Science and technology information in Thailand: policies, strategies and provision

Science and technology information in Thailand: policies, strategies and provision

by

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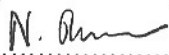
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ABSTRACT

The aim of the research was to investigate the current state of scientific and technological (S&T) information service provision in Thailand with a focus on its role of supporting research and development. The ultimate goal of the research was to develop a service model(s) which could aid the modernisation of the S&T information service. The information policies and strategic management at national and institutional levels were examined together with present and future roles in service provision and barriers to S&T information development. The research framework was constructed on the basis of theoretical models of the provision and management of effective information services. The institutions which participated in this research included 46 academic and special libraries in Thailand, hereafter called S&T information centres, and two funding agencies.

The data were collected using a variety of research tools, employing both quantitative and qualitative methods, namely, questionnaires, semi-structured interviews, and focus groups. The questionnaires were distributed to five groups of respondents: executives, managers, librarians or staff, end-users, and executives or policy-makers of funding agencies. Two hundred and eighty-nine questionnaires were sent by post to 45 S&T information centres and two funding agencies whilst 703 questionnaires were also distributed to end-users. Interviews were performed with 55 executives and library managers. Three focus groups were organised on different topics, with a total of 36 participants.

The major findings showed that national information policy in relation to S&T information was still relatively ineffective with roles and responsibilities of stakeholders not explicitly identified. In general, the results showed that institutional information policies exist but weak communication between executives, managers, and staff caused problems with implementation and interpretation. Most S&T centres were found to have strategic plans. The focus of these were on issues of integrated ICT infrastructure, acquisition of electronic resources, service improvement, communication with users and feedback, user education, cost effective use of resources, E-library transition and knowledge sharing. The

development of resource sharing via computerised networks was considered to be paramount; progress to date was thought to be slow due to a lack of policies at national and institutional levels. Users' information literacy was still found to be an issue, particularly in respect of making effective use of electronic resources. The thesis provided recommendations for a national network for S&T information provision to be designed and managed by a hosting provider.

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DEDICATION

This thesis is dedicated to:

- My dearest parents: Pol.Sub.Lt. Boonchuai Ruenwai and Mrs. Chuenjit Ruenwai, who are the first teachers in my life;

- My beloved sisters, brother, niece, nephews and auntie, who are always looking forward to my journey back home and wishing me every success.

- All the teachers in my life, from my old schools to universities, who have educated me socially, academically and ethically, and have cultivated the seeds of knowledge seeking and spiritual development in me.

TABLE OF CONTENTS

TABLE OF CONTENTS (contd.)

TABLE OF CONTENTS (contd.)

TABLE OF CONTENTS (contd.)

TABLE OF CONTENTS (contd.)

LIST OF TABLES

LIST OF TABLES (contd.)

LIST OF TABLES (contd.)

LIST OF FIGURES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Rationale

Scientific and technological research and development (R&D) is a key requirement for innovation. R&D generates value-added innovations in terms of new products, processes and services. Both R&D and innovation are viewed as key factors enhancing the prosperity of national economies through the development of industry and international trade (Mohnen 2005, p.2). The governments of many countries, therefore, view R&D as a mechanism through which their countries can gain a competitive edge (European Commission 2005; HM Treasury 2004, p.3; Stienmuller 2002, pp.144-153; Buckland 1999, pp.3-7). For instance, in the UK, the British government has set R&D as a strategic goal for all sectors involved in national economic development. The term 'R&D' is defined in relation to science and technology as follows:

> Science is the systematic study of the nature and behaviour of the material and physical universe, and technology is the practical application of science, especially in industry and commerce. The process by which new scientific and technological information is discovered, gathered and used involving theoretical conjecture, observation, experiment, measurement and deduction, is referred to as 'research and development' (R&D).
> (HM Treasury 2003, p.29)

Many countries, including some developing countries, emphasise R&D in their national policies. In doing so, cooperation is boosted at all levels, locally, nationally, regionally and internationally (European Commission 2005; HM Treasury 2004, p.3). The Member States of the European Union (EU), for instance, have implemented an R&D policy under the Framework Programmes (2002-2006) which focuses on the strengthening of research to increase the economic potential of the regions and the promotion of participation between research centres, universities and firms in the EU and international research programmes and networks. The EU framework also defined the supportive factors for R&D infrastructure. One of these factors was to create a user-friendly information society, necessary for industrial and social change. The EU framework promotes the development of information and communications technologies (ICT) and their application which, in turn, supports R&D. It was envisaged that this initiative would lead to new forms of jobs and businesses that will reinforce competitive capability. Scientific and technological (S&T) information flow, research output and networking research facilities were also detailed in the key actions for cooperation and achievement. The latest EU policy towards a European research area in science, technology, and innovation indicates that this mission is ongoing. Similarly in the UK, it is addressed in the Science & Innovation Investment Framework (2004-2014) that R&D is the key to constructing the UK's knowledge base, both in the public and private sectors.

It would appear from the cooperative emphasis of the framework and recent policies that, apart from private research units, public research centres, especially academic institutions, play an essential role in R&D in science and technology. Universities are viewed as the traditional knowledge producers and the national research base. Instead of conducting basic research for the sake of knowledge, researchers in these academic institutes are expected to disseminate their findings. Meanwhile, an awareness of S&T knowledge as an important resource in the modern economy also calls for academic researchers to become more deeply engaged in building a knowledge-based society (United Nations Commission on Science and Technology for Development 1998). S&T development is cumulative, with past work laying the

foundations for new work, so it is important that knowledge is transformed and disseminated to ensure its reuse (Steinmuller 2002). Because of this, the importance of the S&T information service sector inevitably increases through its role in information or knowledge management.

Currently, a vast number of S&T information resources are available electronically and in traditional hard copy format. Ensuring these get to their target audience to enable them to keep up-to-date with novel discoveries is vital (Schofield 1999). However, this is not easy, especially when the budget for subscriptions to scientific journals and serials is cut, as is so often the case (Wolf 1999). Making choices about provision is complicated by the number of computer applications on offer and the fact that a poor choice would be wasteful in terms of resources. Increasing use is made of information technology to facilitate the management of collection, retrieval, searching, cataloguing, acquisitions, and subject indexing, and so on. These factors have pushed S&T information service centres to shift their role into being more of a "*switching centre*" equipped with a networking system and electronic resources, rather than a provider of hard copy services. Artificial intelligence and its utilisation to optimise benefits to users has been recognised (Lancaster and Warner 2001). Ideas from knowledge management and artificial intelligence as well as traditional services, such as current awareness, are being used to enhance access to digital repositories or digital libraries. Furthermore, access to validated and authentic S&T information using electronic delivery mechanisms such as licensing models via web-based services have been developed to provide a faster and less expensive system of research communication on a sharing basis (Choi and Rasmussen 2006;Dodsworth 2003; Tenopir *et al.* 2003; Tam and Robertson 2002). Thus, it appears that libraries and the information sector in several developed countries, for example, the United Kingdom (UK) and the United States of America (USA), Canada, and Australia, pay more attention to information management and related research in terms of the development of user-friendly information systems that are provided through gateways and networking services (Tanase *et al.* 2006; McNicol 2005, p. 496; VanBuskirk and Krym 2003, pp.169-172). Various terms are used to describe

advanced models of information services such as networking collaboration between public and private sectors, resource sharing, consortia, portals, concepts which are mostly new to developing countries.

It is apparent that there is a big information gap between developed and developing countries. The source of the divide lies in the ICT infrastructures, the culture of sharing, the state of research in information science, organisational policies, and personnel's competence and information literacy; all of which are barriers to the modernisation of S&T information services in the developing countries (Pejova 2006; Ashcroft and Watts 2004; Yang 2001; Sacchanand 2000; and Panyarachun 1999).

1.2 Scope and purpose of the research

The scope of   this research   is to focus on the S&T information service in Thailand which falls under the umbrella of the Thai government working with some professional institutions in the private sectors. The S&T sector consist of:

- Special libraries or information centres of different Ministries and government agencies where S&T or research information are provided to in-house users, the research community, and the public;
- Libraries and information centres in the Information Network in Thailand,   which include those under:
  1. The Referral Centre for Research
  2. S&T Information Network having the Ministry of Science and Technology as a coordinator.
  3. Scientific and Technological Information Network Centre (STIN) under the Thai National Information System (THAINATIS).

The above target institutions embrace academic and special libraries playing essential roles in providing S&T information services to the Thai research community. As this research intends to scrutinise the information policy making and strategic management of the S&T information centres in respect to their services-oriented approach, other related stakeholders such as publishers and book traders are not included in the scope of the study. Moreover, the roles of publishers and book traders in Thailand are still limited as most S&T information resources provided in these information centres have been imported from abroad.

The research also covers the organisation and working of the Joint Information Systems Committee (JISC), the major academic information network in the UK. JISC provides a range of research infrastructure to higher and further education based on the concept of collaboration between the academic research community and the funding agencies. A study of JISC will be conducted, focusing on relevant dimensions such as the role of JISC as a national body managing the national information systems to support learning, teaching, and research. It is interesting to note that JISC has diversified roles, for instance, providing guidance and advice, funding development programmes of ICT infrastructure, and providing network and data services (Brindley 1998; Ingram 2002). These roles appear to yield great benefits to the development of the information sector for the UK research community in terms of the provision of seamless access to the full range of national information resources (Brophy 2004; Pinfield 2004). It is possible that the study of JISC's role would be beneficial in terms of policies and strategic management of the national S&T information sector in Thailand.

This research examines S&T information services provided by academic libraries and other information service centres in Thailand and in the UK. In Thailand, the investigation concentrates on the policies, present and future roles and strategic management of service provision. It also looks at development trends of service models which are appropriate to Thailand based on its current and future status. The UK study focuses on S&T information resource management and organisational

structure of information networks for R&D and academic communities under the responsibility of JISC. Patterns of service provision are also a focus, in order to obtain a good practice framework applicable to Thailand.

An overview of the S&T information sector in Malaysia, Thailand's neighbouring country, is also presented in order to see its progress in the development of the S&T information strategies. Malaysia is chosen in this research because of its similarity with Thailand in terms of social and economic status.

1.3 Objectives of the research

The objectives of the research are:

1. To examine the present status and roles of S&T information centres or research libraries that provide S&T information services in Thailand;

2. To examine the policies and goals or achievement targets relating to information services and information communication technology (ICT) in Thailand;

3. To study the strategic management of S&T information service provision within S&T information centres or research libraries in Thailand. Of particular importance are : types of service provided, information resource management, ICT infrastructure, inter-institute collaboration, the competence of personnel, users, accessibility, and future plans;

4. To study the awareness of the barriers to S&T information service development in Thailand, and consider potential solutions;

5. To study the state of information literacy in Thailand in the arena of the S&T community and examine users' attitudes of and their expectations for the present S&T information service centres in Thailand;

6. To develop appropriate information service models or roadmaps in order to aid the modernisation of S&T information services in Thailand.

1.4 Significance of the research

The intent of the research is to provide strategic management guidance and to suggest preliminary models for the development of the S&T information service sector in Thailand so as to provide the best service for end-users in the academic and research communities. The research was basically conducted in order to correspond to the two National Development Plans of the Thai Government: the National Economic and Social Development Plan and the National ICT Master Plan of Thailand, which give importance to integrating S&T information resources and ICT, with the specific purposes of enhancing end-users' benefits and promoting the national R&D. These two plans are discussed in more detail in Chapter Two.

The United Kingdom has been selected as a comparison for this research because its gross domestic expenditure on R&D (GERD) in the government sector is considerably higher and can be seen as a leader in the field (see Table 1.1).

Table 1.1 Gross domestic expenditure on R&D (GERD)

by source of funds – government.

Percentage of GERD financed by government.

Countries	2002	2003
Euro (25 countries)	34.0	34.9
UK	27.8	31.3
US	30.2	31.2
Japan	18.2	17.7

Source: Eurostat/ long-term indicators of Science and Technology.

These percentages are derived from four indicators: percentage of GDP (Gross domestic product), percentage of GERD financed by industry, percentage of GERD financed by government, and percentage of GERD financed from abroad. The R&D projects in this context refer to "*creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and*

society and the use of this stock of knowledge to devise new applications" (Eurostat 2006). Apart from high investment in science and innovation, the R&D performance of the UK is also a great success. According to the HM Treasury (2004, p.6) in the Science & Innovation Investment Framework 2004–2014, the UK is ranked as second to the USA on research excellence, and also a leading country amongst 30 members of the Organisation for Economic Co-operation and Development (OECD). Moreover, Ferrar (2004) also reported that the UK science publications output accounts for 9.4% of the world's total, and is second to the USA in terms of the volume and influence.

The UK is also renowned for the use of state-of-the-art technology when providing information services to the research and academic community. The information resource sharing regime under the Joint Information Systems Committee (JISC), which attempts to provide support for "*managed learning environments (MLEs)*" in further and higher education (FE and HE) and to build up research culture both in and outside the research community nationwide, is a particularly good example. This could be considered a benchmark for developing countries, especially for traditional libraries when visualising the global trends for information services.

It is expected that this research will benefit both the R&D community and S&T information centres or research libraries in Thailand. The R&D community could improve utilisation of S&T information, while the S&T information sector could improve their resources and align the system to individual user needs and national needs.

1.5 Key research questions

The key research questions are:

1. What are the current status, roles and policies of S&T information service centres in Thailand?

2. Are there any policies and goals, or achievement targets relating to information services and information technology in Thailand? If so, what are they and who are responsible for their implementation?

3. How are S&T information centres strategically managed? Which types of services are provided and what are their future plans?

4. What are the barriers to S&T information service development in Thailand? Are people aware of them and how can they be overcome?

5. In relation to users within Thai S&T research community, what is the extent of information literacy and what are the attitudes of and expectations for S&T information services?

6. What appropriate information service models or roadmaps could be developed to aid the modernisation of the S&T information service in Thailand?

1.6 Limitation of the research

Because of the wide scope of the topic, the research had to be limited to the selected S&T information centres under government control, and those under STIN of THAINATIS which include academic libraries and special libraries.

Although this research does not cover all institutions which provide S&T information services in Thailand, reliable generalisation can be made from the research since it covers a large proportion of libraries and information centres which are under academic institutions, government agencies and the private organisations throughout the country. Most of them are also affiliated to the Information Networks in Thailand and play an active role in providing S&T information services to the research community.

1.7 Definitions of terms

Definitions of terms are provided to avoid ambiguity and to ensure consistency in understanding.

Academic library

A library that is a part of an academic institution such as a college or university. An academic library supports the curriculum and research needs of its students, faculty, and staff. (Source: www.usg.edu/galileo/skills/ollc_glossary.html) However, academic libraries in this research exclude those Ratchabhat Universities, which were formerly the institutions for educational professions and later upgraded to be included in a university group

Special library

A library that focuses on the interests inherent in the institution it serves. Libraries in hospitals, corporations, associations, museums, and other types of institutions are all special libraries. In many cases, they are not open to the public. A special library's collection may be narrow in scope, but it will have depth within the specialty it covers. (Source:www.webliminal.com/search/glossary.htm)

S&T information centre

In this research, S&T information centre is used as an umbrella term for academic and special libraries which provide S&T information services to users such as students, researchers, industrialists, entrepreneurs, and the public interest.

Hybrid library

Hybrid library is a term coined by librarians to describe a library which contains a mixture of traditional print resources and electronic resources. (Source: http://en.wikipedia.org/wiki/Hybrid_library)

S&T information

S&T information in this research refers to factual inputs, data, models, analyses, technical information, or scientific assessments related to various scientific disciplines, for example, in public health and medical sciences, life and earth sciences, engineering, physical sciences, or agriculture. It also includes any communication or representation of knowledge in different media or forms such as print or electronic formats. (Source: National Institute of Health, USA)

S&T information services

An S&T information service can be defined as a provider of access to S&T information resources, be that by libraries or S&T information centres. S&T information services cover the management and dissemination of S&T information which is collected, acquired, or produced by the parent institutions of libraries or S&T information centres themselves. The information resources provided can be in either print or electronic formats, and could include books, journals, databases, technical reports, standards/regulations, patents, references, conference proceedings, web resources and bibliographic products. The services provided could include document delivery services, current awareness services, editorial services, reference and referral services, library and literature searches, and subject-based services.

Grey literature

Non-conventional literature comprises scientific and technical reports, patent documents, conference papers, internal reports, government documents, newsletters, fact sheets and theses, which are not readily available through commercial channels. This does not include normal scientific journals, books or popular publications that are available through traditional commercial publication channels.

