Grandmaster of Indian Photography; the Henri Cartier Bresson's Photographs of India comprising candid shots of the Indian freedom struggle; and the D.R.D. Wadia Collection and photographs of the noted Photo-historian Sunal Janah, known for his rural life and freedom struggle pictures.
 - Architecture and Sculpture: Under this category IGNCA has the Lance Dane Collection of Photo Archives of Art comprising 100,000 B/W negatives and color transparencies on the Art and Architecture of India, Nepal and Combodia.
 - Collections of Slides: A rich collection of many unique collections and the GG Miniature Paintings.
 - Slides available in Electronic Media: Include Rock Art, BT Mural Paintings, Visvarupa, Brunners' paintings, Gita Govinda, Devnarayan, Masks, Muktesware Temple, Dev Narayan, Murai (Devadasi), Various Collection of British Library, Balan Nambiar, IRENE Winter's, Akbar Nama, Hamza Nama, Raja Rampur Library, ACSAA, Persian Collection, Lance Dane etc.
 - Publications / Exhibitions: More than 100 Books have been published and 38 Exhibitions on various themes have been organized by IGNCA.
- **National Centre for Science Information (NCSI)**'s Electronic Databases include many major subject fields, such as AGRIS, CAB, GEOREF, COMPENDEX, BIOSIS, FINDEX, MATHSCI, MEDLINE, INSPEC, SCI, JCR, etc... It has access to online hosts like DIALOG, STN and DATASTAR; and to a variety of information sources, particularly electronic journals on the Internet
 - **Indian Institute of Technology (IIT) Library** - see Arora's article on pp. 7-16 in this book.

Indonesia

- **The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)** library are based on science and technology information covering books, scientific journals (local & abroad), R&D reports, patents, standards, trade catalogs, etc. PDII-LIPI also has its own publication program, which includes some major tools such as Index of the *Indonesian learned periodicals*; *Directory of Special Libraries and Information Sources in Indonesia*; *Index of Research Reports and Surveys*, *Index of Conference Proceedings*, *Workshops*, *Seminar*; and other special bibliographies.
- **The National Library of Indonesia** has over 1.2 million titles. Among them are 10,000 some manuscripts written on a variety of materials, such as lontar leaves, tree bark, bamboo etc and 100,000 old collection generally written in Dutch language, which is called the Indonesiana. These unique and rare materials are products of the past store a wealth of information on the history and culture of each region in Indonesia.

Korea

Korea Institute of Industry and Technology Information (KINITI) collects a wide variety of information resources such as journals, monographs, reports, catalogues, industrial standards, patents, conference proceedings, dissertations and indexes. There are 7,500 journals from 52 countries (partly CD-ROMs and microfiches); over 7 million patents from 6 countries (mainly CD-ROMs and microfiches); 55,000 technical reports in Korea (printed only), and over 70,000 Monographs.

Malaysia

- ***The Malaysian Science and Technology Information Centre (MASTIC)*** gathers Malaysia's official statistics and indicators of S&T status, trends and future directions. These statistics form an integral part of the National S&T Indicators. Electronically, MASTIC develops online S&T databases and maintains the MASTICLink. MASTICLink holds the largest single source of information available in the country on S&T experts, current research projects and facilities. The data is sourced from government agencies, institutes of higher learning and research institutes in Malaysia. This web-based database is available to public and private sector. Subscription to MASTICLink is FREE at <http://www.mastic.gov.my>. The datasets available are under the headings of National S&T Minimum Dataset (NMDS); S&T Management Information-dataset; etc...

MASTIC's website also acts as a conduit for its information products. Its indicators reports are available on-line (full-text) under the Publications section. A directory of Malaysian private and public sectors involved in S&T related activities, with a brief description of their activities is also available from MASTIC's website. The MASTIC Library, open to the public has a collection of S&T management information reference materials includes titles on CD-ROM, Technology Profiles and Updates, selected proceedings and S&T policy related materials.

- ***Universiti Putra Malaysia Library*** had developed its collection in agriculture and related fields since its early beginnings to meet the information needs of its clientele. Currently it has over 450,000 books, 2,133 current journal subscriptions, about 60,000 AV materials, and 26 CD-ROMs. It has access to foreign online databases via subscription to EBSCOhost on the World Wide Web, Emerald Intelligence and Full Text Electronic Library, and Digital Dissertations. It also has access to local online databases on a subscription basis, such as:

Nepal

- ***Nepal National Library*** has collections of more than 75,000 books in different languages - Nepali, English, Sanskrit, Hindi etc... 2320 volumes of bound periodicals, and 616 newspaper and journals. It also has 45 CD-ROMs. NNL also possesses audio and videocassettes, and drawings, paintings and photographs. Of these, 303 audiocassettes and 60 items of art and photographs have been deposited under the Copyright Act.
- ***The Royal Nepal Academy of Science and Technology (RONAST)*** Information Center has a collection of about 8000 titles of books and documents mostly on S&T. It receives 20 titles of journals and 150 newsletters from various S&T organizations. On the electronic collection, the Center has prepared bibliographic database, Inventory of S&T manpower, Institutional and project profiles.

New Zealand

Ministry of Research, Science & Technology focuses on science policy information both New Zealand and International. Thus its collection includes journal titles, reports and monographs with these subject emphases. It subscribes to EBSCO's Corporate ResourceNet, Reuters' Business Briefings, and shall build electronic collection further in the future.

Philippines

- ***The National Library of the Philippines (NLP)***'s collections are divided in the following:
 - Filipiniana Division – consists of general, rare book, manuscripts, theses and dissertations, serials, special, photo, map, and Philippines revolutionary and presidential papers.
 - Reference Division – consist general, reference, fiction, and foreign collections.

- Government Publications Division – both Filipino documents and US.
- Asia & Oceania Division – both general and special.
- Library for the Blind Division – Braille, large prints, and audio tapes
- Multimedia Center – CD-ROMs, sound recordings/tapes, videotapes, microforms, etc...
- ***The Science and Technology Information Institute (STII)*** has a library collection of 5,800 books and reference titles and 2,124 periodicals. It maintains 5 electronic publications and a subscription to several CD titles.

Singapore

- ***The Singapore Productivity and Standards Board (PSB) 'IRC'*** - The attraction of the IRC as a specialized productivity information center lies in its unique collection of resource materials corresponding to PSB's six productivity improvement thrusts - productivity promotion, manpower development, industry development, standards and quality development, technology application, and incentives management. It also has a specialized collection in the areas of standards, system and process automation and industrial design and product development. The resource materials of the information center come in various forms. These include monographs and periodicals, on-line databases, CD-ROMs, videotapes, audiotapes, slides and photographs. It has a total of 244 serial titles, 32,900 books, and 500,000 standard documents in print.

IRC has access to thousands of electronic databases containing up-to-date information. These are done through private networks such as Dialog, Dow Jones, as well as through the Internet. The IRC holds more than 20 CD-ROM database titles on productivity related information such as: the OECD Statistical Compendium and the Singapore Trade Connection for the Economic and trade statistics, the Kompas CD-ROMs for company information, and Perinorm and Infodisk for standards.

- ***Nanyang Technological University (NTU) Library*** is a young university Library. In terms of book collection, it is much smaller than its counter part at the National University of Singapore. However, in terms of facilities, advances in library automation, and library development, NTU is known for its achievements since its formation. The Library's total collection as at May 1999 consists of 370,000 volumes (or 215,000 titles) of books, 30,000 journal titles, 45 CD-ROMs, 15 online databases, 1,500 e-journals, and other multimedia and AV materials.

Sri Lanka

Sri Lanka Scientific & Technical Information Centre (SLSTIC) does not intend to build up a comprehensive collection of books, periodicals etc. Instead it pays more attention to developing a collection of reference books which are not available in most other local libraries. The main objective of SLSTIC is to collect, process and disseminate information relating to Science and Technology. To fulfill this objective SLSTIC has developed some databases given as described in Section 2.3.

Taiwan, ROC

Science and Technology Information Center (STIC) - STIC in general, since the restructuring in 1998, does not maintain printed collections. Instead, access to electronic resources has become its niche and strength. However, a few special collections at STIC remain unique in ROC -- the NTIS SRIM Collection (about 458,000 titles, 1988-), NSC Reports in Microfiche (about 65,990 titles 1984-), and Dissertations in Microfiche (about 22,630 titles, 1994-). The Electronic Collection includes 41 titles of CD-ROM databases (13 current). For more information on this,

see the paper by Ke, Chang and Liu (pp. 217-224) and Ke and Hwang (pp. 225-234) of this book, as well as Chen (1999).

Thailand

Thailand Institute of Scientific and Technological Research (TISTR) – See Section 2.3.