(Source: http://en.wikipedia.org/wiki/Grey_literature)

Information literacy

Information literacy is "knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner. This definition implies several skills. The skills (or competencies) that are required to be information literate require an understanding of a need for information; the resources available; how to find information; the need to evaluate results; how to work with or exploit results; ethics and responsibility of use; how to communicate or share your findings; and how to manage your findings."

(Source:

http://www.cilip.org.uk/professionalguidance/informationliteracy/definition/)

Information literacy also includes "the practical skills involved in effective use of information technology and information resources, either print or electronic."

(Source:

http://www.ala.org/ala/acrl/acrlissues/acrlinfolit/infolitoverview/infolitforfac/infolitfaculty.htm)

Roadmap

A roadmap in this research can be defined as a plan made up of stages, or a timetable identifying the key steps of activities that need to be completed in conducting a specific programme in order to achieve goals.

(Sources: www.cordis.lu/en/src/g_013_en.htm,

www.lgib.gov.uk/european_work/glossary.html

CHAPTER TWO

BACKGROUND OF THAILAND

This chapter will present general background information about Thailand. The profile will give an overview of Thailand (geographical data, monarchy, general data, Thai government and policy making, Thailand Development Plans for R&D promotion, and the statement of development of ICT in Thailand), education system, the S&T research community in Thailand, the S&T information service sector in Thailand, and S&T information strategies of Malaysia, Thailand's neighbouring country.

2.1 Overview of Thailand

2.1.1 Geographical data

Thailand is located at the geographical heart of South-East Asia, covering an area of 513,115 square kilometres, about the same size as France. It has borders with Cambodia and Laos to the east and north, and Myanmar to the west. In the South, the Gulf of Thailand is created by the Andaman Sea, and is adjoined to Malaysia (see Figure 2.1). Thailand's coastline is approximately 3,219 kilometres in length. Forest covers some 32 percent of the country's total area, while cultivation occupies about 40 percent.

Figure 2.1   Map of Thailand

The topography can be divided into four regions: the fertile Central Plains, nourished by the Chao Phraya River basin; the semi-arid northeast plateau, which rises some 300 metres above the central plain; the northern region of Thailand, the mountainous region and fertile valleys; and the southern peninsula, mostly covered by rain-forests and bordered by Malaysia.

2.1.2 Monarchy

A coup d' etat in 1932 led by a group of army officers and western-educated civilians brought about the end of the Thai monarchy's absolute power. The regime adopted parliamentary structures, although the monarch remains the Head of State. The present King is His Majesty King Bhumibol Adulyadej, the ninth

king of the reigning Chakri Dynasty founded in 1792. He ascended the throne in 1946. Today, he is the longest reigning king of Thailand.

2.1.3 General data

Population: The country's population is 64.9 million, as of March 2005. The ethnic mix mainly consists of Thai, Mon, Khmer, Burmese, Malay, Laos, Persian and Indian. About 36 percent of people live in urban areas.

Capital city: Bangkok is located along the banks of the Chao Phraya River. The population in Bangkok is 9 million (as of March 2006).

Religion: Buddhism is the dominant and national religion in Thailand, professed by 95 percent of Thais. Other religions include Muslims (3.9 percent), Christians, Hindus and Sikhs (about 2 percent).

Language: Thai is the national language. Nowadays, English is widely studied in schools and universities as a second language while Chinese, Japanese and other languages, for example, German and French, are also taught.

Climate: There are two types of climate in Thailand: a tropical savannah climate for most of the country north of Bangkok, and tropical rain climate for the southern and south-eastern regions. The three seasons start from hot (February to May) to rainy (June to September) and cool (October to January). Average annual temperature is about 27°C, with a range from 16°C to 41°C. Humidity is generally high, ranging from 60 percent to 94 percent.

Economics: The annual growth rate of the Thai economy is 3.8-4.3 percent while inflation is 4.0-4.4 percent (as of 2005). Major export products include computers, integrated circuits, garments, gems, jewellery, and agricultural produce. Major trading partners are among the ASEAN countries, the USA, and the European Union. However, the country's economic development as it moves towards industrialisation has forced change on Thai society at a headlong pace. Problems arising from this include inadequate infrastructure, an overburdened metropolis in Bangkok, serious pollution and ecological deterioration, poor conditions for many workers, and widening gaps between urban and rural areas.

Politics: HM the King acts as a supervisor or consultant to the Thai government via the three ruling bodies which include the legislative branch through the Parliament, the executive branch through the Cabinet headed by a Prime Minister, and the judicial branch through the courts.

2.1.4 Thai Government and policy making

The executive branch is composed of the Prime Minister, his cabinet, and the elected members, who form the legislative body, so-called the National Assembly. The National Assembly of Thailand has two types of members: those in the Lower House or the House of Representatives, and those in the Upper House or the Senate. Both are composed of elected members.

The Prime Minister and his Cabinet are the most important officials of government and are instrumental in the initiation of key policies. The cabinet is responsible for the administration of the ministries. Each ministry is supervised by a minister with one or more deputy ministers who are also cabinet members. A number of cabinet committees, or the Standing Committees of the House of Representatives, have been set up consisting of members of parliament, such as the Committee on Economic Development and the Committee on Education, to coordinate the major policies concerned. This mechanism is so arranged to ensure that the government's policies are related to each other and compatible to the whole structure. The implementation and progress of each project or policy may be thoroughly examined by the committees assigned by the Prime Minister.

Besides the ministers, there are other related bodies which provide a vital function in formulating the national policy, namely, the Budget Bureau, the Board of Investment (BOI), the National Statistical Office, the Technical and Economic Cooperation Department and the Office of the National Education Commission. These agencies are also under the responsibility of the Office of the Prime Minister. The system of national policy making and the examination of its implementation can be seen in Figure 2.2.
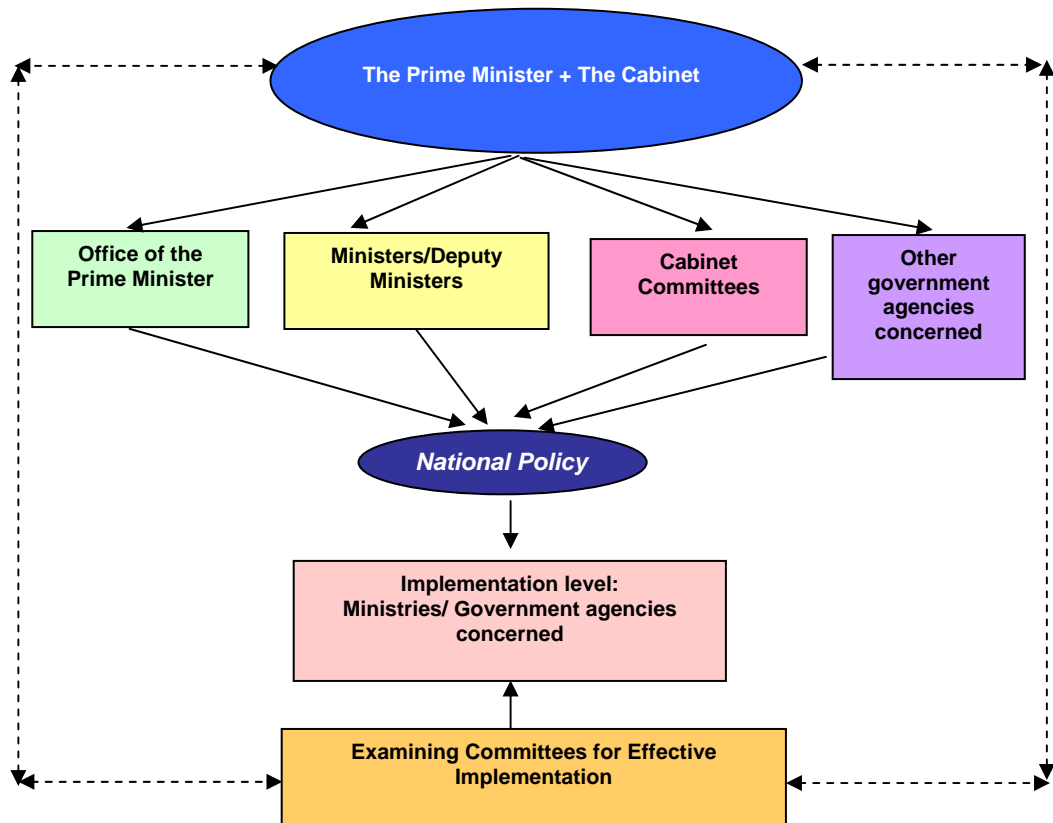
Figure 2.2 The system of national policy making of Thailand

Figure 2.2 shows a flow chart of how the government formulates a national policy. In this process, the Prime minister and his Cabinet formulate a policy in cooperation with the Office of the Prime Minister, Ministers/Deputy Ministers, Cabinet Committees, and other government agencies concerned. In other words, the aforementioned units assist in providing information for decision making, setting priorities, and creating a policy. Then a policy is announced at ministerial and departmental levels and implementation follows. Follow-ups of implementation are performed by the Examining Committee for Effective Implementation, who will communicate with the Prime Minister and the Cabinet about effectiveness or weakness of any implementation. (Asean Focus Group 2002; Interknowledge Corp. 2002; Lonely Planet Word Guide 2002); Thailand's Information 2000; Tourism Authority of Thailand 2002; Mahidol University 2002; National Economic and Social Development Board 2005; Bank of Thailand 2006).

2.1.5 Thailand Development Plan for R&D Promotion

The Ninth National Economic and Social Development Plan (2002-2006) of Thailand outlined a vision for Thai society, and one feature of this is to promote a *"knowledge-based and learning society"*. In order to achieve this vision, it is noted that Thailand needs to build up its potential and drive vigorously towards a knowledge-based economy. As defined by the Organisation for Economic Co-operation and Development (1996), the term *"knowledge-based economies"* means *"economies which are directly based on the production, distribution and use of knowledge and information."* From Thailand's perspectives, these new economic trends will place emphasis on the inclusion and use of knowledge in all sectors which are important to developing the national economy. Concerning this, it is necessary for Thailand to enhance the knowledge and expertise of the Thai people so that they can adapt to using and exploiting modern technology. The science and technology sector is viewed as one important factor to the restructuring of the economy. Support for R&D, therefore, should be a priority as well as the application of S&T knowledge. With regard to the S&T strengthening strategy, the government has set the target to apply R&D to improve production efficiency, the quality of life for farmers, the poor, and the disadvantaged. Meanwhile, local knowledge or wisdom is to be incorporated within advanced technologies in the production sector. This needs a system to disseminate and transfer scientific knowledge and applied technologies to production sectors and the general public. The establishment of provincial information centres or information networks is, therefore, amongst the goals to help establish a knowledge-based society. Also, the government has set a target to support R&D by establishing effective S&T information networks orientated towards increasing productivity, reducing cost of production, promoting value-added products, and raising the export potential of products.

In this regard, the development and application of information and communication technology (ICT) is a priority need. It is intended that the development of ICT and the utilisation of a reliable, economic and rapid network

will increase efficiency in all sectors and communities (National Economic and Social Development Board 2002).

Furthermore, in an attempt to alleviate economic crisis and to enhance competitiveness, the government has put a strong emphasis on R&D promotion which is clearly shown through these following R&D priorities:

1. To allocate more funding for R&D;
2. To seek more collaboration from the private sector in R&D;
3. To promote co-operation among governmental and private universities in engineering process and design development;
4. To promote collaboration between academia, governmental agencies and small and medium enterprises (SMEs);
5. To promote international collaboration in   R&D.

In addition, the view emerged at the 2001 Thailand National Science Conference that there is a need to re-engineer S&T information services. As a consequence, the Collaborative S&T Information Committee has been established as a focal point to generate cooperation among S&T information service centres and academic libraries in Thailand. The committee's responsibilities are to call for cooperation and to set standards for information management systems as well as services using a synergistic approach (National Science and Technology Development Agency 2001). It is intended that S&T services, training and technology transfer centres will be established with the support of the networks which will link these centres together. This needs to be integrated into the current process of ICT development in Thailand.

2.1.6 The state of development of ICT in Thailand

Even though Thailand has been preparing for globalisation by launching a national policy for the development of information and technology, the country still faces a problem of a "*digital divide*". It is a situation in which inequality in

accessing ICT and knowledge impacts on the country's development as a whole. Sciadas (2002) and Pooparadai *et al.* (2005) state that a digital divide refers to a gap of *'haves'* and *'have-nots'* of ICT, thus causing unequal access to the Internet and losing chances to gain benefit from ICT. Other factors influencing a digital divide include income, education, age, and geographical location.

The National Information Technology Committee Secretariat (2002) reports that the ICT infrastructure of Thailand is totally inadequate for the size of the population. The lack of development has many root causes including poor economic development, and lack of the relevant knowledge and skills, particularly those in respect to the English language.

Pooparadai *et al.* (2005) provides graphic descriptions of ICT density in Thailand as shown in Figures 2.3 – 2.5.
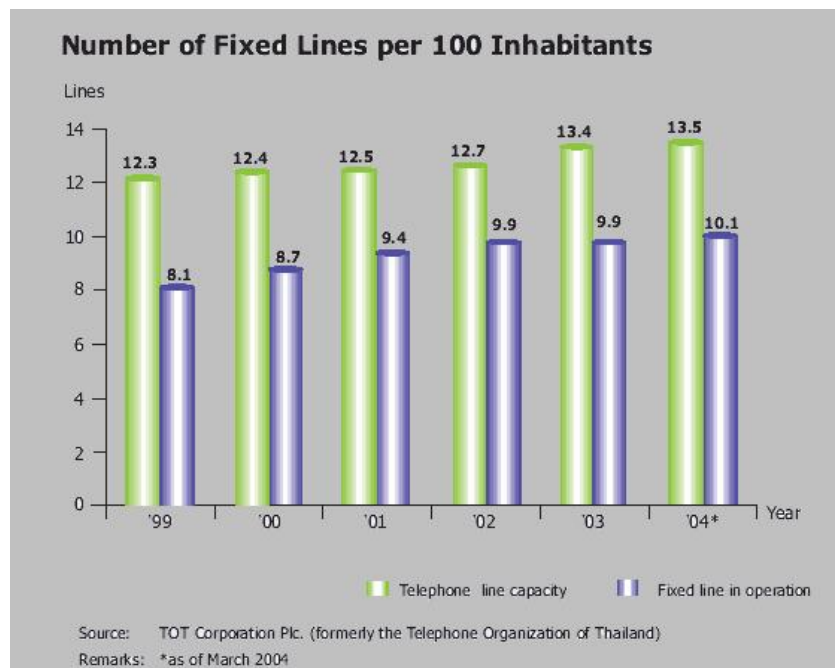
Figure 2.3 Number of fixed lines per 100 inhabitants (1999-2004)
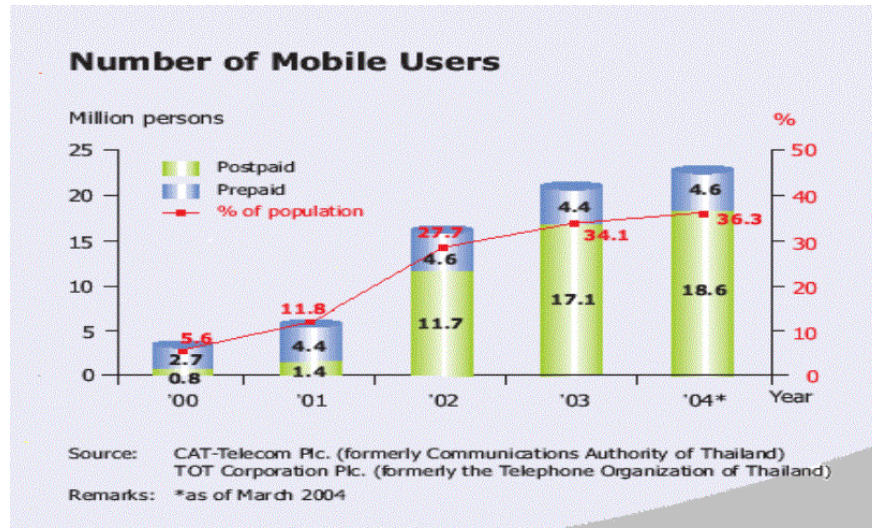
Figure 2.4 Number of mobile phone users (1999-2004)

Figures 2.3 and 2.4 show that during the five years (1999-2004), the use of mobile phones have grown rapidly while the growth of fixed lines shown in Figure 2.3 is steady (from 9.9 percent in 2003 to 10.1 percent in 2004).

Source: Pooparadai *et al*. (2005)
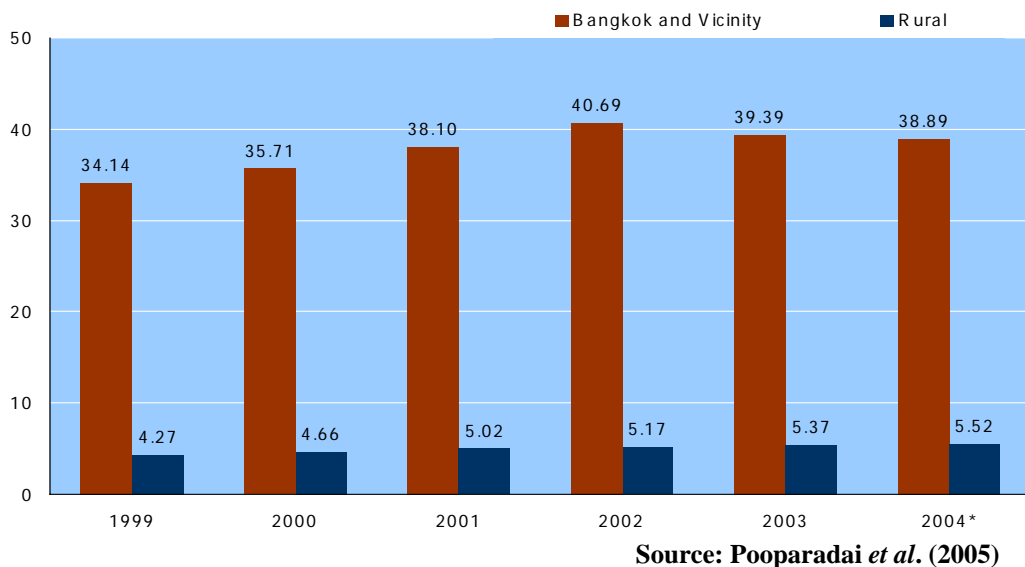
Figure 2.5 Fixed lines in operation per 100 inhabitants:

Bangkok vs. rural areas (1999-2004)

Figure 2.5 shows that the number of fixed telephone lines in operation per 100 inhabitants in Bangkok and rural areas are significantly different. Fixed line services in Bangkok have increased to as high as 58.89 percent in 2005 while only 5.52 percent of people have fixed lines in the rural areas of Thailand. The gap in computer ownership between Bangkok and the rural areas of Thailand is further illustrated in Table 2.1.

Table 2.1 Number of computer ownership per 100 households

Year	2001	2003	2004
Overall	5.8	9.6	11.7
Bangkok	23.3	29.4	30.6
Central	5.5	8.9	12.2
North	3.0	6.8	9.5
Northeast	2.3	4.9	6.5
South	2.3	6.6	8.8

Source: National Statistical Office *In* Pooparadai *et al.* (2005)

Table 2.1 shows an overall increase in the number of computers owned per 100 households from 5.8 percent in 2001 to 9.6 percent in 2003 and 11.7 percent in 2004. It is notable that there was a large increase between the years 2001 and 2003. Households in Bangkok, the capital city, own the highest number of computers. Other regions of the country do not show much variation in computer ownership. Table 2.2 shows a picture of access to the Internet in all regions of Thailand.

Table 2.2 Number of the Internet users in all regions of Thailand

Region	Number of users (million persons)			Users per 100 inhabitants		
	2001	2003	2004	2001	2003	2004
Whole kingdom	3.53	6.03	6.97	5.60	10.4	11.9
Bangkok	1.23	2.01	2.00	16.00	26.9	26.6
North	0.52	1.34	1.52	4.60	10.1	11.2
Central	0.83	1.00	1.21	5.90	9.70	11.4
Northeast	0.56	1.07	1.49	2.60	5.60	7.70
South	0.39	0.62	0.76	4.70	8.20	9.90

Source: National Statistical Office *In* Pooparadai *et al.* (2005)

Table 2.2 indicates that the number of Internet users in the whole kingdom in 2004 had doubled when compared to 2001.

In Dhar and Banerjee's (2006) interview of the Permanent Secretary, Ministry of Information and Communication Technology (MICT), Thailand, it is reported that Thailand's ICT growth is about five percent and Thailand has targeted to become the new ICT hub of ASEAN by the year 2008. The ranking of ICT growth among the peninsular region shows that Singapore is first, followed by Malaysia and Thailand. The report suggests that Thailand needs to conduct more research on development of software and hardware. According to the MICT's Permanent Secretary, Thailand's greatest barrier to the development of ICT is low speed connectivity (less than 56 Kbps) in rural areas. The Thai government, therefore, has an objective to extend services by connecting 70,000 villages with high bandwidth.

The National Information Technology Committee Secretariat (2002) reports that, in the public sector, investment and the collection of information is often duplicated, confounded by the lack of standardisation. Exchange of information is still mostly based on the printed form or hard copy, with each agency having its own data set. A SWOT analysis undertaken by the National Information Technology Committee Secretariat has examined the opportunities for the development of ICT in Thailand and has revealed various threats and weaknesses as follows:

Threats

- Lack of policies in promoting R&D in ICT;
- Ineffective use of ICT;
- Low IT literacy.

Weakness

- Inequality of infrastructure;
- Lack of information and knowledge management;
- Overlapping investment cost;

- No collaboration among government agencies;
- Lack of skilled personnel in ICT;
- Lack of continuous training;
- Lack of reliability in networking system;
- Dependence on foreign technologies.

To implement the e-government policy, the Thai government has attempted to bridge the digital divide by undertaking a large number of ICT projects in cooperation with private companies, local entrepreneurs, and state enterprises (Koanantakool 2003). These projects, are, for example, offering low-cost PCs for low income users, and the promotion of Internet access for rural villagers. This will play a part in achieving the ultimate goal of Thailand to create a knowledge-based economy as stated in the national ICT policy framework 2010. Moreover, the Thailand ICT Master Plan (2002-2006), has outlined ICT development strategies which include:

Strategy 1: The development of the ICT industry into a regional leader;

Strategy 2: The utilisation of ICT to enhance the quality of life and society;

Strategy 3: The reform and enhancement of the capability on ICT research and development;

Strategy 4: The reinforcement of social capacity for future competition;

Strategy 5: The development of entrepreneurs' capacity to expand into international markets;

Strategy 6: The utilisation of ICT in Small and Medium Enterprises (SMEs);

Strategy 7: The utilisation of ICT in government administration and services.

The Master Plan also describes the vision, missions, objectives, and goals of the government. Priority in this plan has been given to the development of the software industry, the development of e-Government, and promotion of ICT utilisation among SMEs. Timeframe and activities have been identified for operations as well as monitoring and evaluation mechanisms to measure the

effectiveness of the development strategy (see details in
http://www.nectec.or.th/pld/masterplan/document/ICT_Masterplan_Eng.pdf.)

2.2 Education system

Thailand's adult literacy rate stands at 93 percent (as of 2004), which is one of
the highest in the Southeast Asia region. The high level of literacy is considered
to be the result of the Thai government's policy to provide free schooling and
compulsory education until lower secondary level. In addition, private schools,
which are dispersed throughout the country, are also promoted as an alternative
to state provided education. The higher education system of Thailand has both
government and colleges offering bachelor level courses in agriculture,
archaeology, architecture, arts, business, administration, economics, education,
engineering, humanities, law, medicine, and nursing, science, social and political
science, and statistics. Master's degree courses and some doctoral programmes
are also offered both at universities and other institutions. Apart from
conventional universities, there are also two open universities.

Centres for adult education can also be found in most Thai schools throughout
the country. Besides, many monasteries offer evening classes especially for
vocational training, e.g. basic skills in computer applications and the English
language. The provision of such courses is considered essential because Thai
people need to adapt and upgrade their education to meet the demands of
employers in a rapidly changing economic and social environment (Bangkok
ETC 2002).

• **Thailand higher education**

Higher education (HE) in Thailand is the responsibility of the Ministry of
Education (MOE), which coordinates the operation of 20 public universities, 6
autonomous universities, 41 Ratchabhat Universities (formerly Teacher's
Training Colleges), 35 Ratchamongkol Technology Universities, and 54

privately operated universities and colleges. The Ministry has to cope with thousands of secondary school graduates throughout the country who continue their education.

Approximately three decades ago, the study of science and engineering was considered to be a high priority in the public universities to support the development of the country as formulated in the Social and Economic Development Plan of Thailand (National Economic and Social Development Board 2002). There has been an attempt to increase graduates in these needed areas both at the Bachelor's and Master's Degree levels in the fields of engineering and architecture for the development of the nation.

In addition, most of the privately-run colleges also offer courses and programmes leaning heavily towards science and technology. It is clear that these colleges are responding both to the increasing demands of a large number of high school graduates and also to current needs for advanced technology.

At present, there are at least 156 higher education institutions in Thailand providing a wide variety of courses for the fulfilment of Diplomas and Degrees. In responding to a government plan to decentralise education, many universities are located in large regional centres throughout the country. These universities offer courses in various major subjects at the undergraduate, graduate, and post-graduate levels. The language of instruction at most public universities is Thai, with the exception of special courses which are taught in English in some universities. Admission to public and autonomous universities is achieved through two methods: a direct admission examination held by each university and a Central University Admissions System (CUAS) conducted by the Office of Higher Education Commission within the Ministry of Education. The criteria for passing depends on scores obtained from O-Net (Ordinary National Educational Test) and A-Net (Advanced National Education Test) scores together with the grade point average(GPA) and grades for some relevant subjects (Saengpassa 2006). There are also two open universities which have been established to

expand educational opportunities for working people and secondary school graduates via campus instruction, television, radio programmes and other kinds of audio-visual media. Other higher education institutions, which are not supervised by the Ministry of University Affairs, are in professional fields such as police or military academies. Programmes of studies at the Master's Degree level are offered in at least 30 universities, whereas those at the Doctorate's Degree level are offered at over 10 universities (Office of the National Education Commission 2002; Sedgwick 2005)

2.3 S&T research community in Thailand

Thailand's S&T development can be traced back to the 1950s when the government of that time announced some S&T policies. The National Research Council Act was passed, followed by the establishment of the National Research Council of Thailand (NRCT), with the aims of promoting sustainable development through the use of scientific research and guiding the development of the country's scientific and technological capabilities. In 1963, the National Applied Science Research Institute was established, and later became the Thailand Institute of Scientific and Technological Research (TISTR). In that period, the R&D undertaken focused on the development of industries which transformed natural resources into value-added products. It is interesting to note that the Thai National Documentation Centre (TNDC) was also established under the supervision of TISTR in order to provide S&T information services to Thai scientific researchers. Then, later in 1979, the Ministry of Science, Technology and Energy (now the Ministry of Science and Technology) was established to perform administrative activities in relation to the planning and implementation of S&T policy.

According to the International Institute for Management Development (IMD), Thailand's competitiveness was ranked 27 amongst 60 countries worldwide in the World Competitive Scoreboard 2006 (IMD 2006). This is an improvement of the ranking of 29 given in 2004. The ranking is based on the following criteria:

economic performance, government efficiency, business efficiency, and infrastructure (including technological and scientific infrastructures). This implies a promising future of the development of Thailand S&T. In order to enhance the country's competitiveness, the Thai government has launched a policy of promoting R&D and innovation, focusing on knowledge-based learning especially on the issues of innovation development, intellectual property rights, and R&D infrastructure. It is interesting that cooperation between the public and private sectors is also being promoted. Many government S&T institutions have provided S&T services to private companies in the area of product development and improvement of quality and standard of products. Scientific R&D, therefore, has played a dominant role in boosting the economy of the country. As seen by the government's strategies, strong economy, competitive industry, advanced ICT, and good infrastructure are important factors that need to be focused on (National Economic and Social Development Board 2004).

Given that scientific R&D is not an end in itself, the government has attempted to promote and maximise the use of it by transferring technologies and knowledge to target groups and the public. This process has influenced the development of ICT infrastructure and helped establish networked communication systems to connect the government sector with the private sector and the community in remote areas. Educational institutions, particularly higher education, play an important role in conducting R&D projects which have helped to solve critical economic problems in the country. Moreover, these institutions are encouraged to act as information centres for the community, which can serve the government's policy of trying to motivate Thai people into adopting lifelong learning. Universities and vocational colleges are viewed as a good place to produce qualified personnel for the industrial and R&D sectors. Apart from these roles, the government expects the academic sector to be a centre of knowledge sharing via transferring technologies obtained from R&D activities. Furthermore, the policy to encourage resource sharing among educational institutions has created great benefits to the academic community as it has resulted in the establishment of the THAILIS consortium.

The majority of R&D in science and technology in Thailand can be divided into two main categories: the public and the private sectors. According to data reported by NSTDA, investment in R&D is low and relies more on the public sector than private companies. For example, Thailand's R&D expenditure as percentage of GDP in 2001 showed that R&D expenditure in the public sector and higher education was 0.13 percent whilst that in the private sector was 0.08 percent (United Nations 2005). It was also noticed by the Permanent Secretary of MOST that the development of S&T in Thailand was still being hampered by low funding for R&D, only 0.26 percent of gross domestic products (GDP) compared to 1-2.0 percent in developed countries. In addition, S&T manpower accounts for only 2-3 in 10,000 persons, which is 10-30 times lower than developed countries. Therefore, this is considered a significant barrier and needs to be improved (Paojindamuk 2005).

Batsomboon (2004) reports that the Thai government's mission on S&T places emphasis on the use of scientific R&D to create a knowledge-based economy. The R&D trend, therefore, is steering the country towards advances in technology and S&T knowledge, simultaneously with the capture of local knowledge in order to improve the quality of life for Thai people. It is also concluded in Batsomboon's paper (2004) that the S&T sector of Thailand has been developed under these four essential policy frameworks:

- The Ninth National Economic and Social Development Plan (2002-2006);
- The National Strategic Plan on S&T (2004-2013);
- Government policy on S&T to solve the economic problem;
- The Sixth National Research Policy and the National Research Plan (2004-2006).

These plans and policies have their main focus on the development of technology and its application, development of human resources in S&T, development of ICT, and competitiveness of the S&T sector in Thailand.

Batsomboon (2004) also presented statistical data obtained from the Thai research databases of the National Research Council, which shows that, as of September 2004, 51,195 projects had so far been undertaken, the majority of which fall into three main categories: science and technology (13,386 projects), agriculture (27,331 projects), and social science and humanity (10,478 projects). The total budgets for these projects are 27,796 million baht (approximately £400 million). Furthermore, the National Research Council has developed a researcher database in order to register as many of Thailand's researchers as possible. This could benefit further research collaboration and knowledge management projects in the future. The data required for registration consist of personal data, education and working background, research rewards, publications and ongoing research projects. From 1994 up to 2004, there have been 16,945 registered researchers (6,896 in science and technology; 4,187 in agriculture, and 5,862 in social science and humanity).

2.3.1 R&D in the public sector

As in other countries, the S&T research community in Thailand was formed in response to developments made in higher education and was initially aimed at improving public services. Thus, the main subject areas were medical science, engineering, science and arts. In recent years, the government has concentrated more on improving R&D to help solve economic, social and environmental problems. The areas of R&D specifically cover agriculture and agro-industry, science and technology, society and culture, and health. Funding criteria for R&D projects also focus on the aforementioned research subjects.

The first university of Thailand, Chulalongkorn University, which was established in 1916, is regarded as the trigger of R&D evolution in Thailand. The R&D community in Thailand has expanded with the organisation of various universities, the upgrading of technical and vocational colleges to university status, and co-operative research in the national development programmes subsidised by foreign funds. To date, a programme of "*international universities*"

has been established with an aim to use English as the language medium for teaching and learning. Such kinds of development in the Thai R&D community in universities have introduced Thai students and professionals to the R&D system operating in the wider world. Gamage and Samarajiva (2006) reported that the university ranking of 77 institutions in various Asia-Pacific countries (Australia, Bangladesh, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, and Thailand) undertaken by Asia Week showed that Thailand had ten universities ranked of which five are offering S&T as main subject areas and these are ranked within the top fifty.