Vietnam

- *The General Sciences Library of Ho Chi Minh City* has a collection of 500,000 volumes of books, 7,453 journal titles with 650 current ones, 10,937 volumes of theses, 796 microfilms, 2,982 microfiches, CD-ROMs, pictures, music scores, maps, and video tapes.
- *The National Centre for Scientific and Technological Information and Documentation (NACESTID)* holds a rich collection of information and documentation resources, including over 210,000 book titles, 6,000 periodical titles, 3,000 Research and Study Reports, 3,300 Registration Form for S&T Studies, and a dozen imported CD-ROM databases from abroad. A number of electronic databases based on CDS/ISIS software have been created and maintained by the NACESTID. These include:
 - STDOC - Comprehensive Inter-discipline Database on Science, Technology and Environment.
 - DT and KQNC - Databases on on-going R&D projects and completed R&D projects in Vietnam
 - SERIAL – Computerized Union Catalogue of Overseas S & T serials available in Vietnam
 - BOOK and TAPCHI - Database on the books and journals available in NACESTID Central Library of Science and Technology.
 - VENDOR - Database on technological and industrial equipment offered by foreign companies and suppliers.
 - PASCAL - Inter-disciplinary Database on natural sciences, technical sciences, life sciences and medical science.
 - DIALOG - Database on four disciplines: chemistry, chemical technologies, energy and environment, electronics and information science, materials.
 - SPIRS - Database on agriculture and food processing.
- *Vietnam National University Hanoi (VNUH) Library and Information Center* has a rich collection of 200,000 book titles in 750,000 volumes, 3,000 journal titles, 254 video tapes and CD-ROMs, and 1,000 pieces of rubbings. The Center also owns a rare book collection including Vietnamese rare books published in the 14th century and before and some other valuable collections. The reference collection contains a variety of encyclopedia, dictionaries, handbooks etc... in both Vietnamese and foreign languages.

5) TECHNOLOGY RELATED SERVICES

Bangladesh

- *Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)*
 - *Internet* - Internet has been introduced 1993 in Bangladesh. At present, full Internet services are provided by more than 16 Internet Service Providers. Most educational institutes have subscribed to the Internet services, but apart from these major libraries most medium to small libraries have no access to Internet. Earlier this year, University Grants Commission of Bangladesh has established Internet connectivity with RAS (Remote Access Server) provided with other logistics in the eleven Government universities.

At present BANSDOC is providing Internet E-mail services to the users. BANSDOC also established BANSLINK network connecting 16 nodes at different places of the

- country with the central Hub at BANSDOC. All of them are located in the universities and R&D organizations.
- *Website Development* – In developing institutional Websites, ISPs are rendering their services including their domain name registration with interNIC. Many commercial Websites have already been developed, but educational (edu) and organizational (org) Websites are not many as yet. The largest university library of the country, university of Dhaka's library has already developed its own Website with updating of information service. This library's selective catalogue will be on the Net very soon. Other University libraries are expected to follow soon. BANSLINK in its second phase and will go on Internet with its own home page.
 - ***National Library of Bangladesh*** – The NLB provides technological services mainly through computer, microfilm and lamination. A national information and reader service through the Internet is now under consideration by the authority.

India

- ***Indira Gandhi National Centre for the Arts*** has been one of the most technology-intensive centers in India. Its multimedia applications have been discussed earlier in Section 2.3. More than a dozen major multimedia projects have been completed. Currently, the Center has Internet and Web-based services with a dialup account. Web Site of IGNCA is www.nic.in/ignca. The web site is being redesigned to include more contents.
- ***National Centre for Science Information (NCSI)***
 - Web Services
 - Information Services through the World Wide Web Service links hundreds of information sources and over 1000 electronic journals
 - Access to databases available in house, including Adonis – Search biomedical journal, Information Sources for Electronics, Directory of Numeric Data Centres (CODATA Referral Database), and ISI's journal citation report
 - Access to SilverPlatter's ERL databases, including Biological Abstracts (1995 -), MEDLINE (1994 -), and Mathsci (1993 -)
 - E-mail Based Profile Alerting Services - Citation Alert Service, Hot Papers in Science & Table of Contents (ETOC) are the three e-mail based profile alerting services.
 - InfoWatch – An Electronic Newsletter
 - LIS Forum – E-mail discussion forum - There are currently over 200 subscribers from India & abroad.
 - Access to CD-ROM databases on the campus network - A 28-drive CD-ROM server on the NCSI's LAN is accessible on the campus wide network. Some leading bibliographic databases like COMPENDEX, INSPEC, Byte full text magazine are mounted on the CD-ROM server.
- ***Indian Institute of Technology (IIT)***- see Arora's article on pp. 7-16 in this book.

Indonesia

- ***The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)***
IPTEKnet is an acronym for Science and Technology Information Networking. It provides a nation-wide information infrastructure and database network based on open system standard. It is connected to the global Internet using a dedicated satellite line to the United States through PT Indosat since 1993. It provides transparent access to the global Internet; to use and exchange information, and to encourage the development of electronic databases in Indonesia. The network plans to connect all sectors of information sources in the country. Some of them -- the R&D information system, library services, public information systems, and computer in education and government information system – are being implemented.

At present several nodes (one of them is PDII-LIPI) have been connected directly using leased line to Internet. Besides connectivity, PDII-LIPI is also preparing and creating homepages for each of the members of IPTEKnet.

- **The National Library of Indonesia** is still in its initial stage of the use of Internet and WWW. The NLI's URL is <http://www.pnri.go.id>. The users cannot access the database collection of the NLI through the web.

Japan

Japan Science and Technology Corporation (JST)'s Information Services major product is JICST File on Science and Technology, in Japanese language. Collecting literature in S&T field from all over the world, processing data by 100 information specialists in every field of S&T together with 3,000 cooperative researchers outside, JST has provided said database to domestic researchers through the online system, JOIS. Currently, JICST's Japanese database has a file size is 10,319,000 (1975 - 1998), and an annual citation number of 700,000. It covers 5,172 journals from some 60 countries and other materials. JST then started a service of English language database for Japanese S&T information, called JICST-E File, in 1985. It has a file size of over 3,104,000 (1985 - 1998), and an annual citation number of 300,000. It covers over 7,015 journals and conference publications in Japan. EngliJICST-E is available on the Web at <http://stnweb-japan.cas.org> on a fee basis. As a part of an ASCA project, JST has distributed Japan's S&T information in the 3 subject areas -- Agriculture, Forestry and Fisheries; Electronic Communications; Renewable Energy, free of charge since 1980 to date. The data on CD-ROM is a part of JICST-E. This CD-ROM is distributed to 170 organizations in 22 countries in the region.

In addition to the above, JST provides the following services related to S&T information:

- **Advanced Databases** - JST develops new type of factual databases backed by the advance of computer processing technology. For more information, see <http://www.bio-info.jst.go.jp/advdb/english> (free of charge).
- **Directory Databases** - JST develops Directory Database of Research and Development Activities (ReaD). ReaD includes information of research institutions, researchers, research themes, and research resources to provide informational support for R&D in Japan. It is available at <http://www.jst.go.jp/EN>, free of charge.
- **Machine translation Service** - JST developed JICST Machine Translation System Japanese to English with some 600 thousand terms. It is provided in CD-ROM, and in 1998, made available on Windows as well, on a fee basis.
- **Networking** - JST is responsible for enhancing and managing the Inter-Ministry research information network (IMnet). The network connects national and public research laboratories throughout Japan. IMnet has been further growing by linking international projects such as APAN and TransPAC.
- **R&D Applying Advanced Computational S&T** - The aim of this project is to promote R&D utilizing the network, computational S&T such as computer simulations, transmission, and analysis of high-volume data. This project is expected to create outstanding intellectual properties, and to develop computational S&T to create new industries.

Korea

Korea Institute of Industry and Technology Information (KINITI) has four main Web-based Services as follows:

- KINITI-IR: KINITI's main information retrieval system providing bibliographic and patent databases. (<http://www.kiniti.re.kr>)
- Regional Information System: A Web-based information system providing regional industrial information such as products, firms, human resources, industrial facilities etc. for activating regional economy by means of informationization. (<http://region.kiniti.re.kr>)

- Inno-NET: A business service network which provides SME's and venture business with necessary information for solving problems, technology innovation and related activities; and linking 150 information agencies including government, public organizations and business support organizations together on the network. (<http://www.innonet.ne.kr>)
- Digital Library: The KINITI is a part of the national digital library (<http://dlib.kiniti.re.kr>). see also 2.8.

Malaysia

- ***The Malaysian Science and Technology Information Centre (MASTIC)*** - MASTIC subscribes to Techmonitoring and the Asia Pacific Centre for Technology Transfer (APCTT). Techmonitoring is a publication that monitors the latest trends in high technology areas. Currently MASTIC subscribes to 15 technologies. This publication is also available on-line to Malaysian subscribers of MASTICLink. The APCTT provides regular updates of technologies on offer from the Asia Pacific region. The hard copy version is available in MASTIC's library.
- ***Universiti Putra Malaysia Library*** experienced computerization and use of technology through several projects -- Cooperative cataloguing project, known as MALMARC (Malaysian Machine Readable Cataloguing) in 1979; the purchase of the first microcomputers in the library in 1985 used for online access to foreign databases, namely DIALOG through MAYPAC (Malaysian Packet Switched Network); the launching of CD-ROM based information search service as one of the tests sites for evaluating CABI's databases on CD-ROM. Now, a total of 10 microcomputers, each with a multidrive CD-ROM unit, are currently provided for easy access to CD databases. A CD-ROM networking system was also installed in late 1994 used only by the staff in technical processing units.