In addition, the universities are also the main source of scientific research. Major achievements of Thai S&T research have mostly been in medical science including health, medicine and clinical studies. According to a survey using the Science Citation Index, some Thai papers on these topics are among the most cited from the developing world. Other strong R&D fields cover agriculture and engineering. (National Science and Technology Development Agency 2002b).

R&D outputs also emanate from other government institutes whose function is to conduct research and development as well. For instance, the Department of Agriculture, the Thailand Institute for Scientific and Technological Research (TISTR), and the National Science and Technology Development Agency (NSTDA) are the predominant S&T research bases of the country.

Recognising the importance of R&D in sustaining the scientific development of the country, the Thai government has placed emphasis on providing financial support for research. The main funding agency in Thailand is the National Research Council (NRC), which was specifically set up to fund research in 1956. However, NRC's responsibility was later changed to enable them to be in charge of the national research policy rather than funding. Given that the support is insufficient to meet the increasing demand of R&D projects, in 1991, NSTDA was established to support both public and private sector agencies, and conduct

its own research in areas of science and technology considered to be of strategic importance, including biotechnology, materials science and electronics/ computer technology.

Another new agency concerned with boosting R&D in Thailand is the Thailand Research Fund (TRF) which supports work in wide-ranging areas including basic science, social sciences and the humanities. Besides these, there are also other national centres established for conducting R&D in specific areas on a basis of international support programmes.

2.3.2 R&D in the private sector

The Thai government also recognises the indispensable role of the private sector in reinforcing national economic growth through investment, and technology development. Importance of the private R&D sector has been stated in the national policy to commercialise S&T innovations by encouraging the private sector to play the leading role in R&D with support from the government. Measures have been taken to increase productivity, particularly of the R&D sector, where some large firms are gearing themselves towards high-technology and export-oriented production.

The promotion of R&D in the private sector has been achieved by patterns of government investment in state-run companies, and agencies which undertake various kinds of promotion activities. For instance, the Board of Investment (BOI) is mandated to promote investment through tax concessions, to provide incentives for the import of new and more efficient machinery and technology, to improve the transfer of technology to Thai personnel, and to establish R&D programmes. Moreover, NSTDA and the Ministry of Science and Technology (MOST) have set up low-interest loans for the R&D Programme that supports these firms long–term. The Science Park Project has also been established collaboratively to serve private sector needs for technology development and

information services (National Science and Technology Development Agency 2002b).

2.3.3 Future trends in the R&D community in Thailand

To overcome economic backwardness, Thailand is applying more effort to tackle major difficulties which lie in the growing shortage of infrastructure, especially the inadequate ICT system for S&T information service provision and a lack of skilled human resources. The development of research support systems is required to overcome the obstacles of mismatches in S&T human resource capabilities, low levels of R&D investment and the stagnant growth of the R&D community. This requires strong action from the stakeholders concerned in order to accommodate the trend of Thailand R&D which is heading towards a knowledge-based economy through various S&T projects and innovations. Therefore, most projects are currently focussing on, for instance, development of value-added products and patenting (Wongruang 2005). The national S&T research agency such as NSTDA has a mandate to strengthen the S&T sector and national R&D by overseeing issues of technology management, science policy, and intellectual property rights. The concept of clusters has been adopted to provide assistance to the industrial and commercial sectors, particularly the SMEs. These clusters are responsible for the development of networking, research infrastructure, and human resources. The scope of activities includes development of R&D and Thai SMEs databases, consultancy services (in the areas of industrial technology assistance, intellectual property, and R&D certification), business incubation (The Thailand Science Park and Software Park Thailand providing facilities, ICT and infrastructure to the industrial sector), and financial assistance (for example, research grant, soft loans, and joint venture). Interviewed by Paojindamuk (2005), the Permanent Secretary of MOST said that the cluster model had integrated all stakeholders concerned in R&D such as researchers, economists, and the government agencies and this would build the competitiveness of Thailand's economy as well as the S&T sector itself. It was

also reported that the National S&T Committee was to be established in order to steer the development of the S&T sector and the country's economy.

Another promising strategic policy is to invoke cooperation between the public and private research sectors. Apart from government R&D institutions, university and industry links have been targeted as a key strategy for overcoming economic problems. It is also stated in the Ninth National Economic and Social Development Plan that there is a plan to develop educational institutions to become research centres responsible for collecting, studying, and discovering new knowledge, and distributing it to the private sector and general public. Moreover, there will be integration between universities and domestic or international agencies or institutions in order to exchange knowledge and expertise, collaborate on R&D, and perform activities in other areas of academic and R&D purposes, for example, resource sharing and training. This is in line with the global R&D trend in consolidating the research community by reorganising university research systems in the 21st century (UNESCO Cairo Office 2002).

According to this concept, the R&D community in universities is required to contribute more and participate as a core component in complex knowledge networks. Applied research activities on a commercial basis for industrial clients have become a key activity for universities at a global level. For instance, the UK has a policy to integrate the science base of industry and universities with national objectives to strengthen socio-economic outcomes (HM Treasury 2004). In Thailand, the government R&D institutions are cooperating with universities to produce S&T manpower and develop research infrastructure. For example, the Science Parks are located near educational institutions in order to create good relationships and cooperation among researchers and entrepreneurs. Some of government R&D institutions have adapted this policy to build up close cooperation with educational institutions, for instance, cooperation between TISTR and 18 universities and colleges for the purpose of technology transfer to local entrepreneurs and development of appropriate technologies that build on

local knowledge. Besides, TISTR has cooperated with the Federation of Thai Industries (FTI) to bring commercial value to R&D, leading to new chances of business as well as enhancing the country's global competitiveness, technological self-sufficiency, S&T manpower to meet industrial needs, resource sharing (information and research resources), and technological incubation. The Department of Science Services (DSS) also cooperates with 13 Ratchabhat Universities in a project designed to improve and standardise laboratories. A Technology Clinic has been established by MOST in order to provide technical services to enterprises and the general public. To achieve the government policy objectives, the public R&D sector, especially the academic and research institutions, must respond to these expectations. They must develop a critical mass of research capability. Attaining this could be through many supportive functions, of which the S&T information service provision is one.

2.4 S&T information service sector in Thailand

In order to give an overview of the S&T information service sector in Thailand, it is important to describe the domain of information itself which is necessary for researchers. Other issues which will be presented in this section include the information sources for researchers, information service providers in Thailand which consist of academic libraries and S&T information centres, national information policies and their implementation.

2.4.1 S&T information

Malaiwong (1998) gave the view that information is an indispensable resource for researchers because most researchers conduct research based on findings from previous research. As conducting research implies the building of new knowledge or innovation, it is necessary for researchers to search information from amongst the latest findings in the areas from which they are going to conduct further studies. The author classified the types of information which are normally needed by researchers in five categories as follows:

- **Literature review**

This kind of information will present what has been lately found or discussed in each particular research area and help researchers identify aims, objectives, framework, and the scope of their research. It embraces theories, results and findings of previous research or new proposed concepts. Sources of this kind of information are, for example, previous research papers, reports, textbooks, and scholarly journals.

- **Background information**

This refers to information which gives factual background related to the research topic, for example, statistics and current information.

- **Experimental or survey data**

This kind of information refers to findings from experiments, surveys, case studies, observations, or any research tools and methods.

- **Publication services**

It is important for researchers to search and know about publishers or key sources where research papers can be published and disseminated to the research community or the public.

- **Citation index and reviews**

Researchers need to find information regarding the citation or reviews of their work in order to keep themselves updated with trends in that research area, or to improve their work.

2.4.2 Information sources for researchers

Malaiwong (1998) also mentioned the sources where S&T information can be found or are provided to Thai researchers. These sources consist of:

- **Personal collection**

Most researchers usually subscribe to scholarly journals published by scholarly publishers or professional associations. Moreover, they might own proceedings or papers collected from conferences, seminars, or meetings.

• **Academic libraries**

Researchers can go to find information related to their research at libraries in universities or educational institutions where a variety of material such as textbooks, journals, references, theses and dissertations, or proceedings is provided, depending on subject areas or courses taught.

• **S&T information centres**

Most S&T information centres in Thailand are located in different government R&D agencies or educational institutions. The main objective of these centres is to provide S&T information to both in-house and external researchers. Apart from textbooks, standards, or serials, other types of information provided include, information repackage, lists of abstracts, journal index, or article index. Other services are interlibrary loans and document delivery services.

• **Electronic information services**

Apart from print format, most libraries, especially some academic libraries and S&T information centres also provide electronic information resources such as CD-Rom, electronic journals, and online databases using ICT and automated library systems.

• **Internet**

Researchers can search for information on the Internet via websites, for example, the websites of institutions concerned in the research community such as R&D agencies, universities, information centres, and professional associations.

2.4.3 S&T information service providers in Thailand

The key S&T information service providers in Thailand consist of academic or university libraries, and special libraries including S&T information centres. These libraries are known as a good source for researchers to search for S&T information. The information networks providing S&T information are also presented.

• **Academic or university libraries in Thailand**

Bhakdibutr and Keesiri (1999) stated that academic or university libraries in Thailand include those in higher education institutions. They categorised academic libraries into libraries of public and private universities and colleges, and libraries of higher education institutions for special purposes (for example, military and police academies, universities for Buddhist monks, and nursing colleges). It was also stated that academic libraries in Thailand were well-resourced particularly with funding, personnel, and technology when compared to other types of libraries. The authors noted that the first library science courses offered at the Faculty of Arts, Chulalongkorn University in 1915 yielded great benefits to the development of the library profession. The status of academic libraries in the universities is now equivalent to that of a faculty. Relationships amongst Thai academic libraries are relatively good as they have been organised into provincial and metropolitan networks. According to Siripan (1999), university libraries have offered online databases services through campus networks since 1985. The online services provided included international bibliographic databases and CD-ROM databases. Wareesa-ard (2004) notes that academic libraries began to cooperate in the sharing of resources since 1975. Their sharing activities include acquisitions, cataloguing, serials, information services, media services, and information technology. In 1986, the Provincial University Library Network (PULINET) was established, followed by the Thai Academic Libraries Network (THAILINET (M)) in 1992. The UNINET network for higher education was established in 1997. This is considered as the beginning of library cooperation in Thailand for resource sharing, using an automated library system. In 1998, the two networks were then united into the Thai Library Integrated System (THAILIS). Meanwhile, THAILIS also works collaboratively with libraries in other higher education institutions (Siripan 1999; Wareesa-ard 2004).

• **Special libraries in Thailand**

According to Siripan (1999), the first special library in Thailand was founded in 1887 at the Ministry of Education. Then later, more special libraries were

generated as other Ministries and government organisations saw the benefits of having their own libraries to collect their in-house publications and provide services to their staff and the public. Siripan (1999) also divided special libraries in Thailand into eight categories:

1. Governmental libraries including special libraries of the departments and divisions operating under the department;
2. Libraries of state enterprises;
3. Libraries of associations and societies;
4. Libraries of banks and financial institutions;
5. Libraries of research institutes;
6. Libraries of academic institutions, universities and colleges;
7. Libraries of international organisations and institutes, and
8. Other libraries that do not belong to any of the previous categories, for example, libraries and information centres in hospitals and military institutions.

The author noted that special libraries mostly operated individually without sharing any standards for library resources or systems. Therefore, development of this sector was unequal depending on budgets and the resources each library was allocated from parent institutions. While some special libraries still maintained traditional services, some had changed their roles and types of service provision. Siripan (1999) added that these special libraries also changed their name to '*information centres*'. Pungtrakul (1999) mentioned that the well known information centres are, for example, Thai National Documentation Centre (TNDC: established in 1961), Thailand Information Centre (TIC: established in 1968), and Technical Information Access Centre (TIAC: established in 1989). These special libraries and information centres provided additional services such as preparing reports on specific topics for corporate users, providing document delivery upon request, searching online and full-text databases, producing organisation's publications and training staff on the utilisation of ICT, and last but not least, developing organisations' collections both in print and electronic formats. Other libraries providing S&T information as stated by Siripan (1999)

were, namely, the National Library, the libraries of the Department of Science Services, the National Research Council, the Department of Intellectual Property, and the Thailand Office of Industrial Standards.

Siripan (1999) also pointed out that the professional status of librarians in special libraries (government offices) was not satisfactory due to the unfair civil service classification system, which did not promote librarians to the higher ranks as other government officers with comparable degrees. However, the author noted that this situation was better after the latest Civil Service Act was passed in 1998 as librarians could be promoted up to the highest rank (Class 11). Special libraries formed themselves as a Special Libraries Group, having its mission to strengthen professional and cooperation amongst special libraries.

• **Information networks**

THAINATIS

THAINATIS is the first Thai information network originating from the meetings of the United Nations International Scientific Information System (UNISIST) Advisory Committee, under the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Dhutiyabhodhi (1999) reported that the concept of building a world science information system was initiated in 1972. Then the Thai National UNISIST Committee was appointed by the Government in 1974 to be responsible for the development of manpower for libraries, documentation centres and archives in Thailand. Finally, the Thai National Information System (THAINATIS) was established and approved by the Thai government on December 2, 1986. Later, the Sub-Committee for the six central focal points of a national network were established on 28 January 1988. THAINATIS also worked in cooperation with the Thai Library Association in order to develop library networks and information centres. Dhutiyabhodhi (1999) reported that THAINATIS had the main objectives to:

- • Develop and organise information resources and provide the information services to the government and private sectors as well as the public;

- Organise a national standard information system and services;

- Eliminate duplication and provide information services;

- Be a centre of diversified knowledge and information, and

- Encourage cooperation and coordination among libraries and information centres, for example, exchanges of information at national and international levels.

The organisational management of THAINATIS is shown as in Figure 2.6.
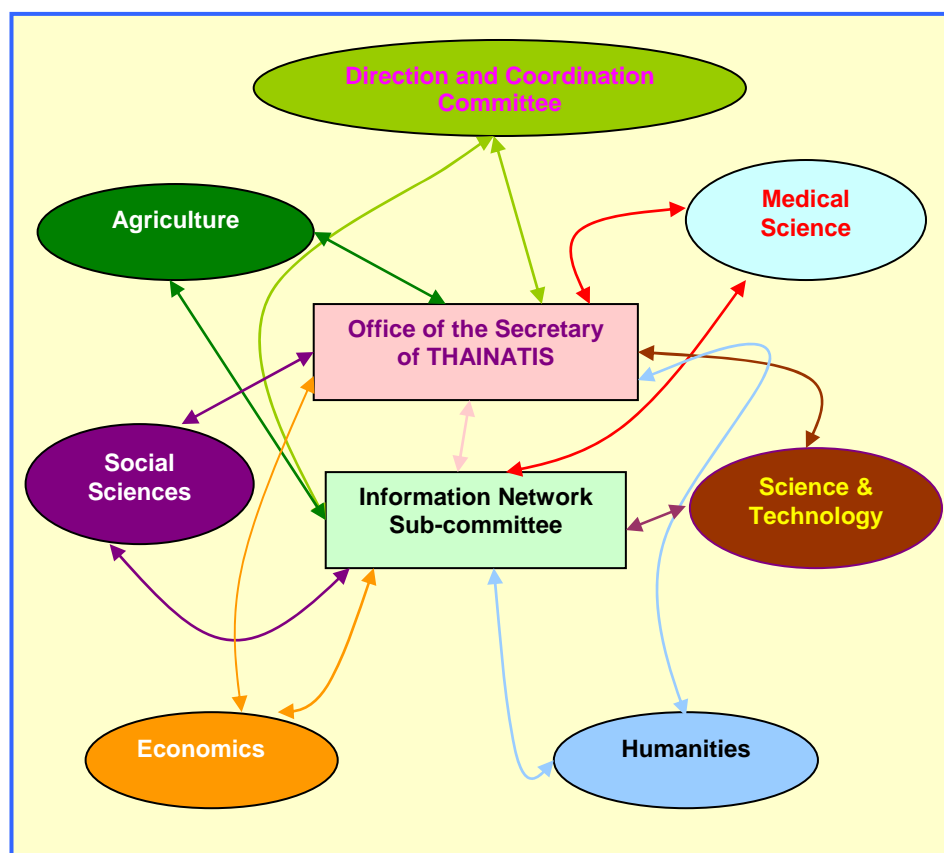
Figure 2.6 Organisational management and networks under THAINATIS.