The Hewlett-Packard minicomputer was installed in July 1987, and the period July - December 1987 saw the development of an in-house database using the IDRC's MINISIS. Then Virginia Tech Library System (VTLS) was installed in January 1988. About 40 terminals and 60 microcomputers are currently linked to MINISIS and VTLS.

The University installed the campus wide network with the ATM backbone in 1995, and has enabled the library catalog to be on the Internet ever since. The catalog is directly accessible through the library's homepage, which also provides links to other sources of information on the Internet, both local and international. The academic staff can also make requests for purchase of books and interlibrary loans through the library homepage. The library has recently installed a network printer so the users are now able to print from the Internet using this network printer.

Nepal

Nepal National Library - Computerized catalogues of holdings have been set up in the NNL, using the UNESCO developed CDS/ISIS software. So far, records of Nepal related books in English, and the children's library stock records have been computerized. The NNL has facilities for playing audiocassettes and videos. Educational and children's videos are used especially with schools. Televisions and VCR's have also been supplied to the 4 Regional Libraries affiliated to the Nepal National Library. Readers may make use of the CD-ROM facilities in the library. A variety of educational and information CD-ROM's are available, suitable for adults and children, including the Encyclopaedia Britannica. Bibliographic database CD-ROM's, such as POPLINE and the UNESCO databases, are also available.

The Internet facility has been available in Nepal for 14 years. Kathmandu Valley, Pokhara and Birjung areas have access to Internet through leased lines from Kathmandu. Thus the digital information from different parts of the world has become more accessible to Nepalese people

than the materials produced in organizations and libraries within Nepal. Some entrepreneurs and information providers inside Nepal are contributing to the Internet.

NNL is providing Internet facility to its readers via a dial up connection to one of Nepal's 4 commercial Internet Service Providers (ISP). The software used is Netscape. The NNL's home page can be found at <<http://www.nla.gov.au/cdnlao/nepal.html>>. This website has been designed by the Conference of Directors of National Libraries of Asia and Oceania (CDNLAO), from information submitted by member National Libraries.

New Zealand

Ministry of Research, Science & Technology has full web access through an external provider. Internet Explorer is utilized across the organization to browse the Internet.

Philippines

The Science and Technology Information Institute (STII)

The S&T InfoWeb is a Web-based S&T information and communication service. This Website is being developed and maintained by the Science and Technology Information Institute. The S&T InfoWeb aims to provide a single point of entry and easy-to use interface to the set of existing (and currently being developed) electronic information and communication services of the Science and Technology Information Institute. The STII recognizes the great potential of these new technologies for revolutionizing the traditional paper-based information services. This project is the culmination of almost three years of research work that clearly showed that it is now possible to implement such type of service using readily available and affordable technologies. The S&T InfoWeb is divided into three layers - the interface layer, the content or service layer, and the infrastructure layer. The interface layer consists of the intermediary software that will facilitate interaction between online users and the services. This layer will harness the power and flexibility of the set of WWW technologies, such as HTML, CGI and Java, to provide users with a consistent and easy-to use interface. The design of the intermediary software will be based on a simple book metaphor so that access and navigation through the information pages will be familiar to majority of users.

Singapore

- ***The Singapore Productivity and Standards Board (PSB)'s IRC provides a number of*** customized services to meet the needs of businesses. These technology related services include:
 - Information Retrieval Service - Businesses can retrieve and package customized information from electronic/print sources through the IRC's Service. Access to CD-ROMs on productivity related matters are also made possible through do-it-yourself computer terminals.
 - Standards Information Service – The IRC offers the Standards Updating Service to provide subscribers status reports on specific standards on a quarterly basis. It functions as an ISO Information Network (ISONET) inquiry point to disseminate information on standards.
 - Current Awareness service (CAS) and Accessions List - Bibliographic information on relevant articles from current journals held by IRC are selected by staff and provided in monthly listings to users.
 - Productivity Online Benchmarking (PROBE) Service - Search for best practices and benchmarking information is now made easier with the PROBE service, a benchmarking database.
- ***Nanyang Technological University (NTU) Library*** has progressed significantly over the years. All library functions are fully automated since March 1988. Library users on campus can access to the Library's OPAC via personal computers linked to the network. Users from outside campus may access the OPAC through Internet or modem dialing. Since the installation of the library system, ATLAS of the Data Research Associates, Inc, in March

1988, many improvements have been added. NTU is the first library in Singapore to introduce self-check machines to facilitate self-borrowing of library books in 1994. The self-check machines are now widely used in Singapore libraries. NTU Library is also the first library in Singapore to integrate Chinese language materials into the Library's bibliographic database without incurring any changes in the Library System and more importantly, without incurring any extra cost. NTU Library WebPages was established in 1995 to identify and provide access to useful electronic information on the Internet. The Library WebPage has won an award in an international competition for its contents.

Taiwan, ROC

Science and Technology Information Center (STIC) - There are a large variety of electronic resources available on STICWeb, which include databases from STICNET, STICNET-E, and others acquired from abroad. STIC set up the Consortium on Core Electronic Resources in ROC (CONCERT) in 1998 to help libraries and research institutions in ROC to obtain better service and financial terms from database providers. As of mid-1999, more than 90 university libraries subscribed to various electronic information systems at affordable prices through CONCERT. STIC provides hardware, software and staff support to facilitate mirror sites and gateways for users to access these database systems, while users pay the content fee directly to database providers. Currently the users can access the following databases:

- **STICNET** – 22 domestic databases (including 12 bibliographic databases, five union catalogs, three directory databases, and two other reference tools) and five databases leased from abroad.
 - **Domestic Databases** – These include:
 - **Bibliographic databases** such as *Abstracts of Research Projects of the ROC* (1986-); *Abstracts of Research Reports of the ROC* (1970-); *Abstracts of Sci-Tech Journal Articles of the ROC* (1988-); *Abstracts of Humanities and Social Sciences Journal Articles of the ROC* (1991-); *Abstracts of the NSC-Awarded Research Papers* (1985-1996/07); *Abstracts of the NSC-Granted Research Papers Presented at International Conferences* (1991-); *Abstracts of Conference and Seminar Papers of the ROC* (1991-); *Abstracts of Doctorate Dissertations and Index of Master's Theses in the ROC* (1987-1995/02); *Sci-Tech Policy Review* (1985-); *Industrial Technology Research Institute (ITRI) Technical Reports* (1985-); etc...
 - **Catalog Databases** such as *Union Catalog of Non-Chinese Sci-Tech Journals Available in the ROC*, *Union Catalog of Non-Chinese Sci-Tech Books Available in the ROC*, *Union Catalog of Scientific Instruments and Equipment of the ROC*, *Union Catalog of Chinese Sci-Tech Periodicals in the ROC*, and *Union Catalog of Sci-Tech Periodicals in the Mainland China*.
 - Directory Databases and others
 - **International Databases** – These include BIOSIS Preview, COMPENDEX Plus, INSPEC, NTIS and Scientific Meetings.
- **STICNET-E** - *Research Papers of the ROC* (1988-), and *R&D Institutions in the ROC*
- **Mirror Sites** - Ei Village, SDOS (Science Direct OnSite), and WOS (Web of Science)
- **Gateways** - IEL (IEEE/IEE Electronic Library Online), IDEAL (International Digital Electronic Access Library), OCLC FirstSearch, SwetsNet, and EBSCOhost.

Through these systems, libraries and the research community have fee-based access to the full texts of a few thousands of electronic journals, reports and other resources. The resources are also available to the walk-in users in STIC's service area.

Sri Lanka

Sri Lanka Scientific & Technical Information Centre (SLSTIC) has access to Internet through a 64kbps-lease line. Some S&T CD-ROMs are also accessible through a Local Area Network developed with the assistance of SIDA (<http://www.nsf.ac.lk/SLSTIC/Slstic.htm>). These resources are available for the scientific community in Sri Lanka. For this purpose SLSTIC offers

a membership scheme for individuals and Institutes. SLSTIC also provide web-hosting facilities for S&T institutions. SLSTIC is making use of the networks established by universities to disseminate information to the S&T community. For example, LEARN was established by the academic community to provide E-mail service to enhance communication among them. SLSTIC acts as nodal points of LEARN to disseminate S&T information to the academic community.

SLSTIC/NSF is in the process of developing the National Information Network by establishing a wide-area computer network, with links to each other. SLSTIC will act as a gateway to the on-line databases outside the country. Presently three databases are online on Internet. SLSTIC intends to provide all the databases online in the near future.