Figure 2.6 illustrates how THAINATIS operates and organises its management. The Direction and Coordination Committee serves as a central management unit which formulates policies and implementation guidelines derived from the

Cabinet's demands. It also monitors implementation, provides consultation and supports the operation of national networks, promotes the utilisation of resources of the networks, oversees international cooperation, and appoints members for the Information Network Sub-committee and other sub-committees. The Direction and Coordination Committee also works in cooperation with the Information Network Sub-committee and the Office of the Secretary of THAINATIS or the National Library of Thailand (NLT). The Information Network Sub-committee members, appointed from representatives from each library and information centre, has the responsibility to manage the six information network centres of the different subject areas given in Figure 2.6. Meanwhile, NLT acts as a secretary to the Direction and Coordination Committee, liaises amongst the information network centres and serves as a referral centre.

The Information Network Centres consist of six subject areas with their coordinating centres, shown in parenthesis: Agriculture (Kasetsart University), Medical Science (Mahidol University), Science and Technology (the Division of Scientific and Technological Information, MOST), Social Sciences (the Development and Document Centre, the National Institute of Development Administration), Humanities (NLT), and Economics (the Bank of Thailand Library and Information Centre). These information network centres have the main responsibilities for building collections of information resources and provide information to meet users' needs and locating information sources for users.

In Figure 2.6, the double-headed arrows indicate two-way communication between the organisations and represent their cooperation in working together. Activities such as serial indexing, development of databases, microfilming of primary documents, and union cataloguing of THAINATIS databases were performed and services provided to users. In addition, NLT was responsible for organising annual seminars for members countrywide in order to catch up with information technology. It is noted that a number of seminars, trainings and

lectures were held, thus providing chances for members to participate and update themselves with new trends in information services. It was mentioned by Dhutiyabhodhi (1999) reported that the government had provided funding to set up a computerised network at NLT in order to link up six information network centres. This computerised network was expected to facilitate resource sharing between the THAINATIS network and other libraries and information centres. Dhutiyabhodhi (1999) also reported obstacles to the development of THAINATIS as including:

- Inadequate support from the government;
- Lack of coordination from libraries concerned, resulting in ineffective resource sharing;
- Inadequate funding to invest for ICT;
- Shortage of information manpower;
- Low use of information resources currently provided, and
- Lack of local information resources.

Dhutiyabhodhi (1999) concluded that, in strengthening THAINATIS, the six information network centres and NLT needed to work together in asking for more funding from the government under the five-year National Economic and Social Development Plan (1999-2003). Additional financial and technical support both from the Thai government and international organisations were also recommended.

Journal Link

In 1998, the *Journal Link* Programme was initiated in a meeting of the Thailand Committee of the Deans of Science Faculties. An economic crisis in that period had a tremendous effect on the amount of funds for the available acquisition of S&T information resources, leading to a withdrawal of subscriptions to many S&T serials. A lack of a union list of S&T serials subscribed to by academic and special libraries all over Thailand had exacerbated the situation as many serials were unsubscribed and disappeared from the holdings of all libraries whilst in other cases multiple subscriptions were retained. The Faculty of Science,

Chulalongkorn University, therefore, was assigned to work collaboratively with other 31 academic libraries and two libraries of other Ministries in order to manage the Programme. The aim was to promote S&T information resource sharing, focusing on developing the online Union List of S&T serials in Thailand, locating information sources and providing networking services to member libraries and end-users. Membership of the Programme is free. Users only pay the service fees charged by the libraries from whom they have ordered full-text papers. The system has been designed to be convenient to both member libraries and users. Through accessing www.Journal Link.or.th, member libraries can update the data of their holdings on their own, whilst users can browse, locate the information sources they want and make requests online. The *Journal Link* Programme has been operating continuously, financially supported by the Faculty of Science, Chulalongkorn University; TRF, and Technical Information Access Centre under NSTDA, respectively. Two research projects undertaken were "The Use of Advanced IT for S&T Information Resource Sharing amongst Thai Libraries" and "Development of Library Consortium for Joint Resource Acquisition" (Journal Link 2006). Apart from serials, now a couple of databases have been developed to extend services further.

2.4.4 National policies and their implementation

The national policies concerning the information sector, as stated in several of the government's plans, can be summarised as follows:

1. The Strategy Plan Framework towards Quality and Sustainability of Thailand Economic Development (National Economic and Social Development Board 2001) has stated that the government aims to:

- Improve public libraries in main cities to be knowledge and learning centres by promoting the use of ICT for services and management;
- Integrate libraries and museums into one single learning centre;
- Restructure the National Library to be a modern public document office.

2. The Ninth National Economic and Social Development Plan (2002-2006) considers that the development of science and technology in the country needs to be strengthened. One strategy is to develop and apply ICT to aid the dissemination of knowledge and information to support economic stabilisation and increased international competitiveness.

The National Electronics and Computer Technology Centre, so-called NECTEC (2005) reported that the government gave importance to S&T information services for R&D by connecting the academic community with the Internet in the early period of national ICT development. The Thaisarn 1 Project (Thai Social/Scientific Academic and Research Network), which involved the development of an Internet gateway to the World Wide Web, was initiated in 1991 and supervised by NECTEC. Currently, The Project has been developed to be Thaisarn 3 (Phase 3) since 1998, focusing on the development of an information superhighway (high speed Internet) for society, education and research. The main objective of Thaisarn is to build up a computerised network linking educational institutions, government agencies, and schools with the purposes of improving education, research and international cooperation (Koanantakul 2002).

MOST has implemented the national ICT policy by encouraging governmental departments under the Ministry to apply the use of ICT to various activities, for example, communications, service improvement, and video-conferencing. In 2005, the office of the Permanent Secretary, MOST, established the Science and Technology Advanced Research Network (STARNET) in order to provide networked linking for communications and information exchanges between agencies under the Ministry. STARNET is the high speed network which aims to connect MOST with the international R&D community, namely, SINET, APAN, and Internet-2, via the Thaisarn network. It is envisaged that this connection will enable Thailand's scientific R&D to effectively address global competitiveness and prepare the country to be a south-east Asia regional S&T hub (NECTEC 2006). The Grid Computing project, therefore, has been started to implement the

government's policy by promoting powerful computing systems, massive storage, and fast networks (Uthayopas 2004). The use of the tool called '*accessgrid*' will facilitate cooperation amongst researchers and increase effective performance via the grid's computing infrastructure.

2.4.5 Thailand's recent responses to global trends

Conferences, meetings and seminars recently organised in Thailand indicated that information service providers in Thailand were striving to keep pace with global trends in the development of information service provision. The 19th annual seminar on cooperation between academic libraries in 2001 placed emphasis on the theme of a paradigm shift of library and information services. The role of libraries was widely discussed. The development of virtual libraries for lifelong learning to meet the needs of users in the learning society was proposed as a target for Thai academic libraries to reach. It was stated that consolidation of the information service providers was the first priority. This was believed to contribute greatly in the resource sharing activities. Poovorawan (2001) states that the Thai library sector needs to be fine-tuned with respect to its role and mission in order to accommodate the global development in information services. The changing paradigm has put some stresses on the library sector which include the rapidly advanced ICT, change of user needs, the shift to a knowledge society which requires sophisticated methods to manage information and knowledge and present them via different media, and the proliferation of the Internet (Pooworawan 2001; Tipakorn 2001). The speaker notes that the core concept of future society tends to be "*distributed intelligence*" where knowledge and information are demanded to be distributed instead of centralised. In the light of ever-changing ICT, information provider must, therefore, put strong attempt to develop databases of valuable knowledge and information for sharing among them (Tipakorn 2001).

Chantarasorn (2001) stresses the necessity for the library sector to cooperate with other government agencies such as MOST, the Social and Economic Development Board, and other political units of the country in the mechanism of

capturing and transferring knowledge and technology to Thai society. Academic libraries are viewed as having an important role in undertaking this responsibility. Therefore, the universities must work collaboratively in order to reduce the possibility of work being needlessly replicated. Chantarasorn (2001) also notes that organisation of libraries should be restructured with the purpose of extending networks and services. The National Education Network (EdNet) was also established in order to create a learning centre by transferring knowledge from universities to colleges, schools and down to the local community via the use of electronic media (Wongsawatkul 2001). Chantraraksri (2005) reports that THAILIS members have been extended from 24 state universities to include 41 Ratchabhat universities, 9 Ratchamongkol institutions, two universities for Thai Buddhist monks, and one technical college. The resource sharing schemes of THAILIS lie in two key activities which include co-acquisition of print journals, electronic journals and electronic books, and a consortium of reference databases (Raksasuk 2003). THAILIS members collaborate for sharing resources and services. However, each organisation and also their financial resources are independently managed. Recent collaborative projects are development of the union catalogue for Thai university research, the digital collection of full-text articles and images, a consortium of reference databases and electronic books, and provision of electronic document delivery services (Wareesa-ard 2004). Pitipunya (2005) remarks that the current organisational structure of the THAILIS consortium is as shown in Figure 2.7.
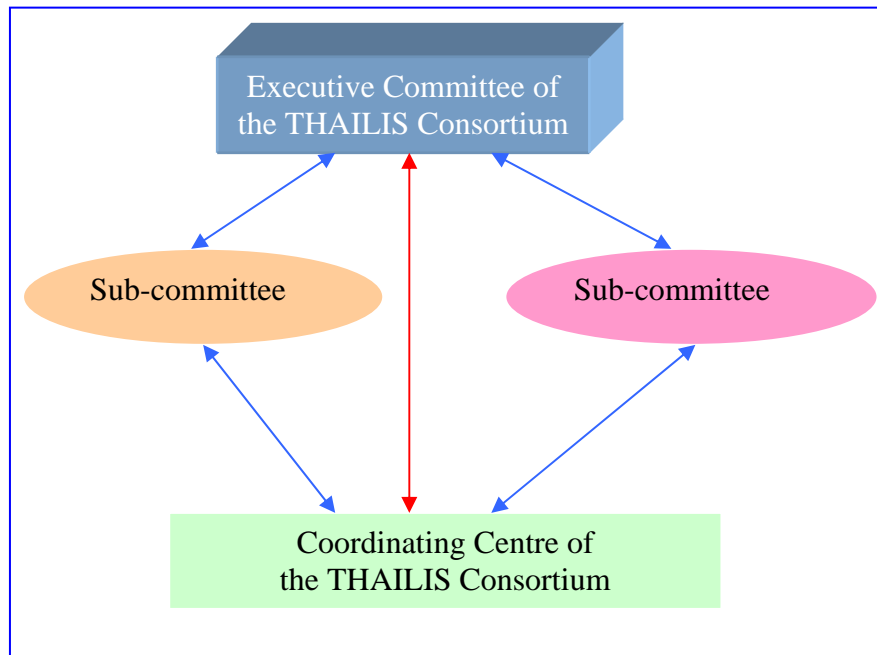
Figure 2.7 Organisational structure of the THAILIS Consortium

Chantraraksri (2005) reports the progress in the development of the university union catalogue that the project is at the stage of training librarians and producing user manuals. Meanwhile, duplication of records is being eliminated and the system is being improved as the number of members has grown from 24 to 77 educational institutions. The union catalogue development is considered as a pilot project of resource sharing of the academic community in Thailand, which could be developed into a national bibliographic centre in the future. Nagapreecha (2005) reports that the digital collection project of THAILIS has focused on digitisation of theses and rare books. With respect to service provision, more studies on copyrights of electronic documents and international laws on information access and sharing are suggested to be conducted to ensure open access without copyright infringement. In the future, Raksasuk (2003) thinks that THAILIS needs to strengthen the cooperation between members in terms of a formal arrangement. The author notes that THAILIS started its activities in library cooperation and resource sharing, and their next step, it is suggested should be to focus on the development of an information system

network. The cluster of network members might be categorised into types of libraries (for example, academic libraries), subject areas (for example, law), and geographical areas (for example, the southern region). In order to achieve this objective, Raksasuk (2003) suggests that members need to build positive attitudes towards sharing and change, to be open-minded and have a participative role in a decision making process. Soontaros *et al*. (2003) give the view that the academic library consortium such as THAILIS is important in the situation where information services are provided electronically and more sophisticatedly. THAILIS, therefore, needs to be developed in a sustainable manner to become the richest knowledge base of the country. There are four strategies proposed for managing the consortium which include:

- development of national databases;
- promotion of the cost effective use of resources;
- development of consortial purchasing; and
- extension of collaboration in order to create the learning society.

However, Pitipunya (2005) thinks that THAILIS still has weak points, particularly in its poor management of collaborative activities and shows a lack of continuity and effectiveness in cooperation and sharing.

Another problem lies in the attitude of users. Sirichana (2004) believes that library resources could be used more cost effectively if lecturers motivated students to explore and use diversified information sources in the process of learning and conducting research. The use of user needs surveys is recommended in order to ensure effective acquisition of resources that meet users' needs. Apart from training users to be information literate, libraries should provide English self-learning material in order to enhance English skills to students, thus leading to a more effective use of English library resources. Resource sharing activities and networks need to be extended in order to enable academic users to access a variety of information sources with limited libraries budgets. Similarly, Prasitratasin (2003) gives the view that libraries should be learning or research centres providing interactive multimedia materials. Furthermore, libraries can

help build up researchers' attitudes towards the use of information resources in doing more commercial research. In this case, researchers will need information such as patents, theses, and research reports. These activities will require librarians to change their role and they must be proficient in searching skills.

New roles for librarians are also proposed by Premkamolnetr (2005) and Na Lampoon (2005), such as being information consultants, trainers, Intranet content managers, product planners, and corporate knowledge managers. New services which can be provided are, for example, reference services, special collection such as grey literature, knowledge centres for SMEs, gateways to resources in the area of knowledge management, and becoming partners with universities in knowledge management projects. However, Premkamolnetr (2003) comments that librarians still face some problems which hinder their professional development. These problems are lack of support from parent institutions, insufficient English and research skills, and a heavy workload. In order to develop librarians' professional skills, it is important to encourage them to become more involved in conducting research. Therefore, the establishment of a centre for promoting R&D in library and information studies as well as providing guidelines and funding for research projects would help create a good research environment. Meanwhile, advanced ICT is suggested to be used for collecting and disseminating research papers and exchanging research techniques and skills. Furthermore, librarians can collaborate in other research projects of their parent institutions.

Similar development trends are also found in information service providers of the government departments. Many special libraries of government agencies, especially where S&T information services are provided, call for more cooperation and restructuring of their organisations in order to set strategies, allocate responsibilities, and accommodate new activities. For instance, the E-library project has also been initiated by MOST under the programme "*the E-library and knowledge management in S&T*" since 2001. The key concept of the programme is to provide electronic S&T resources via portal or gateway

services, embracing S&T information, knowledge, and innovation of government departments under MOST and other government R&D units (see Figure 2.8).
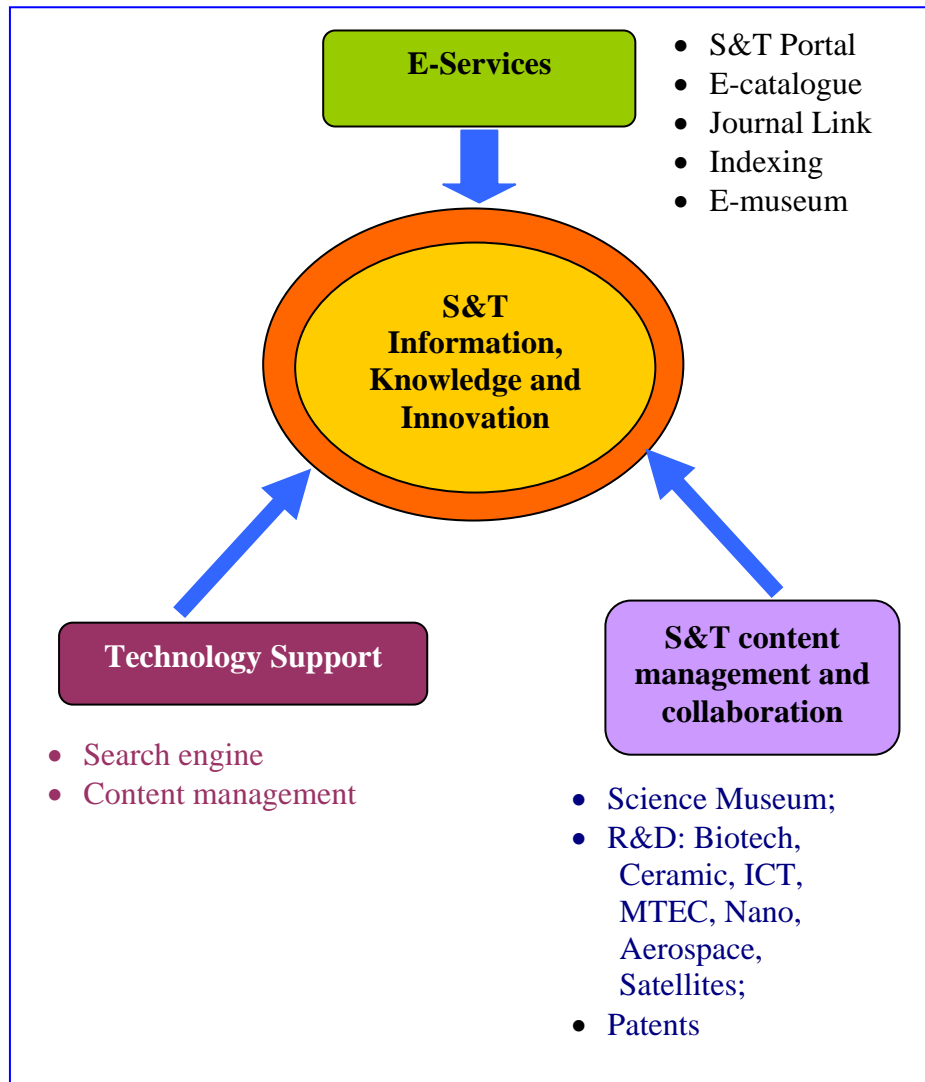
Figure 2.8 The concept of the E-Library Programme for S&T information services

The E-Library Programme is coordinated by NSTDA, TRF, Health Systems Research Institute, and NRCT. Activities under this programme are, for example,

- development of S&T databases including Thai R&D, a list of Thai researchers, and a procurement list of international information resources;
- provision of selective dissemination of information (SDI);

- provision of a list of contents for the public catalogue of international publications

- further improvement of *Journal Link* services;

- development of information networks of food science and technology;

- production of information repackaging (electronic technology/ information files);

- development of S&T Thai journal indexing;

- virtual museum; and

- development of a digital library on geo-informatics and space technology.