Thailand

Thailand Institute of Scientific and Technological Research (TISTR) has used PC facilities since 1987 for its work.

Vietnam

- *The General Sciences Library of Ho Chi Minh City* is a dial-up subscriber of the Vietnam Net Internet Services. In order to share our single Internet connection within our Local Area Network, we will apply a proxy server firewall software package. The library has an On-line Public Access Catalog (OPAC) which is made up of several databases. The users can make information retrieval in library's databases by using keyword and Boolean search strategies. The databases include databases of books, periodicals, union catalog of serials with the library of NACESTIC, abstracts of periodical articles on global science, technique and economy, abstracts of articles from newspaper "Free Saigon", abstracts of periodical articles on economy, bibliography for Tay Ninh province, and bibliography for the 300th anniversary of Ho Chi Minh City
- *The National Centre for Scientific and Technological Information and Documentation (NACESTID)* is providing traditional and electronic information access services to users through various CD-ROM databases and other domestic-built-up databases. It also performs information searches on Intranet/Internet. It publishes six online electronic bulletins and Web sites in the VISTA network. As a Non-profit Internet Service Provider (ISP), NACESTID offers Internet Access service to its S&T information users, and also acts as Internet Content Provider (ICP).
- *Vietnam National University Hanoi (VNUH)'s Library and Information Center* has a number of services related to the use of technology. See Nguyen's article on pp. 301-304 of this book.

6) Latest Technologies Utilized – see also Sections 2.5 and 2.7

Bangladesh

Bangladesh National Scientific and Technical Documentation Centre (BANSDOC) - Networking technology using UNIX as well as Windows NT are in full use for LAN and WAN in Bangladesh. UNESCO's CDS-ISIS software is used in most libraries, and 1999 has witnessed the high use of this latest version, which is user friendly and GUI (Graphical User Interface)-based. The program follows ISBD (International Standard Bibliographic Description) and MARC (Machine Readable Catalogue). The texts in the latest version automatically can be converted to HTML files, and therefore can be uploaded into the Web pages easily.

BANSLINK is a network of UNIX servers. All the terminals in this network are text based. Two customized software - LMS (Library Management System) and ANA (Application Network Agent) - are used for record keeping, retrieval and data exchange among the BANSLINK nodes.

India

- ***Indira Gandhi National Centre for the Arts***
IGNCA's Multimedia (MM) Lab integrates modern technology to help further the mandate of IGNCA as the designated nodal agency for all matters related to art, humanities and cultural heritage. The networked multimedia lab operates a wide range of equipment, which include multiplatform workstation:
 - Silicon Graphic - 3D Graphic Station, Image and Video Editing, Modeling & Animation; Wintel - Project Development, Database Development,
 - Power Mac - Graphic Designing, Image Editing,
 - Kodak Imaging Workstation (PIW 4220) - High Quality Digitization Solution for slides, microfilms and microfiche.
 - Dual layered networking is adopted to connect the entire Lab: ATM workgroup switch is used to connect the powerful SGI workstations, inter-linked at 155Mbps. Ether switch with ATM uplink and 8 - port Ether hub is used to connect rest of the workstations at 10 Mbps.
- ***National Centre for Science Information (NCSI)*** - Scanning, OCR and PDF technologies are used to scan useful information and bring it to the notice of users. A high-resolution projector is used for delivering lectures, making presentation and demonstrations. Internet & Web technologies are being used quite extensively to provide information services.
- ***Indian Institute of Technology (IIT)*** - see Arora's article on pp. 7-16 in this book.

Indonesia

- ***The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)*** – see also Section 2.5. Since 1984 PDII-LIPI has started using information technology in its operations with a HP 3000/40 minicomputer. And beginning with the era of microcomputer, CDS/ISIS software has been used, and all data in MINISIS had been transferred to CDS/ISIS using microcomputer network on NOVEL 3.12 operating systems. Additionally, PDII has also developed its own Web with www.isis search engine. Microcomputer local area network has been implemented for integrated documentation, information and library operations. This LAN is intended to support the strengthening of the bibliographic databases (including abstracts) of Indonesia monographs, research reports, conference papers, and Indonesian journals. The total number of records available in Indonesian databases, especially of S&T subjects is about 300,000 records. PDII-LIPI's URL is: <http://www.pdiilipi.go.id>.
This year LIPI has tried to improve basic science education in rural areas using ICT applications. The objectives of this program are to make district library as a model gateway to information access; and to provide access to domestic networks and Internet for meeting the information needs of the school and the community. In order to succeed, LIPI will have to work together with local government, universities, other state and private institutes, and the international funding agencies.
- ***The National Library of Indonesia*** is making effort to reproduce manuscripts into microfilms to enable better access for the users. In the planning stage, CD-ROMs or optical disks containing images of the manuscripts are being considered. Currently online Public Access Catalog (OPAC) terminals can be found in every floor of the library building. This can be used in a multi-user environment via the VTLS library automation system installed since 1993. The database can also be accessed by using a dial-up connection with a PC.

Korea

Korea Institute of Industry and Technology Information (KINITI) tries to follow up and implement the emerging technologies into information systems. KINITI is utilizing advanced

information technologies such as html, SGML, JAVA, image viewers, and plug-ins in Web-based services including KINITI-IR, digital library, Inno-NET etc.

Malaysia

- *The Malaysian Science and Technology Information Centre (MASTIC)* provides its database and publications through its website. The database application was web enabled in July 1998. Recently, registration of MASTICLink clients was also made available through the web. Prior to this, MASTICLink was a client-server-based application and registration of clients was done in the traditional way.
- *Universiti Putra Malaysia Library* – see Section 2.5.

Nepal

- *Nepal National Library* has 6 microcomputers (including 3 Pentiums with CD-ROM drives), one laptop computer, and 4 printers. A dial-up Internet and email connection is available. A photocopier is provided, and an overhead projector is used for training and workshops. Television, VCR and audiocassette players are used especially with children's groups. Some of this equipment is also used for copyright registration of audio-visual materials. Each of the 4 affiliated Regional Libraries has been supplied with a television, VCR, computer, printer and photocopier, with financial assistance from DANIDA through UNESCO. A recently acquired digital camera is being utilized in the production of NNL publications such as the Nepal National Library Newsletter, and for making available in digital form excerpts of text from rare items in the collections.
- *The Royal Nepal Academy of Science and Technology (RONAST)* - The Information Center of the Academy is equipped with CD-ROMs, multimedia materials, and Internet resources. It utilizes UNESCO's CDS/ISIS Ver. 3.08 DOS, and other software such as Explorer Network, FrontPage Express, Microsoft 97, and Linux. Digital library is yet to be started in the country. RONAST is taking initiatives to have a networking of 59 S&T libraries in the country.

New Zealand

Ministry of Research, Science & Technology endeavors to utilize the most recent technologies.

Philippines

The Science and Technology Information Institute (STII) - Production and development of information materials of the institute give preference to the use of internet-based technology. Publications are produced both in print and electronic form.

Taiwan, ROC

Science and Technology Information Center (STIC) - Web technology is currently the dominant technology used to provide various information services at STIC. In 1997, STIC replaced old proprietary system that supported the STICNET database service with a new Web-based client/server system. All data of STICNET databases was uploaded to the new system and became searchable with *Finder*, a search engine developed by a local company. In its first e-journal project, STIC staff created a special Web page to provide access to six electronic journals published by NSC. It is an electronic archive in the sense that data is stored and reused for information services. NSC provides STIC with the data on a regular basis, and STIC is responsible for its storage and archival management. NSC is the publisher and distributor for the printed copies, with STIC handling their electronic versions. All data is stored in one of the NT servers at STIC. GRB, an online information system to provide access to information on

government-funded research, is another example of STIC's efforts to explore new Web technology to improve service. With an NT server and web page designing tool Cold Fusion, STIC staff have developed a system that offers report submission, review processing and searching and browsing capabilities.

Vietnam

Based on the communications from Vu Van Son of NACESTIC, there exist some wide area networks in Vietnam, and as communication networks are developing in Vietnam, libraries can access these networks if they have the necessary equipment and connections in their local institutions. These networks are:

- 1) *Netnam (formerly TNET)* established and developed by the Institute of Information Technology under the National Centre of Natural Science and Technology in Hanoi in 1994. This network provides email services, forums, databases and access to the Internet, meeting the emerging requirements of research communities in Vietnam. Its main objectives are:

- To provide information exchange services in areas of research and education, business and management, thereby promoting computer science in all social activities.
- To develop WAN's applications, providing distributed computing environment in the whole country through open system, client/server and distributed processing.
- To serve as information bridge for Vietnamese living and working both in the country and abroad.

In 1994, connections to Internet from Hanoi have been upgraded through a substantial aid from Australian government. Instead of the voice satellite link, an error-free X-25 is used to speed the effective throughput.