The Science and Technology Knowledge Centre (STKC) was also established in March 2004 by MOST which aimed to enhance the S&T competitiveness of the country by strengthening the S&T knowledge base and knowledge transfer. The services provided are web-based with links to other S&T institutions of the country. Moreover, the Thailand Knowledge Centre (TKC) is being established by MICT to develop collections of Thai local knowledge and wisdom, and widely disseminate this knowledge.

Apart from the cooperation in sophisticated sharing schemes such as consortial purchasing which are seen as the ultimate goal for many libraries, many libraries have been working to improve the fundamental sharing services such as interlibrary lending and electronic document delivery. This is evident from the theses of Masters Degrees in the field of library and information science, for example, Tosuwan (1999), Praihooyan (2001), and Hongbil (2001). These theses concern the studies of the development of digital services for an academic library and interlibrary loan via electronic document delivery services. The results show that a lack of ICT in locating resources is still a problem in some libraries. Interlibrary services, therefore, still consume large amounts of time and cannot satisfy user demands. The unequal development of ICT in different libraries is also hindering the development of the rapid communication and the building of good quality services.

2.5 S&T information strategies of the neighbouring country: Experience of Malaysia

This section will discuss the information sector within Malaysia, Thailand's neighbouring country, which is considered to have a similar status in terms of social and economic development. The information sector will be investigated in terms of its leading organisations in the development of strategies, current development of S&T information, and the current state of resource sharing.

Malaysia is known as a multilingual and multicultural society as its population consists of the Malays and other indigenous ethnic groups (61.7 percent), Chinese (23.8 percent), Indian (7.1 percent) and other minority groups and non-citizens (7.4 percent). Malay is the official language which is also the medium of instruction at all levels of education. However, English is widely spoken as the country was a former British colony.

With respect to the library and information service sector, the major library types consist of public libraries, academic libraries, special libraries, and school libraries. It is interesting to note that there are a large numbers of special libraries in Malaysia (293) while there are 52 academic libraries including those of polytechnics, teacher training colleges, matriculation colleges, and private colleges (Baba 2002). The National Library of Malaysia (NLM) acts as a backbone for the national development of the information service sector (Baba 2002). It plays a key role in promoting the use of ICT, in managing and implementing library and information systems; in bridging the digital divide, and increasing research programmes to help develop library and information services. NLM also provides online databases of bibliographic records and index records, namely *BINAR*, *Malaysian National Bibliography*, and *PANCARAN MENTARI*. Moreover, NLM takes a leading role in managing the National Digital Library System (System *PERDANA*) and coordinates with other libraries in providing digital library services to the public. This project is supported by the Multimedia Development Corporation (MDC), and Telekom Malaysia Berhard. The *Mylib*

pilot project has been developed as a web portal or a knowledge centre aiming to promote the delivery of information and knowledge to the population via the web. The local content covers these following topics: agriculture, culture and history, education, health & medicine, IT & multimedia, science & technology, trade & commerce, human resource, entertainment, library & information Science, sports, tourism, statistical resources, theses & dissertations, and government information. Each topic contains a page giving information related to that topic. For example, the science and technology page provides information on databases of R&D, venture capital, a directory of S&T organisations in Malaysia, Government agencies, and S&T statistics. (See details in http://www.mylib.com.my/index.asp.) Other digital library projects include: the Islamic Digital Library Network (PERDIM), library projects under Demonstrator Application Grant Scheme (DAGS-NITC), development of interactive multimedia web-sites, Readers database, production of multimedia CD-ROMS), and conversion of print and audiovisual materials to digital format.

NLM also initiated the programme "*the Connected Learning Community Model in Malaysia*" in cooperation with Microsoft (Malaysia) and all state libraries throughout the country. This programme focused on building an information infrastructure via the Knowledge Network (Jaringan Ilmu) which is a national information network system which NLM and the Malaysian Institute of Microelectronics System (MIMOS) are jointly developing. These two organisations jointly conduct R&D in order to establish linkages amongst libraries, facilitate resource sharing, and encourage ICT applications in content provision. Furthermore, this programme promotes the use of the Internet for educational purposes (Hashim 1999). It is interesting to note that this is an example of good strategic partnership between the government and the private sectors in developing both the ICT and the information domain of the country. NLM also train reference librarians in information skills to provide services through this programme. The community is encouraged to develop content, thus enriching the educational resources of the country.

Apart from information provided in the *Mylib* websites, S&T information can be also obtained from the Malaysian Science and Technology Information Centre (MASTIC), a portal to a national resource centre. However, the S&T information provided by MASTIC mainly concerns the strategic domain, for example, information for decision making, planning and implementing the nation's S&T policies. The information will be useful to stakeholders concerned in the S&T sectors such as policy makers, research funders, researchers in the area of the S&T infrastructure, and users and developers of research results.

S&T information can also be obtained from academic libraries. Yaacob (1999) reports the trend in Malaysia where more information providers and users have begun to subscribe to a networked environment under the government's promotion policy. Hence, ICT development has led to a new paradigm in resource sharing through interlending and document delivery and supply via networking system. This is evident from the increasing number of libraries applying to be members of the Consortium of Libraries and Organisations Document Delivery Programme. The national bibliographic database was developed collaboratively by NLM and MIMOS. This promotes the environment of resource sharing as all libraries are linked with the MIMOS' Joint Advanced Research Integrated Network (Jaring). The services that the project can provide are interlibrary loan and document delivery, information search, information retrieval, and announcement and a mailing list. Yaacob (1999) adds that the Document Delivery System Consortium, initiated by NLM in 1998, has approximately 310 libraries as members. Those libraries come from (as of May 1998) academic and university Libraries (40), government departments (125), commercial agencies (37), and non-government organisations (79). Moreover, Yaacob and Seman (Undated) mention that the electronic resources of Malaysia can be accessed through these following systems as well: Civil Service Link (CSL); SIRIMLINK, Knowledge Resource Centre; NSTP Online Reference Service, PALMOILIS, South Investment Trade and Technology Data Exchange Centre (SITTDEC), Agriculture Information System (AIS), Price Information

Centre (PIC) Malaysian Science and Technology Centre (MASTIC), Medi*Link, and *Pusat Dokumentasi Melayu* (PDM) or the Malay Documentation Centre.

Baba (2002) argues that information resource sharing in Malaysia's libraries was initially started in the 1960s under cooperation between the library associations of Malaysia and Singapore. Institutions participating in these sharing projects were the national and university libraries. Since then, the systems have been standardised together with the use of library automation systems. The resources shared include the online public access catalogues (OPAC); specialised local databases developed by S&T information centres or R&D institutions such as PORIM (the Palm Oil Institute of Malaysia), MASTIC, and SIRIM; library and information networks, interlibrary lending; and training and professional development. Yaacobb (1999) points out that the problems in resource sharing lie in lack of staff and lengthy turn-around times. According to Majid *et al*. (1999, pp.384-395), an investigation of resource sharing among agricultural libraries in Malaysia reveals that executives of participating libraries involved in resource sharing mention the absence of agreement among libraries as the most unsatisfactory condition. An investigation about the level of collaboration indicates that the majority of respondents prefer a loose relationship rather than having strong commitments. The sense of ownership is found to be strong. Therefore, the authors propose the best strategy for these libraries is to intensify their cooperation and strengthen resource sharing activities in order to improve their services and engender a healthy attitude towards resource sharing.

CHAPTER THREE

LITERATURE REVIEW

3.1 The roles of universities and R&D centres

The issue of how to strengthen R&D is the focus of worldwide attention in the key sectors concerned with conducting scientific and technological research such as governments, universities, and industry (National Academies, 2006).Consequently, there is a growing trend to examine the role and benefit of publicly funded research in academic institutions and government research centres. Empirical evidence shows that public investment in research can certainly complement private investment and lead to a strong national research base in an increasingly competitive global environment (National Academies, 2006; Salter *et al*. 2000). Development of research networks among the public and private sectors has been recognised as important for industrial activities (Beise and Stahl 1999; Manfield 1998). In the UK, the government has set a policy to promote scientific R&D, sustain science education and provide a training infrastructure to both the public and private sectors (HM Treasury 2002, pp.27-43). The British government has stated clearly the essential role of universities in contributing to the conduct of R&D. Funding and the research infrastructure is considered to be improved when the full economic costs of academic research are known and fully charged to anyone wanting to collaborate in research activities. This implies a sharper role for universities in the R&D community.

At the same time, the university system itself is in a state of transformation due to the more diverse characters of students who have diverse needs and goals. This change has generated new models of learning and teaching which combine

the traditional classroom with a range of learning experiences independent of time and location (Trustees of the California State University 2002; UNESCO Cairo Office 2002). Being knowledge-driven organisations, universities are also greatly affected by the rapid advances of knowledge media in an array of computer technologies and networks, which considerably facilitate teaching, learning, and research.

Duderstadt (1999) remarks that the primary missions of universities in the 21st century can be regarded simply as teaching, research, and service. However, in the twenty-first century, the role of universities should also be as a "*knowledge server*", or to deal more with creating, preserving, integrating, transmitting, and applying knowledge. The profound transition of society from being industrial to knowledge-based has driven universities to review their aim of educating citizens for prosperity, security, and social well-being. The activities of traditional academic institutions are now converging with other knowledge-intensive organisations, such as telecommunications, entertainment, and information service companies. For instance, the design and format of university curricula has been influenced by the need of these enterprises for a supply of skilled manpower

In their mission of national public service, universities also have to accomplish research and professional service goals associated with national priorities. These include aspects of health care, the environment, global change, and economic competitiveness, which attract funding from both government and the private sector. Hence, universities are being called on to adopt new priorities, collaborate across campus boundaries, and build on their diverse capabilities in order to reach the forefront of development and win long-term public support (Naval Postgraduate School 2000). The new trend for universities to get intensively involved in R&D is evident from a recent announcement at the SPRU 40th Anniversary Conference on "*Future of Science, Technology and Innovation Policy: Linking Research and Practice*." The conference, organised by the Science and Technology Policy Research (SPRU), University of Sussex, had themes focusing on, for example, patenting in universities, the shifting

boundary between public and private knowledge, and processes for allocating resources between disciplines. It was also stated that science, technology and innovation are key components that can have considerable impact on society.

There are three factors that have led to governments in some developed countries producing policies to encourage the exploitation of S&T knowledge through the strengthening of academic research. They are, firstly, the demand of the industrial sector to complete the research and innovation cycle; secondly, the extensive roles of universities in the new century; and thirdly, the vision of invigorating the research base for strong economic performance (Salter *et al.* 2000). New strategies have been initiated to promote research, such as periodic evaluation of academic progress in terms of the rate of return from investment, establishment of research funding mechanisms and schemes, and provision of quality information services to academic and research communities using more collaborative and effective practices, etc. (Manfield 1998; Beise and Stahl 1999, pp.398-399; Joint Information Systems Committee 2001; Rader 2002, pp.187-188). In developing countries such as Thailand, the links between universities and government research centres and industry have been boosted as a key strategy with the aim of overcoming the problems arising from the development of research systems (UNESCO Cairo Office 2002; National Science and Technology Development Agency, 2002). This can be seen from Thailand's S&T strategy to strengthen the R&D sector of the country by incorporating academic institutions into the public and private R&D sectors, as discussed in Chapter two in the section "*Future trends in the R&D community in Thailand*". In the UK, S&T policies also focus on giving support to the public and private R&D organisations which are conducting multidisciplinary research. For example, there is a policy to raise mid-sized firms' R&D intensity. More funding will be allocated to research laboratories in the public sector in order to develop knowledge transfer strategies, leading to the development of innovation and new services. Moreover, more emphasis is placed on the improvement of UK performance in knowledge transfer and commercialisation from universities and public labs to help them move towards the world forefront in R&D. In this regard, universities will be encouraged to conduct R&D with the aims of commercialising their research and working collaboratively with the business

sector in transferring knowledge and developing innovation (HM Treasury 2004).

According to the policies of many countries as discussed above, it is apparent that scientific R&D has been considered as an accelerating factor to the overall development of nations both in terms of providing a rich economy and social prosperity. In order to achieve national development goals, many governments see that it is important to strengthen the R&D sector, for example, by:

- Providing more funding for research and innovation;
- Enhancing the manpower in the R&D area by supporting the science education and providing a training infrastructure;
- Building research networks among the public and private sectors;
- Promoting collaboration between the academic, public, and private sectors;
- Formulating knowledge sharing strategies;
- Commercialising academic and public research.

This suggests that the future trend of global R&D will be directed towards the integration of the stakeholders concerned, namely, academia, government research institutions, and private R&D firms. These organisations will play an important role in developing the S&T base and boosting national economies simultaneously. In this regard, it is also interesting to investigate the status of libraries in the S&T information sector in order to discover their contributing roles to supporting the national R&D effort and to see how much the governments of different countries are aware of the S&T information sector.

3.2 The roles of libraries in the S&T information service sector

Given the importance of R&D as mentioned earlier, a developed country such as the UK has a clear policy for supporting the R&D sector in every aspect. Apart from an increase in the amount of funding to be given, information

infrastructure is another important feature. It is clearly stated in the *"Science & innovation investment framework 2004-2014"* of the HM Treasury that the government will provide efficient access to all kinds of information necessary for the research base, for example, experimental data sets, journals, theses, conference proceedings and patents, as it is considered *"the life blood of research and innovation"* (p.25). It is viewed that efficient access to information is important. In this regard, the UK government also places priority on the development of information infrastructure and strengthened cooperation with funding agencies and stakeholders, namely, JISC and the British Library.

Digitisation of information will be promoted in order to obtain rapid access. Meanwhile, archiving of this digitised information will also be focused on in order to prevent the risk of data or information loss. Other issues to be aware of include online data/information resources, quality of the information, and security and access. It is interesting that the policy is explicitly stated and the party that will be responsible for its implementation is identified, as can be seen from this following extract:

> The Government will therefore work with interested funders and stakeholders to consider the national e-infrastructure (hardware, networks, communications technology) necessary to deliver an effective system. These funders and stakeholders include the British Library, which plays an important role in supporting scientific research and potential, including providing benefits to smaller businesses in the UK through access to science, engineering and technology information sources.
>
> Due to the potential importance of a national e-infrastructure to the needs of the research base and its supporting infrastructure in meeting the Government's broader science and innovation goals, as a first step OST will take a lead in taking forward discussion and development of proposals for action and funding, drawing in other funders and stakeholders as necessary.
> (HM Treasury 2004, p.25)
>
> Note: OST stands for the Office of Science and Technology.