- 2) *VINANET* (Vietnam Trade Information Network) has been established by Vietnam Trade Information Centre. It interlinks 30 provinces and cities, providing daily trade information.
- ***The General Sciences Library of Ho Chi Minh City*** - The promise of technology has helped libraries to respond to the challenges of the information explosion, spiraling storage cost, and increasing user demands. The digital library will become more cost-effective because of four assumptions: Resource sharing, lower maintenance and distribution costs, meeting user demands for timely access, and continuing value of information. Thus, the General Sciences Library is making big effort to make old but precious materials accessible to its people. The Department of Preservation and Conservation of the General Sciences Library has been a leading participant in such efforts, having created over 6000 digital images of old Saigon-Ho Chi Minh city dedicated to the tricentenary of the city. But, we are facing obstacles in the digital conversion of library research materials such as the shortage in number and updated equipment and shortage of funds for acquiring additional needed equipment and new technologies.
 - ***The National Centre for Scientific and Technological Information and Documentation (NACESTID)*** is using Internet for providing much content-based services.
 - ***Vietnam National University Hanoi (VNUH)'s Library and Information Center.*** See Nguyen's article on pp. 301-304 of this book.

- 1) **Current and Future Technology Related Plans (with specific reference to the digital library development)** – see also Sections 2.5 and 2.6.

Bangladesh

- ***Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)*** - Digital library has not yet been established in Bangladesh. Partial digitization is planned in

the Library of National Parliament in Bangladesh and in the Dhaka University Library. In BANSDOC, discussion is going on with the relevant Ministry to prepare a project for partial digitization of its information resources. But, the major problems are the lack of awareness, lack of infrastructure, absence of any feasibility study, and absence of enough technologists for the purpose.

- **National Library of Bangladesh** – Besides computer-based reader services and information services through Internet, the NLB envisages to develop a database related to libraries and their collections within the country for quick references.

India

In India, the Indira Gandhi National Centre for the Arts is probably the leader in the area of “digital” development. More details will be given below. Apart from IGNCA, various institutes, such as Indian Institute of Sciences, The Indian National Scientific Documentation Centre (INSDOC), Indian Institutes of Technology, Sangeet Natak Akademy, CDAC, Saraswati Mahal Library have initiated several digital library projects.

The Indian National Scientific Documentation Centre (INSDOC) has taken steps to established fairly large CD ROM-based full-text electronic library for document delivery. The full-text CD ROM products subscribed by the INSDOC include: ADONIS, Business Periodicals Ondisc and General Periodicals Ondisc. The Indian Institute of Science, Bangalore, which is a beta site for IBM digital Library project has taken up a project, called “Disc Project”. The “Disc” project is analogues to “Project Open Book” taken-up by several countries. Indira Gandhi National Open University at Delhi has successfully launched a number of web-based online courseware in Information technology under their distant education program.

Recognizing the importance of information technology and its applications, the Government of India has constituted a Task Force on Information Technology. The Task Force, in its recommendation, have suggested several international collaboration with organizations across the globe which have made noteworthy inroads in the IT sector. The Task Force has emphasized India’s role in the content creation industry.

- *Indira Gandhi National Centre for the Arts*

Since 1994, a *Cultural Informatics Lab (CIL)* was established under a UNDP / UNESCO assisted Project for the development of interactive Multimedia Documentation and in-depth analysis of cultural information through CD-ROM publications. Over a dozen projects have been initiated requiring a multi-disciplinary team of national and international scholars, computer scientists and graphic designers. They are:

- Digital Library - Efforts have been initiated to develop a digital library of IGNCA collections.
- Gita Govinda - A multimedia experience on Gita Govinda, a 12th Century epic by Jayadeva.
- Muktesvara Temple - This temple is a jewel of architecture of 11th-12th century.
- Brhadisvara Temple - In the course of history, certain regions have developed into cultural centers. This project explores this center from city planning, architecture and sculptures, paintings and literature to socio-economic structures.
- Devdasi Murai - This CD-ROM (December 1997) is part of IGNCA’s endeavor to digitize the multidimensional performative ritual within the architectural space of Brhadisvara temple.
- Agnicayana - Agnicayana is probably to be the oldest surviving ritual of humanity. It offers extraordinary insight into Vedic times and highlights many features of South Asian cultures.
- Visvarupa - A cosmic vision of Krishna revealed to Arjuna in the Bhagavad-Gita before the Mahabharata war.
- Rock Art – Man’s primeval senses of sight and ability to hear have simulated artistic expressions.
- Two Pilgrims - A multimedia database on a 20th century Hungarian painter living in India for over seventy years. Elizabeth Sass Brunner and Elizabeth Brunner, mother and daughter, who traveled to India, Japan and Sri Lanka in search of spirituality in the 1920s.

- Man & Masks - This is one of the many ways through which cultures have given voice to their powerful cognition and most subtle emotions, to define their inner and outer realities.
- Oral Epic of Dev Narayana - A 45-50 hour long oral narrative of a cult's performance in worshipping a fold deity which contains both sung and spoken section.

In near future, IGNCA is planning to offer the academic content to the Internet users. This is likely to have the full text of public lectures, proceedings of Workshops, Conferences & Seminars, material from Exhibitions organized by IGNCA, Synopsis of all books published by IGNCA, Video and Audio Recordings, slides, Microfilm & Microfiches and other collections of all academic divisions.

Clearly these efforts are made for the benefit of scholars, students, researcher and general public. But there are problems and issues. Most of these are related to content structuring, data encoding and copyright related issues

- **National Centre for Science Information (NCSI)** proposes to set up three information facilities:
 - *Internet Information Systems* to improve access to Internet/Web based S&T sites and to facilitate information exchange among scientists
 - *Prototype S & T Digital Library (Dlib)* to improve access to bibliographic and full text databases, library catalogues and Indian scientific information
 - *Information Discovery Centre (IDC)* to train teachers, researchers and librarians in digital/network information handling.
- **Indian Institute of Technology (IIT)** – see also Arora's article on pp. 7-16 in this book. The IIT Delhi, on a smaller scale, has started a project for digital scanning of fragile and deteriorating bound volumes of journals under a project sponsored by the AICTE. This project would be one of the first initiatives of its kind in India.

Indonesia

Conceptually, the Government has devised NUSANTARA 21 for developing the information infrastructure in Indonesia. This program is aimed at linking every small town throughout the archipelago to each other with a variety of communication technologies, including satellites, fiber optics, TV cable, cellular and broadcasting. One of the main objectives is to allow people in remote areas to have access to global information. In the meantime, the telematika (telematics) policy has also been developed in order to push application of technology in the administration, health, education, industry, trade and other sectors as well as science and technology information. This policy closely resembles the concept of MALAYSIA'S MULTIMEDIA SUPER CORRIDOR (MSC). Currently almost every region in Indonesia is accessible through fiber optics cables and satellite links. Several areas have even been designated to become models for pioneering multimedia communities.

- **The Center for Scientific Documentation and Information of the Indonesian Institute of Sciences (PDII-LIPI)'s Future Data Communications Environment** - LIPI is concerned with the emergence of new electronic technologies and the potential widening gap between the North and the South. It is now an active member of both the IPTEKnet program and the NUSANTARA 21 project. Information and communications technology is often seen in the development context as an investment whose high cost and required advanced skills made it difficult to use in the poor environment. Under the supervision from CSIRO, Australia and with the World Bank's support, LIPI will develop IT Services Strategy, "Systems Requirements for LIPI's RDMS." It will describe a possible blueprint for long-term development of LIPI's data communications environment. The network model proposed for LIPI is a centrally administered wide area network (WAN) linking geographically the dispersed sites with one or more R&D centers. Today LIPI has 20 R&D subject centers and dispersed to more than 10 location around the country.

- *The National Library of Indonesia's* Reprography Division is responsible for preserving the library materials information content by transforming them from conventional to modern media. But, the digitizing effort is only at the beginning stage.

Japan

Japan Science and Technology Corporation (JSTL), on 2 June 1999, the CST submitted a report to the Prime Minister recommending the crucial need for having the combined efforts of the government and private sector for information distribution in the age of networking. Some of the proposed measures are related to electronic publishing. They also are related to the need to enrich collection via digitization process, the need for factual and directory databases in support of researchers, the need to increase IT literacy via improved environment for integrating distributed digital contents, and the need to enhance better cooperative relationship among responsible organizations for building an one-stop search system for distributed databases of S&T information.

In responding to these recommendations, JST is developing following systems:

- *Integrated System for the Distributed Digital Contents* for one-stop search for multiple databases. Files to be included are the Database Directory File and Link File; Data Collection Robot; Large Synonym Dictionary and Multi-lingual Dictionary; Large Chemical Substance Dictionary; Agent System Communicating with Large Databases Supporting High-speed Search. This system is scheduled for operation by the early FY2001.
- *The System for S&T Electronic Journals* - JST will publish electronic journals on the Web in cooperation with major academic societies in Japan and the National Center for Science Information Systems (NACSIS) under the Ministry of Education, Science, Sports and Culture. This system is scheduled for full operation from late 1999, with some 25 titles.

After accumulated for a certain period, the JST data will be restored at the National Diet Library (NDL) since that is the national responsible organization for the National Digital Library.

Korea

Korean government has proceeded with the national digital library since 1997. It is aimed to link major public libraries together on one single nationwide network. It is aimed for increasing national competitive edge via information, contributing to balanced development among districts nationwide, enlarging public owner system of national information resources, giving the required information to the ordinary people as well as researchers by means of online network, and strengthening national competitive power of information society in the 21 century. With the digital library system, the user can retrieve qualified full-text (SGML and image materials) and abstract information conveniently any time and anywhere.

This national digital library system will be based on the Z39.50 protocol. It will be an SGML multimedia application with a copyright management system for protecting the author's right.

There are 7 major participants of the current national digital library system with an URL: (<http://www.dlibrary.go.kr>). They are:

- 1) The national library of Korea (<http://www.dlibrary.go.kr/home>),
- 2) The national assembly library (<http://www.nanet.go.kr/search/search.html>),
- 3) Supreme court library (<http://sclib.scourt.go.kr>),
- 4) Korea institute of industrial and technical information (<http://dlib.kiniti.re.kr>),
- 5) The Korea research and development information center (<http://eve.kordic.re.kr>),
- 6) The Korea research information center (<http://210.102.99.60>), and
- 7) The science library in KAIST (<http://pasteur.kaist.ac.kr>).

In addition, a number of digital libraries are developed or developing in private sector such as universities and large companies in Korea.

- *Problems and issues* - The infrastructure of national digital library was developed through the two-year project in 1997-8. Several problems issues remains in relation to the techniques of:
 - Including multimedia data including dynamic image and voice data.
 - Changing some SGML data to XML for better efficiency on the Internet.
 - Resolving the problems related to copyright and information security.
 - Enabling a large number of concurrent users
 - Using distributed processing technology for increasing efficiency of data management.
 - Dividing work appropriately among the participants of the national digital library project.
 - Linking to the existing private digital libraries.
 - Developing various services such as directory service, push service etc.

Korea Institute of Industry and Technology Information (KINITI) participated in the national digital library project since 1998 as a principal part. KINITI's digital library started and linked to the homepage of the national digital library several months ago; and provides 25,000 records in the form of MARK as an example service. Its URL is <http://dlib.kiniti.re.kr>.

Malaysia

There are approximately 10,000 libraries of different sizes in Malaysia. Aside from the National Library and 13 university libraries (10 government-funded and 3 private), and 14 state libraries (with 97 municipalities, district and rural libraries, 92 mobiles), there are also 300 special libraries and 8,000 school libraries/resource centers. Yet, the development of digital libraries in Malaysia is still at its infant stage, even though there have been government initiatives towards this development. These initiatives include the development of the Multimedia Super Corridor and Cybercities; the provision of broadband telecommunication infrastructure and legal framework - intellectual property protection, cyberlaws, etc.; the development of smart schools; and the establishment of the Multimedia University.

The National Library is currently leading the National Planning Committee for the Development of Digital Libraries, whose membership comprises representatives of the different types of libraries - academic, public, special, and school. A concept paper proposing the development of digital libraries has recently been completed and will be submitted to the authorities for approval. One of the main focuses is to develop local content in the digitized format. The National Library has in its plan to digitize 10% of local publications by the end of the year 2000, 20-40% in 2001-2005, 80% in 2006-2010 and 100% by the year 2020. Meanwhile, some of the major libraries have also taken necessary steps to start some form of digitization projects on a much smaller scale within their staff and financial constraints. One recent development is the launching of the Connected Learning Community Project, whereby the National Library with the cooperation of the 14 state libraries has developed local content which is currently accessible to the community at large through their respective homepages on the Internet.

The development of digital libraries may result in libraries being the Knowledge Resource Centers or gateways to the national and global resources, and acting as a reservoir of the memory of the organization, state, community and the nation. It may also lead to the development of the Smart Library which provides:

- integration of all libraries and knowledge-based institutions and “anywhere and anytime” access to their combined rich resources available in multiple formats;
- creation of digitized local information and knowledge bases;
- interactive online reference service;
- online membership registration, request for document delivery;
- distant learning and education on demand;

- availability of IT equipment for public use;
- infotainment, edutainment and infomedia center.

While there are great promises with the digital library development, there are also many problems and issues as well. They are: the legal issue – copyright/intellectual property, privacy and confidentiality, safety, security; overload of information; multicultural and multilingual issues; currency and authenticity of information; preservation issues; cost and affordability of information; increasing gap between information rich and information poor; lack of local content in digital format; net congestion; propaganda and unhealthy information on the net – misinformation and disinformation and local finding aids – metadata, inventory and directory of local information resources.

- **Universiti Putra Malaysia Library** has planned to digitize some of its materials a couple of years ago, but was handicapped by the shortage of funds and available staff. A pilot project is currently underway to digitize only the University publications as to avoid any possible copyright problem. The hardware and software for the project was provided by the University's Information Technology Division, comprising the IBM RISC 6000 server with a configuration of 128-MB RAM and 6 GB disc storage, and the IBM Digital Library (IBMDL) package. The package includes the Digital Library Software, DB2 software for the database, and the net.data software as the interface between the Digital Library Software and the Internet. The inputting of data started early this year when the library was given 2 additional staff for the project. These are received in MS WORD format, edited and then converted into the PDF format. The thesis file is then indexed in IBMDL.

Libraries are among the key contributors towards the development of an information-rich and knowledge-based society. The UPM library definitely strives to fully utilize the technology that is within its reach to move towards the digital environment in the near future.

Nepal

There is still a long way to go in the development of digital libraries here in Nepal. As yet, no digitized full-text document libraries have been generated within Nepal. Digitized bibliographic information is however becoming more readily accessible. In a survey of 38 leading libraries carried out in 1997², out of total stock holdings of 557, 590 items, only 23.8% of catalogue records had been computerized. At that time, 15 out of the 38 libraries surveyed had CD-ROM drives. However, much progress has been made, especially in the past 2 years, and CD-ROM and Internet facilities offered by libraries in Kathmandu have greatly increased.

Bibliographic databases are also on the increase, with over 100 organizations now using the CDS/ISIS software. Some databases may number only a few hundred records, and it is still true that only a minority of ISIS users have as yet computerized 100% of their stock holding records. However, some leading libraries have sizeable working databases. Many of these have chosen to adopt the Common Communication Format for their records structures, thus greatly facilitation the exchange of data between institutions, and opening up potential for merging of digitized records to create bibliographic databases of national significance. (See for example the National Union Catalogue database, outlined below.)

Specific initiatives in digital information sharing in Nepal are visible. For example, *Nepalnet* (www.panasia.org.sg/nepalnet), Electronic Networking for Sustainable Mountain Development, is a network of 31 Nepali organizations sharing sustainable development information on the Internet. The project was initiated by International Centre for Integrated

² Gregson, Jon and Pathak, Bhanu. (1997). "Enhancing library and information services in Nepal through use of new technology," Paper prepared for *National Conference on the Role of Information in National Development*, Kathmandu.

Mountain Development (ICIMOD) which provided Internet training enabling member organizations to mount information on the Nepalnet website. Members access the site through an Intranet network. Information is grouped under 9 key development sectors - agriculture, ecology, forestry, economy, education, policy and law, sociology and demography, technology and infrastructure, and water, earth and atmosphere. The future development of Nepalnet under discussion is proposed to include digitized full-text documents from members' library holdings on the site, commencing with research reports on education and on mountain development.

- ***Nepal National Library*** - Digital library development at the NNL has not begun. Other technology related plans within the Nepal National Library include:

- *National Union Catalogue Database* - The Nepal National Library coordinates a network of 20 cooperating libraries that contribute bibliographic data on their Nepal-related holdings. 8 of these libraries have computerized part or all of their catalogue records. These databases were merged at the National Library, duplicates deleted, and the resulting 10,731 records were published in 1997 as the first volume of the National Union Catalogue. Bibliographic data is continuing to be collected at the NNL, and compiled into the National Union Catalogue Database
- *Microfilming* - The Nepal National Library is about to receive microfilming equipment through an aid program of the government of Japan. This will be used to microfilm the National Library periodical collections, and rare and valuable items from the Sanskrit and Nepali bookstocks, in order to make them more accessible for general use, while preserving the originals. Microfilm readers and printers will enable NNL users to access not only items from the NNL stocks, but also microfilmed collection from the Department of Archives, and from Madan Pustakalaya, a private library with extensive Nepali collections.