The above statements of an S&T policy indicate that national libraries and other information centres play an important role in supporting the R&D sector. Consequently, the role and development of libraries or the information sector with respect to the scientific R&D community is worthy of investigation. In this

research, the role of S&T information centres which embrace academic and special libraries was investigated as these libraries are the key institutions providing information to the research community. In addition, their objectives to support institutional research and characteristics in service provision are not much different as both of them are involved with researchers either inside or outside their parent institutions.

Traditionally, the library has played an essential role in selecting, accessing, and subsidizing information resources (Trustees of the California State University 2002). Traditional library services offered to the user were based on print collections. The materials in a library's collection supplied to users were selected   in advance to meet the needs of the users. However, the growth of information technology has influenced the information services provided by libraries. Electronic resources are widely found on the Internet and are accessible from almost anywhere. This has resulted in new patterns of information-seeking behaviour and changing user demands for searching and retrieving the required information (Chen 2000, p.190). Because of the tremendous social, economic, and institutional changes in all sectors of their parent institutions, libraries themselves have to review their roles and activities. While libraries still sustain traditional services, there are significant challenges in responding to change such as the increasingly complicated functionality of services models and sophisticated ICT. (Rader 2002, pp.187-188; Lougee 2002). In the S&T information service sector, S&T information centres including academic or research libraries are becoming more committed to the creation and dissemination of knowledge, and at the same time, must act as collaborators with other stakeholders in information service activities.

Defining information as a raw material that academics use in synthesising advanced knowledge, Prytherch (1998) argues that the processes of information management are an essential function of libraries. He observes that academic libraries should produce "*the output of various kinds of information management processes, which may be a library service, a knowledge management methodology, a learning resource base, a bureau offering*

database access, an Internet-based information resource." (p.3). It is a new role for academic or research libraries to play a part in this function of "*knowledge management*", defined by Rowley (2001) as "*the processes and structures that organisations use to create, store, share and disseminate knowledge*" and which concerns people, culture, organisational structure and IT (p.227). In addition, Murray remarks that:

> For research- and knowledge-driven organisations, bringing knowledge and information into the organisation from outside is as critical to their success as managing internal information.
>
> (Murray 2001, p. 57)

Lougee (2002) compares the shifting roles of academic libraries as follows:

Traditional roles	**Emerging roles**
• Emphasising the value of collections	• Emphasising the value of expertise
• Supporting information description and access	• Taking responsibility for greater information analysis
• Serving as a support agency	• Serving as a collaborator
• A facility-based enterprise	• A campus-wide enterprise

It is interesting to note that the advanced services of academic libraries tend to be provided via campus-wide networks rather than using a centralised or stand-alone system (provision of facilities for users to access information only in the libraries).

In this transitional period, academic libraries are seen as a respected partner in encouraging the necessary transformation of other on-campus organisations. In addition, they are viewed as an influential facilitator which provides direct assistance and instructions to users and introduces new ICT for learning, teaching and research in an age of great change in information formats. (Trustees of the California State University 2002).

The phenomenon of merging academic research and industrial-oriented research performed outside academia has greatly affected the roles of academic libraries. At the same time, multidisciplinary collaboration leads to new patterns of scientific communication. More sophisticated communication and information technologies have been developed with the aim of sharing data, information and knowledge among scientists and for scientific education and research. At the same time, the publishing costs and prices of scholarly publications such as monographs and journals are increasing. The enormous amounts of printed materials create a need for an organising, storing, and accessing mechanism, thus affecting both the S&T community and the libraries. For economic and technical reasons, the emergence of scholarly electronic journals and digital storage are the new options available to the research community (Tenopir and King 2000, p.61). As regards the provision of S&T information services, libraries are advised to develop new services to meet the needs of the growing technical community, which require a broad spectrum of information tools coupled with the librarian's understanding of the literature, the research process and specific user needs (Youngman 2002).

The impact of economic slowdown in the early 1990s put libraries under considerable pressure, for instance, through a shortfall in space and materials, and spiralling costs of information resources (Joint Funding Councils' Libraries Review Group 1993). This made many academic libraries seek new strategies, for instance, using advanced ICT and networks, restructuring the organisation, shifting the collection to be "*a hybrid library*", which is defined as "*a mixture of printed and electronic information, content and knowledge*" (Rusbridge 1998; Edwards and Walton 2002). The terms, electronic library, digital library or virtual library are used interchangeably. Blazej and Marzena (1999) observe that:

> …the key issues for academic libraries then, as now, included the need to reposition from custodian of locally held collections to the gateway to information beyond the library walls; accommodating the rapid growth of information resources in electronic form; the investment and increasing dependence on information technology as the enabler in the delivery of library and information services; the changing teaching and learning environment and the converging roles of libraries and information technology providers.

Bourke (2002) describes the new roles for libraries in scholarly communication as definitely different from traditional ones because they focus on building relationships between academic authors, publishers, libraries and readers. In order to meet these changing roles, strategic management is necessary, which should be integrated into the overall strategies of the organisation.

In the case of special libraries, they are classified as having specific characteristics when compared to other types of libraries. For instance, Ahrensfeld *et al.* (1986, pp.1-3) and Ashworth (1979, p.5) defined special libraries as being different from other libraries in their service and information functions. That is, special libraries possess special collections covering a single subject or subject area, usually established to manage information for the benefits of their parent organisations. Furthermore, special libraries tend to focus more on in-house clientele or a well-defined group of users within their parent organisations. The information services provided are more tailor-made in order to meet the needs of the organisation. Information resources or materials provided ranging from one subject discipline or diversified but related subject areas. Special libraries can be found in institutions such as industrial complexes, research centres, hospitals, banks, private companies, and industrial organisations or in government sector, museums, or trade and professional associations or societies.

It is also reported that special libraries cannot avoid the reality of a paradigm shift generated by the development of ICT for service provision and specific user needs. (Siripan 1999; Ghosh and Wesley 2002, pp.135-137). Therefore, there has been tremendous change in service provision from being conventional to ICT-oriented libraries. Siripan (1999) reported that special libraries in Thailand in the 21st century reengineered their structures and services and were transformed into "*information centres*". A wider range of services provided to users included the production of organisational publications, the development of databases of the organisation's information, the evaluation and purchasing of library software and systems, and the provision of staff training related to information literacy. This is similar to what Ghosh and Wesley (2002, p.137)

report. They state that, apart from having as its main task the definition of specific users' needs, special libraries in general provide the following services:

- an electronic catalogue of resources;

- a computerised circulation and loan system;

- periodicals indexing service;

- reference and information services such as information retrieval and dissemination, information packaging, etc.;

- access to online and CD-ROM databases, and audio-visual resources;

- documentation services - current awareness and specific dissemination of information (SDI) services;

- inter-library lending and information interchange;

- on-demand selective acquisition of new resources;

- newspaper clipping services; and

- photocopying and document delivery services.

However, the terms "*special library*" and "*information centre*" are often used interchangeably or linked to describe the type of library where special collections of a particular subject can be found (Ahrensfeld *et al.* 1986, p.2). According to a definition given by Ahrensfeld *et al.* (1986, p.2-3), an "*information centre*" is a type of library where:

- organisation information which might not be in a standard format is kept and provided, for example, sales and production figures, personnel records, and company profiles;

- there is a deep control and analysis of information. The information provided is usually processed into sophisticated review, synthesis and evaluation;

- librarians and staff have responsibilities to prepare reports, reviews, and other publications for their organisations;

- types of staff are varied, for example, librarians, subject or information specialists, programmers, and editors; and

- the organisation type is normally non-profit.

Ghosh and Wesley (2002, p.135) also point out that there has been a huge growth and development of special libraries and information-resource centres due to the growing numbers of inter-disciplinary and issue-based R&D projects within various organisations. Moreover, the authors state that the special library has changed its function from '*a storehouse of books*' to being '*an information centre*' (p.136). Librarians have changed their roles to become '*information specialists*' customising services to meet user needs in multi-disciplinary subjects via the use of advanced library technologies. Special libraries are also geared towards being a knowledge manager of their parent organisations. Other tasks undertaken are, for example, managing information resources effectively and establishing a learning environment. Special libraries, nowadays, extend their services to cover a greater variety of resources in a multiplicity of subjects; as demanded by the different academic or professional backgrounds of their users. The information management systems use both computerised and manual operations (a hybrid service). They still provide query services to users. Examples of the services provided are given as follows:

- Acquisition of new resources as recommended by internal users;
- Preparation of research reports or other organisational publications;
- Verification of statistical data of parent organisations;
- Identification of research needs and provision of information resources for those research projects; and
- Development of databases of organisational information and library resources.

Siripan (1999) interestingly notes that each special library, particularly in Thailand, has developed its organisation individually in terms of operations, standards of library resources and service areas. This indicates that there is a lack of collaboration among Thai special libraries, which provide S&T information services to the research community. This is also a reason why the service provision of libraries and S&T information centres in Thailand needs to be investigated in order to find out how effective they are at transforming themselves into becoming hybrid libraries.

The librarian's role is another issue that has been widely discussed in the community of both academic and special libraries. While Ghosh and Wesley (2002, p.136) states that librarians in special libraries are preparing themselves to take part in the domain of knowledge management in their parent organisations, there are many papers reporting the same situation for academic librarians (Koenig 2003, p.12; McManus and Loughridge 2002, pp.322-324; Todd and Southon 2001; Shen and Gresham 2000, pp.366-367; Loughridge 1999, p.8). Shen and Gresham (2000, p.360) note that ICT development has resulted in enormous change within the academic research community and the library community, particularly in terms of the production and dissemination of scholarly papers. Universities are viewed as a place for training new scholars. Therefore, it is necessary for academic librarians to take part in this training, providing student users with information seeking skills (Koenig 2003, pp.8-13). Academic librarians are encouraged to participate in teaching processes by retraining themselves to be '*information specialists*'. It is also suggested that academic librarians must be service-oriented, for example, in the areas of bibliographic development and the locating of resources for research projects, development of new databases and electronic reference tools in a particular subject, and provision of information related to research methods and processes. A more prominent role which librarians can take part is to promote the cost-effective use of electronic resources.

Gavin *et al.* (1993) suggest an interesting idea for libraries and librarians to act as a knowledge centre for entrepreneurs who want to acquire knowledge and information for their businesses. Using library properly and acquiring library skills are the basic steps that would help train these entrepreneurs in using information resources effectively. The authors believe that libraries, particularly public ones, can accelerate the self-improvement of people. For example, libraries can cooperate with universities to provide basic knowledge in business areas. Librarians can take part in activities such as organising conferences, or informing users in the business sector if there are relevant seminars and workshops to be organised.

In Rowley's study (1995, p.6) concerning the issue of professional development within the library service, the term '*management development*' is used and defined as an important skills for librarians to possess. Librarians need to be trained in management skills so that they can lead their organisations in a more effective way. Skills for managers include the management of operations, finance, people, and information.

The new role of librarians as an '*information architect*' is proposed by Rowbotham (1999, p.60). As quoted by Robowtham from the terminology defined by Richard Saul Wurman (1997), an information architect is an individual who '*organises the patterns inherent in data, making the complex clear*', and '*a person who creates the structure or map of information which allows others to find their personal paths to knowledge*'. Similarly, White (2004, p.219) considers the term '*information architecture*' as rather new and describes that some responsibilities of an information architect include:

> …the structural design of an information system to facilitate task
>   completion and intuitive access to content;
> ...the art and science of structuring and classifying Web sites and
>   intranets to help people find and manage information."
>
> Source: Rosenfeld and Morville

It is a challenging role for librarians to use their skills in classifying information and organising information from web sites so that users can benefit from the librarians' professional skills. This is not much different from Evans' (1999, pp.310-317) recommendation for librarians to be involved in creating Web pages for academic libraries.

Kester (1997, pp.5-9) suggests librarians should improve their professional communication through their writing skill. The author believes that librarians should be involved more in writing or editing professional publications such as journals and monographs. Another communication area to be developed is interviewing skills. These help librarians to develop visionary thinking, debating skills as well as organisational ability, and effective communication. To conduct and write up the research is also recommended. Gosine-Boodoo and

McNish (2005, pp.375-376) propose a librarian's role in information management, which involves using all skills in managing information including management skills, system skills, and multimedia knowledge.

Some studies stress that librarians have attained high professional status and there is a gradual growth in recognition of librarianship and information programmes in the academic community (Foster 2006, p. 488; Premsmit 2004; Ashcroft 2003, p.165; Sindusopon 1999; and Rehman *et al.* 1997, p.381). However, these authors also mention that the status of librarians would be improved further if they received comparable salaries to other professions and their professional skills were fully recognised. It is reported that professional organisations in the UK and the USA, such as the UK's Chartered Institute of Library and Information Professionals (CILIP) and the American Library Association (ALA), have given strong support to dealing with these issues. The reasons for higher librarians' recognition as mentioned by Ashcroft (2003) are:

> …Libraries are twenty-first century centres for information, education, literacy, and culture. And librarians are the ultimate search engines, the knowledge navigators. We save time and money (not to mention aggravation) by helping our users find the best, most accurate and complete information, whether it is in print, online, video or any other format. Our challenge now is to transform how we communicate about libraries and ourselves……the expertise of librarians is the library's unique selling point…Good libraries are essential in an information society. You cannot have good education without good libraries…And you cannot have good libraries without librarians who are fairly compensated!
> p. 167

To meet these demands, librarians need to constantly update their professional skills. In order to promote the roles of librarians to fulfil users' expectations, librarians need to have social, cultural, technological and intellectual development (Foster 2006, p.488), as it seems that there have been no studies, so far, reporting the success of librarians in fulfilling all the roles which have been expected by users and the research community. This has been justified by Foster (2006, pp. 488-501) that the course in librarianship and information studies (LIS), for example at University of Wales Aberystwyth, has been reviewed in order to create opportunities for "*future professionals*" (students)

and "*those undertaking professional development training*" (instructors) to be good practitioners who can fulfil vocational roles, are creative in finding solutions, understand the research process, and can apply theory in their practice. The issues of information literacy with respect to information behaviour and information skills are also stressed. The author says this will lead to the training of students in LIS to become "*proficient and professional information literacy trainers*" in the future (p.492). Another issue considered by the LIS community, as necessary for the future information professionals, is the development of their research skills. Ellis and Urquhart (2006) state that there is a change in roles and responsibilities of health librarians in Wales who have worked collaboratively with researchers in health and nursing, supporting those researchers in, for example, literature searching and organisation of the databases containing references. In this regard, research training is strongly required for librarians.

Engle *et al*. (2003, p.231) note that librarians are often frustrated in their plans to develop their professional skills by heavy workloads and additional responsibilities. However, the authors point out that the heavy workload and more diversified responsibilities that librarians have encountered can be solved by recruiting paraprofessionals to undertake routine work. It is suggested that the paraprofessionals need to be trained systematically in library techniques or need to undertake librarianship courses. This is similar to what Biddiscombe (2002, p.228) proposes. The author gives the view that some of the professional skills of librarians can be practised by paraprofessional staff. Hence, librarians have to play a new role in the '*post-modern society in which knowledge has become the principle commodity that separates the developed and developing economies*'. Considering the knowledge management context, there is a wide discussion that librarians can be a knowledge manager of the research community to open a gateway to information resources. However, the author argues that knowledge managers in today's world can come from various professions other than librarians. It is recommended that librarians in this situation need to enhance themselves with pedagogic skills, computing skills,

and understanding of e-learning environments (or so-called virtual learning environments (VLEs) and managed learning environments (MLEs) in the UK).

Morgan and Atkinson (2000, p.448) report the situation for academic librarians in the UK where there is a dramatic shift in service models influenced by the concept of lifelong learning, differentiated services to a variety of users, quality of services, and electronic library development. Hence, librarians need to become multi-skilled to '*support a wider range of subject backgrounds*'. Remote access to electronic resources is also necessary for off-campus users involved in the lifelong education. The diversified services to meet different user needs have required librarians to be more competent in information skills so that they can play a key role in user training, and in the provision of electronic current awareness as well as alerting services. In addition, librarians need more proactive skills in project management as they have to encounter a large numbers of projects in the context of information service development such as an electronic library programme.