Problems and Issues- There are many problems and issues. These include:

- Lack of awareness among government planners and policy makers of the importance of efficient information systems in national development,
 - Lack of government funding for electronic development in libraries. Such progress as has been achieved has generally been funded through time-bound projects, thus sustainability is a real problem,
 - Shortage of qualified and skilled manpower to carry out computer and electronic based developments,
 - Full consensus on standard data recording formats has not yet been reached at national level,
 - Some libraries are still protective of their catalogue records, and unwilling to cooperate fully in data sharing initiatives,
 - Many organizations are not in a position to join cooperative efforts because their own collections have not yet been systematically organized, and
 - Even for database construction in using the CDS/ISIS, CDS/ISIS does not yet satisfactorily handle the Devanagiri script (the script of the Nepali language). At present Nepali materials can only be recorded in Romanized script, a very serious handicap in the development of national bibliographic control.
- ***The Royal Nepal Academy of Science and Technology (RONAST)*** - In the Nepalese perspective, a 20-year strategic plan on Information Technology has been prepared by the National Planning Commission of Nepal with the assistance of United Nations Development Program (UNDP) recently. The plan contains 4 phases:
 - 1) preparation of a conducive environment for IT business (1999-2002),
 - 2) development of global framework for IT (2000-2005),
 - 3) internationalization (2005-2015), and
 - 4) Nepal computerization (2010-2020).

To implement the plan, a high power agency to coordinate government actions has been proposed which will serve as a permanent interface between all government units and the private sector. The IT board will be chaired by the Prime Minister while the Vice Chairman of the National Planning Commission will be its Deputy Chairman. Similarly, the board will

be composed of key ministers viz. Finance, Education, Telecommunication, Industry and Law and Justice.

New Zealand

Several organizations have set up digital libraries in New Zealand, but most effort has been put into creating tools for accessing information. The National Library of New Zealand has just released its new national bibliographic database (Te Puna), and there is also work being carried out on subject specific access to information. Project is underway to improve access to New Zealand science information, which is currently not indexed in a comprehensive manner.

Ministry of Research, Science & Technology - In the Ministry, efforts have been concentrating on increasing the available electronic information resources. Hard copy resources are still being collected, but only when the material is not available in electronic form at a reasonable price.

There is a general problem with access to electronic information once the organization has stopped subscribing to it. However at MoRST, new information is in demand but not the older materials. Fast access to needed information is also a must, so electronic delivery is the most useful means of delivery.

Philippines

The digital library is a very new phenomenon in the Philippines. The libraries in the Philippines, are still groping their way to becoming a digital library, a sort of a hybrid type, with the traditional library collections that cannot be completely dispensed with, side by side with the exciting CD-ROMS, Internet services, E-mail services and other digitized formats. So far, only big academic libraries are gradually going the way of digital library by having some digital collections and access to digital resources via the Internet. These libraries have books and periodicals in CD-ROM format. They have facilities for Internet and E-mail services. They subscribe to some electronic journals, which are rather expensive.

For example, three academic libraries in the Philippines – two private academic libraries and the other one a state university – have been described here by Dr. Rosa M. Vallejo.

“One academic library has 200 terminals for Internet services, OPAC in every floor of its recently renovated 3-storey building, and a fully automated circulation system. The other private academic library has 65 terminals for Internet and e-mail services, a cyberspace corner in the library for the faculty. The library digitized the doctoral dissertations and these are available in full text in CD-ROM. The master’s theses are presently available online using CDS-ISIS. It will be digitized this year. At the present time, this library has 186 CD-ROM titles inclusive of e-books, journal index, abstracts and full text and multimedia; 11 titles are networked and accessible system-wide. The Filipiniana collections of around 14,000 titles have been digitized. The library is continuously purchasing e-books particularly reference books and multimedia materials. Their students pay a semestral IT fee integrated with the tuition fees. They have an online subscription to OCLC and will subscribe to other online specialized databases via membership of their faculty in societies and organizations.

The state university main library has 20 terminals for Internet services and OPAC terminals. They have databases in CD-ROMS and videotape collections. There are 26 college libraries on campus and each library has computer facilities, some digitized materials which are rather expensive and also because the students still use book collections in its original format. Slowly, the libraries are beginning to realize that they have to acquire more materials in digitized format to facilitate access to information.

Digital library application is for library orientation and user education, for accessing online catalogs and indexes, and for communicating to the academic community, and for information dissemination.”

The problems encountered by the private academic library mentioned above tend to relate to the slowness of the traffic flow which affects the response time due to telecommunications

infrastructure limitation, the high cost for upgrading and expansion of the hardware, training and development of staff and hiring of qualified personnel, limited choices available locally, and literacy program for the target community.

- ***The National Library of the Philippines (NLP)***'s Information Technology Center (ITC), attached to the Bibliographic Services Division, handles the computerization activities and projects of NLP. These projects cover library operations from the time the book and other library materials are acquired, processed and served to the readers/users and to establish and maintain the Philippine Library Information Network (PHILIN).

NLP will have the following networks fully implemented within the next five years:

- *National Library Information Network (NLIN)* is a network of databases wherein existing library consortia and other information networks will be linked through cooperative acquisition and shared cataloguing projects with the National Library as the central node. While the technology advances, NLP will also provide alternative means of access to its collection, both in the reading rooms and remote off-site. In 1998, the Library has already established its OPAC in the Filipiniana Division. Towards the end of 1999, the Library will be able to improve access to its entire collection. It is planned that within the next five years, researchers from other libraries and other parts of the world can consult the NLP main database via Internet-based services.
 - *Public Libraries Information Network (PUBLIN)* is a NLP network project that will provide access to all library materials and promote resource sharing among public libraries nationwide. PUBLIN, launched in May 1998, provides the first 20 public libraries from Metro Manila and nearby localities the system package consisting of the hardware and software (SEARCH/EDIT user license of the TINLIB v300 software). At the end of the first quarter of 1999, NLP has distributed another sixty (60) units to provincial and city libraries as the 2nd phase of this project, and another sixty (60) units for the municipal libraries as the 3rd phase. Expansion of PUBLIN project will take place within the next five years in accordance to the approved NLP Information Systems Plan (ISP) which is now being updated and for submission to National Computer Center, the government regulatory body for IT.
 - *Digitization* is one the NLP's proposed projects, which will convert selected rare materials of the Filipino cultural heritage into digital form. This will be a tool to provide worthwhile, enduring access to some of NLP's most treasured cultural and historical resources. These digitized materials will be stored in CD-ROMs. Digitization is projected for implementation by year 2000.
- ***The Science and Technology Information Institute (STII)*** - The development of digital library has always been in the priority activity of STII and has been in the pipeline project for three years now. The only problem here is the funding. STII is building up its CD title collection and for the year 2000, STII plans to convert 25% of its in-house publications to CD-ROM.

Singapore

- ***The Singapore Productivity and Standards Board (PSB)***' IRC - A unique feature of the IRC is that it actively publishes productivity-related information in print and electronic form to meet industry's demand for value-added information. PSB publications are grouped under four broad categories. These are *Productivity Updates* which includes listings and directories; *Productivity Alerts* which includes summaries, abstracts and reporting of events, products and services; *Productivity Focus* which includes descriptions and basic analyses of concepts, issues, events, products and services; and *Productivity Insights* which includes in-depth analyses of concepts, forecasts and implications of trends and issues.

Currently, a number of product series and subject matter series have been created under the *Productivity Focus* category. For example, the core regular publications are the *Productivity Digest*, which reaches out to 10,000 subscribers. Other publications include product series such as the "Case Books", "Guide Books" and "Primer" series; and subject matter series such as the "Benchmarking" and "Best Practice" series.

The IRC is also partnering the Singapore Chinese Chamber of Commerce and Industry (SCCCI) to produce an abridged version of the *Productivity Digest* in Chinese to cater to the Chinese-reading business community.

The IRC's future plan is in the process of enhancing accessibility to its collection through automated circulation. The PSB OPAC will soon be available to the public via the PSB Website. Furthermore, as most seasoned Internet users prefer to surf the information highway from the comfort of their homes and offices, the IRC is looking into the feasibility of enabling users to make reservations for its materials via the Internet, after the OPAC goes "live" on the PSB Website.

- ***Nanyang Technological University (NTU) Library*** - To face with the challenges of the future in the face of the fast changing environment, the NTU Library have drafted several strategic initiatives to their development. These are:
 - *Strategic initiative 1* - To provide a one-stop electronic access to resources, this will bring the Library towards the digital era. This was accomplished this in May 1999, and the Library has launched a Project called GEMS (Gateway to Electronic Media Services). See Foo and Loh's article on pp. 107-114 of this book.
 - *Strategic initiative 2*: To take a proactive role in promoting the user education programs such as information literacy skills among students and staff.
 - *Strategic initiative 3*: To provide a learner-centered environment. The Library cooperates with the University's Centre for Information Technology Services to source and acquire a wide range of educational software and courseware. The Library also strives to be the depository and access provider to multimedia developed by the university's teaching staff.
 - *Strategic initiative 4*: To strengthen the local and overseas cooperation to establish global networking. The Library is a user of OCLC cataloguing facilities.
 - *Strategic initiative 5*: To actively promote usage of "Push" technology to meet individual information needs.

Problems: Like any other library, the NTU Library has budget constraints. With an annual budget of \$3,200,000 the Library has to be prudent in acquiring materials, especially online databases which are usually very expensive. Knowledge is advancing at a very fast pace; professional staff find it hard to keep up-to-date in their knowledge and skills. As such, continuing education for staff is essential. The Library also faces space problem. With increasing student enrolment, staffs and library members, collections, space shortage is unavoidable. However, to provide for additional space is not easy, it needs time and money and a lot of convincing.

Taiwan, ROC

Since 1998, Taiwan has made big stride in the development of digital libraries and museums. In this book, there are several papers related to the Taiwan scene. Readers are referred to papers by Chang (pp. 27-32), Chang and Huang (pp. 33-42), Chen and Huang (75-82), Chen et al (pp. 65-74), Hsiang and Hong (pp. 201-208), Hsueh (pp. 209-216), Oyang (pp. 305-312), Sung and Jeng (pp. 371-380), Tsai (pp. 411-418), and Tseng (pp. 419-428). Thus, we shall not repeat the summary here.

Vietnam³

Since 1990, some libraries in big cities of Vietnam, such as in Hanoi, Ho Chi Minh City, Danang, Hue, and Can Tho have already started their library computerization activities, but much still need to be done. Since 1995, the application of information technologies has been accelerated by the National Programme on Information Technology with a master plan up to the year 2000,

³ The introductory part of this section on Vietnam is heavily based on the information provided by Vu Van Son of NACESTIC.

issued by the a Government Decision on April 7, 1995. The general goal of the development of IT in Vietnam is: “*Building the first foundation for the information structure in the society which are able to meet the basic demands for information in the management and in socio-economy activities...*” In order to achieve this goal, the master plan focuses on developing potential resources and building the IT infrastructure and implementing the major projects on computerization in state management and in the fields of socio-economic development, including library and information activities.

Vietnamese librarians and documentalists recognize the need to acquire new information technologies to improve access to information and data sources, but there is not sufficient fund for them to do so. In the last few years, the support from the Vietnamese government, international organizations such as IDRC (Canada), SAREC (Sweden), and governments of France, Australia, etc, Vietnamese librarians have been able to use microcomputers in addition to traditional methods, in handling library functions and in creating databases. The noteworthy developments include the network development as mentioned in Section 2.6 and the following:

- The NACESTID, heading the National system of Scientific and Technical information, has pioneered in the information technology applications specifically in establishing and managing networks. NACESTI has also become the Internet Service and Content Provider.
- The National Library of Vietnam has implemented a data transmission network with communication capabilities among libraries, attached to the public libraries system, in large cities and provinces throughout Vietnam.
- Recently, multimedia began to be used in Vietnamese big libraries. The Central Library for Science and Technology of Vietnam (CLST) is so far the first and the only one in Vietnam, who applies bar codes in circulation control with optical recognition technique.

The availability of networks, especially high-speed telecommunication ones, at both the local and national levels is critical to the development of the electronic library.

Digital Library Development - The concepts of "electronic library" and "digital library" are very new to Vietnamese library community, and there are many different definitions. Vietnamese librarians and information specialists have begun to study concerned issues and wrestling with the challenges of the digital information age. For a developing country like Vietnam, there are many pros and cons, and so are many views. One thing is clear; establishing digital collections in Vietnam will not be an easy task. Currently there are many problems. As articulated by Mr. Son, these are:

- *Economic Problems.* The first and most difficult step in the evolution of the digital library will be the conversion of traditional publications on paper to digital ones. The cost involved is very substantial and currently not affordable in Vietnam in most cases.
 - *Technical Problems.*
 - *Legal Problems.* Copyright can be a big problem. How to balance the intellectual property and public interest in a digital library is a real question.
 - *How to balance the needs of the market and the public in the digital environment?* Libraries promote the concept of free and equal access to information and knowledge. Can this idea continue to be upheld in the digital-economy environment?
- ***The National Centre for Scientific and Technological Information and Documentation (NACESTID)*** – see Sections 2.5 and 2.6 and the above.
 - ***Vietnam National University Hanoi (VNUH) Library and Information Center*** - In the future, the Center is planning to be involved in digital library development. Efforts will be made to upgrade and complete the WAN network including upgrading the database and web servers for all the branches of the Library, and create a large IT center with powerful servers for databases, electronic mail and web-based services at LIC 's headquarter.

8) INTERNATIONAL COOPEATION

It is fair to say that regardless whether the country is a developed, less developed or developing one, the importance of maintaining active and close collaboration with other organizations both nationally and internationally is of paramount importance to every one. For developing countries, available funds have been limited thus few have been able to enjoy more frequent participation of international conferences and informal networking. To them, benefits have mostly been realized through the funding support from international organizations such as Unesco, UNDP, IAEA, IDRC, World Bank, Asian Development Bank, European Commission, and the like. These organizations help to bring experts to them, to help them in the process of planning and implementation of specific project(s), to provide much needed technologies including enabling software such as the Unesco's CDS/ISIS, and to provide much needed education and training programs in the countries. In addition to these international organizations, supports from governments of countries such as Australia, France, Germany, Japan, Norway, Sweden, the USA etc... have also been credited for the possibility of some developing countries to achieve technology related information activities.

For the ASCA/NIT group, three major sub-groups of organizations – scientific documentation centers, national libraries, and major university libraries – can be clearly identified in addition to some governmental agencies. It is clear that organizations of each sub-group have tried their very best to make regional and international collaboration and cooperation with their counterparts in other countries, as well as the major international organizations as widely as possible.

9) ADDITIONAL COMMENTS – Specifically Related to Problems and Issues

Throughout this synopsis, many country representatives have express the visible problems and issues related to the use of technology in library and information services, as well as in developing digital libraries. It should be pointed out that, as expected, the problems articulated by those from the developed countries differ substantially from those from the developing ones. For the few similar problems mentioned - *budgetary limitations, lack of hardware and software, lack of qualified staff thus the needs for education and training, and lack of space are common to both groups* - the difference in scale and interpretation is quite dramatic. Although the languages used are similar, but they mean totally different things! The following illustration can best serve to demonstrate the huge differences:

Common Problems/Issues	Those from Developed Countries	Those from Developing Countries
▪ Budgetary Limitation	- US \$3 million is still inadequate	- Less than US\$100k for a national organization
▪ Lack of Equipment	- Don't have the latest available in recent months, not enough GB of storage space, not high enough resolution, not fast enough Pentium...	- Only have a few 386 or 486 PCs, don't have any scanning equipment, etc...
▪ Lack of qualified staff	- Don't have enough high-end programmers, don't have sufficient number of professionals who have the latest knowledge and expertise in using the high-level facilities	- Have only one or two professionally trained librarians. Don't have any staff, who is knowledgeable with computers, etc...
▪ Need for continuing education	- Need to provide continuing education on the use of latest equipment and software. Need to learn more than html...	- Need to provide more of the basic training in library work, and basic computer knowledge

In addition to the above common problems and issues, the following expansion is also necessary:

Those from Developed Countries: Representatives from this group refer more often to the following:

- Technological problems and issues
 - Including multimedia data, using distributed processing technology, converting SGML to XML, scaling problems related to a large number of concurrent users,
 - Additional exposure of the technological potentials related to telecommunications to executives of all types,
- Copyright, security of information, etc...
- Linking of various private digital libraries together

Those from Less Developed and Developing Countries: Representatives from this group refer more often to the following major concerns:

- Lack of awareness among library and information professionals as well as governmental officials and policy makers,
- lack of infrastructure,
- absence of proper planning,
- lack of sufficient technologies for the intended purposes,
- Information technology is more useful to the elite. A large percentage of population in these countries are still illiterate, thus the more technology is utilized, the bigger the “digital divide” will be between the technology haves and havenots,
- Computers and telecommunications are still too expensive for most organizations and people,
- Serious lack of experienced professionals in information technology related activities,
- Attentions should be paid more to the basic organizations such as public and school libraries than the “digital” libraries,
- Lack of commonly accepted standards and consensus
- Lack of digital contents,
- Copyright and intellectual properties, privacy and confidentiality, security, etc...
- Multicultural and multilingual issues’
- Preservation issues, etc...

Surprisingly, although baseline issues related to metadata and standards should be of paramount importance in the development of any digital libraries, yet, of all the 25 reports, there was only one mention. Clearly those who can afford the technologies, they are more preoccupied with the technological problems and issues, while those can not, are more concerned with the issue of “digital divide.”

Given the leading position of Taiwan in information technology development in the Asian Pacific region, one representative calls on Taiwan to play a more important leading role in the region. This indeed can be both a challenge and opportunity for Taiwan.

REFERENCE

Chen, Ching-chih. (1999). *Electronic Resources and Consortia*. Taipei, Taiwan: STIC.

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from the “horseback.” Thus, while offering my most sincere thanks to each of them for their contributions, I wish to apologize for any possible omission and mistakes.

Sources of Information:

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