It can be concluded that both academic and special libraries, which play a central role in supporting the research and academic communities, need to adapt to their organisations' long-term goals to ensure they have a role as information managers in a knowledge-based society. Meanwhile, librarians are facing critical change. Therefore, they need to acquire new skills in order to work in new ICT environments, whilst adapting to the changing characteristics of user needs under constrained budgets and the ever increasing cost of resources. In this respect, policy and strategic management are considered as crucial factors for libraries to survive in this challenging situation.

3.3 Global trends of information policies, and strategic management

Before discussing strategic management, it is important to examine the relevant issues related to this subject in the context of institutional and information policies.

3.3.1 Institutional information policy and national information policy

Institutional or organisational policies are generally viewed as important as they reflect the image, vision, and missions of an institution. Thompson and Martin (2005) give a clear picture how the term '*policy*' is perceived. They define this term as:

> guidelines relating to decisions and approaches which support organisational efforts to achieve stated (intended) objectives. Can be at any level in the organisation, and can range from mandatory regulations to recommended courses of action. They may or may not be written down formally.
> p.860

To make the definition more understandable, the authors state that policies are statements designed to guide managers in any business and will help them in the decision-making processes in order to achieve strategies and objectives more readily. Appropriate policies for an organisation are necessary since they can represent the planned tasks and activities that the organisation has to undertake. Moreover, they refer to the implementation of strategies formulated by organisation leaders, which give an overall picture of objectives. Interestingly, the authors argue that policies, in one way, can be broad statements or advice, thus giving more freedom and flexibility to staff who have to implement them. However, they can be mandatory as well. This reveals that organisational or institutional policies and strategies are essential factors

mutually supporting each other in the decision-making processes of an institution.

In the present situation where many institutions are playing a participative role in creating a knowledge society, it is generally viewed that, apart from an institutional policy, an information policy is a necessity as it helps institutions become successful. Smith (2002) discussed that an effective information policy has to begin at a national level. In order to achieve the goal of creating a knowledge-based society, governments must be aware of the importance of having a national information policy running in parallel with a national information strategy. Information policies can be described in different ways depending on the context. An information policy, as a general concept, can mean a policy of access to information (Nilsen 2001, p.31). According to Nilsen (2001), information policy covers a range of issues, for instance, "censorship, communications (including telecommunications, broadcasting, and the "information highway"), copyright, freedom of information and freedom of speech, government information, information industries, literacy, privacy, and scientific and technical information" (p.31). The definition given by McClure *et al*.(1989, p.77) shows that an information policy is "*a set of all public sector laws, regulations, and policies that encourage, discourage, or regulate the creation, use, storage, communication, and presentation of information.*" Prytherch (1998, pp.47-48) considers a national information policy as a channel to call for strong cooperation among the parties concerned in the development of library and information services. It is initiated in order to increase awareness of the challenging of ICT and identify where resources can be shared.

From this definition, Ayoo and Otike (2002, p.350) note that a national information policy reflects the government's decision making through laws and regulations in order to create a synchronised effort in the development of the information sector to meet the information needs of the country. This process, thus, needs great effort from the parties concerned. This supports Nilsen's view (2001, pp.31-32) who suggests that a national information policy should be formulated with a concerted effort from different parties concerned, not only by

academic, but also any stakeholders for whom an information policy issue is of interest, for instance, government, industry, community groups, and individual users of information. It is observed that the library sector including librarians, information science scholars and practitioners often plays an essential role in this process. This is articulated by Smith (2002) who views libraries as a main component of a national information policy and the knowledge society. The author gives the example of New Zealand where the library sector has helped develop the national information policy through the formal frameworks and through informal cooperation. Therefore, the country has a clear-cut information policy which includes investment for libraries and improvement of policies and systems in order to achieve the goals to create a knowledge society.

An information policy should not be focused on only censorship and laws or regulations which restrict the citizen from accessing information. On the contrary, it should rather concentrate on the frameworks which encourage the development, creation, and the use of information and knowledge (Smith 2002). Ayoo and Otike (2002, p.350) suggest that the formulation of a national information policy should aim to harmonise activities in gaining access to information, minimise duplication of information activities by promoting resource sharing, and make cost-effective use of resources. These activities have to be performed with ultimate goals to satisfy the users' needs nationwide. The authors mention the information and knowledge that users need to access, for instance, specialised and professional knowledge; scientific, technical, industrial, commercial, and economic information; expertise of the country; and information resources needed for the national development.

Smith (2002) observes that the term '*national information policy*' was introduced firstly in the 1980s; the terms '*national information strategy*' or '*knowledge economy*' are more recent alternatives. The formulation of a national information policy fits appropriately with the growth of ICT. The author holds the interesting view that libraries have a long history in keeping records of knowledge and creating value-added information, hence they are a good place for generating and sharing new knowledge. Librarians are also

excellent at adding value to knowledge content. Therefore, the development of a national information policy or strategy should not rely only on massive investment in ICT infrastructure but should also include the expertise of librarians in developing the content of information resources. However, participation of the library sector is reported as very low in developing countries, for example, Mexico; Cortes (2002) notes that not much participation is found in the process of national information policy formulation, even from the library sector where academic libraries play a dominant role in information provision in the country. Similarly, Smith (2002) comments that a national information policy has not yet become a public or key issue, but it is only sporadically found in some parts of a national development plan. Arnold (2004, pp.199-207) holds the same view. With respect to developing countries, even though many countries have developed socio-economic development plans, the role of information is not yet explicit or clearly understood. Most parties concerned have not yet recognised how important information is; thus their awareness of the development of the information sector is still not high, and last but not least, information is "*frequently undervalued by managers and seen as contributing to overhead costs in the economic sector*" (p.201). Liu (1996) notes that a problem with many national information policies is that they have only broad statements or are rather macroscopic, without "*forceful policies and measures to deal with concrete problems in practice*". Ayoo and Otike (2002, p.351) suggest that it is important for developing countries to have a precise national information policy which defines goals and allocates responsibilities to the parties concerned. Meanwhile, a national information policy should define clear objectives in using resources, and promote the institutionalisation and systematic flow of, and access to information resources.

However, Arnold (2004, pp.201-202) observes that the role of information is increasingly important in a global context as many countries see information as a national resource and is often valued as an economic product, and has an impact on a country's economic and social growth. For instance, industrial development needs access to scientific and technical information where it can be related and used in particular industries. Therefore, national information

policies have recently been formulated in many countries. In the process of developing a national information policy, Arnold (2004, pp. 203-205) views the national and global socio-economic conditions as important factors. Social factors include levels of education, literacy, information literacy, and the ability to access and use available information. Meanwhile, economic factors are, for example, commerce, agriculture, and manufacturing. Furthermore, there are other factors which should be taken into account such as ICT infrastructure - a means of accessing and distributing information, and the cost of information resources, which can give rise to an "*information divide*" by creating barriers against those who cannot afford to pay for access. In an era of electronic information provision, Arnold (2004, pp.203-205) suggests that there are many electronic resources which can potentially be accessed, for example, official information (such as patent law, data protection law, telecommunication regulations, libel and slander laws), and distance learning resources. The author also mentions issues related to access and to the availability of information which include:

- information technology;
- libraries, databases, and other information services;
- guidelines for the direct development of resource sharing networks;
- holding facilities and coordinating centres;
- radio frequency spectrum allocation;
- geostationary satellite orbit slots;
- direct broadcast satellites and signal spillover;
- remote satellite sensing;
- personal privacy;
- data protection;
- trans-border data flow;
- press and media censorship;
- copyright;
- standardisation;
- free dissemination in relation to the protection of cultural, political, and economic sovereignty; and

- restrictions on information and technology transfer.

- The author suggests that governments need to provide funding for R&D in those aforementioned issues before formulating a national information policy.

Nwokocha (1997, pp.346-347) adds that a national information policy for developing countries should focus more on information management particularly on acquisitions and resource sharing; packaging and repackaging of information; and the organisation of information. Clear policies on information sharing are suggested by Gilbert (2003) as important. The author implies that this could be a security issue and relates to rights of access and the right of privacy, especially at an institutional level.

Apart from a lack of recognition of the importance of information, Ayoo and Otike (2002, pp.351-357) mention the problems arising when formulating a national information policy in developing countries, which often comprise: shortage of funds; poor information infrastructure; lack of adequate qualified manpower; poor information literacy; lack of commitment by information professionals; lack of advanced ICT; poor understanding of user needs; and discontinuity.

In the UK, according to the Library and Information Commission or LIC (later replaced by the Museums, Libraries and Archives Council or MLA), the formulation of a national information policy is positively influenced by government policy and strategy. It is reported that the development of a national information policy needs cooperation among the parties concerned in order to avoid duplication of effort. The national information policy of the UK focuses on:

- industrial and commercial competitiveness;
- employment and the creation of high value-added job opportunities;
- lifelong learning and the effectiveness of the education and training system;

- social inclusion and access to services and opportunities;
- healthy living and the effectiveness of the National Health Service;
- the efficiency and effectiveness of the public services;
- participation in the democratic process;
- regional development;
- cultural identity and diversity; and
- intellectual rights.

The UK national information policy is divided into three issues: connectivity, content, and competencies (Library and Information Commission 2002). Connectivity involves developing the information networks, providing universal access, and ensuring interoperability. The issue of content concerns creating core content of good quality for the public, and ensuring its effective delivery, also legal and regulatory issues for protecting the citizen, and free access to this core information. Meanwhile, the competencies include developing universal information literacy, adequate supply of information specialists, and developing organisational information strategies and frameworks for government departments. It is interesting to note that professional groups in the UK, for example, the Policy Advisory Group (PAG) under the Library Association (LA) have ample opportunity to take part in the formulation of the national information policy. The PAG proposes three layers when considering developing a national information policy. They include, firstly, society issues which the policy will have an impact on in relation to people's rights to access information, such as the knowledge economy and learning society, globalisation and competitiveness, lifestyle changes and quality of life, and the Human Rights Act. Secondly, the role of libraries and information providers must be recognised in the formulation of a national information policy. This layer include issues such as freedom of information and copyright, metadata and interoperability, universal access, legal deposit, heritage and legacy, and e-government. Thirdly, the library profession needs to keep pace with, and contribute to other areas of information development such as issues of authentication, encryption and e-business.

It can be concluded that a national information policy is a key component for every country that views information as of high value and a powerful tool in

creating a knowledge-based society. Furthermore, libraries and the information community need to participate and have their voices echoing in the arena of policy formulation. Meanwhile, a national information policy must have strong influence on the formulation of information policies at an institutional level. An institutional information policy and strategies for implementation must be precisely identified, particularly by government departments and all parties concerned in the implementation of such policies.

3.3.2 Strategic management and global trends

Thomson and Martin (2005, p.3) consider strategies as a means to achieve goals. According to the authors, either profit or not-for-profit organisations need to set short or long term goals. Then strategies must be created to achieve these goals. Interestingly, the authors quote the speech of Peter Beck, the ex-chairman of the Strategic Planning Society, who said:

> Far too many companies either have no goals at all, other than cost reduction, or their boss hides them in his head. There's no hope for companies in Britain unless more top management accept the need for a widely communicated set of clear objectives.
> p. 7

This comment implies the importance of organisational objectives that should be clearly stated and clearly communicated. Thomson and Martin (2005, p.8-9) argue that strategies can be simply defined as activities that managers and organisations do, or might involve the areas or problems that organisations want to tackle. Regarding this, an organisation needs to have clear objectives and strategies to reach their desired goals. In developing strategies, Thomson and Martin (2005, p.16-17) propose some factors which should be taken into account, as shown in Figure 3.1.
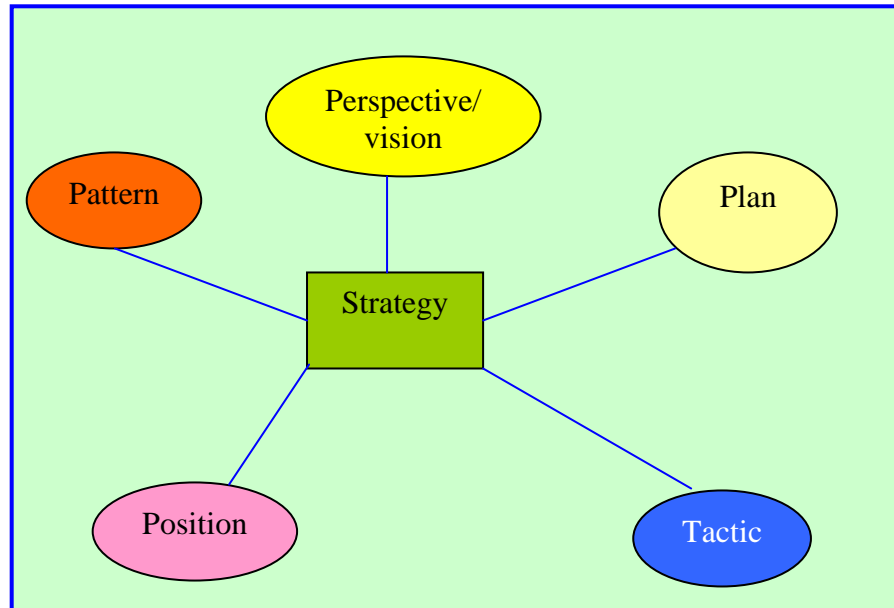
Source: Thomson and Martin (p.17)

Figure 3.1 Important factors in developing strategies

In Figure 3.1, the development of a strategy requires perspective or visionary thinking in order to locate the position where an organisation wants to be. A pattern of previous failure and success of the organisation might need to be reviewed and fine-tuned to enable future decisions, plans, and actions or tactics to be used or adopted effectively, as outlined in Figure 3.1. In developing strategies, creativity and innovation are also needed if the organisation is to respond to pressures arising from constant change. At this stage, strategies need to be improved and renewed. Bob Bauman, ex-chief executive of SmithKline Beecham proposes five key questions that managers have to ask in developing strategies (Thomson and Martin 2005, p.21) as follows:

- What are the basic goals of the organisation?
- What is the strategy for achieving these goals?
- What are the fundamental issues facing the organisation?
- What is the organisation's culture? and
- Is the organisation organised in a way to support the goals, issues and culture?

In some cases, strategy can be developed as a set of policies used for dealing with conflict and the securing of an advantage over the competition.

The purpose of strategic planning as stated by Johnson and Scholes (1999, p.4-5) is for an organisation to define the long term direction and scope of activities in order to create benefits to the organisation on a basis of configured resources subject to a changing environment, in order to meet the needs of markets and stakeholders' expectations. According to Corrall (2000, p.2), strategic planning and management is conducted for two kinds of purposes: general and specific (see Table 3.1).

Table 3.1 General and specific purposes of strategic planning and management

General purposes	Specific purposes
• To clarify purpose and objective	• To change the direction of an organisation
• To determine directions and priorities	• To shift resource to important areas
• To encourage a broader-based longer-term view	• To get better information for decisions
• To identify critical issues and constraints	• To develop better internal co-ordination of activities
• To provide a framework for policy and decisions	• To improve awareness of the changing environment
• To inform resource allocation and utilisation	• To set more realistic, attainable or demanding objectives
	• To pick up the pace of a "tired" organisation

(Corrall 2000, p.2)

As cited by Corrall (2000, p.4), the definition of the term "*strategy*" as defined by Johnson and Scholes (1999) relates to long-term direction "*which achieves advantage for the organisation through its configuration of resources within a changing environment, to meet the needs of markets and to fulfil stakeholder expectations*". In Pacios's study (2004, pp.259-269), the author tries to differentiate between '*a strategic plan*' and '*a long-range plan*'. The author points out that these two terms are slightly different in the context of business

management. From the author's review of previous literature, a strategic plan is described as more extended and focusing on anticipation of future trends without considering the past performance. On the other hand, a long-range plan sets future goals by extrapolating from past activities. Strategic planning rather deals with idea than procedures. A strategic plan normally presents an organisation's vision and new functions to be undertaken in the future, for example, service improvement of the library and priorities in allocating resources, SWOT analysis (analysis of strengths, weaknesses, opportunities, and threats), evaluation of the library itself and the patrons. The issues contained in a strategic plan include: the vision statement, the service responses, the mission statement, goals and objectives, resources, and activities. The strategy model proposed by Corrall (2000, pp.56-57) holds these following issues: fundamental analysis (environmental analysis, SWOT analysis, planning assumptions, and scenario development), mission, values, vision, priorities (critical success factors, key result areas, information services priorities), goals, strategies, and formal plans. In addition, strategic planning needs participation of all stakeholders in order to think creatively in the same direction and decide how to achieve it. Dougherty (2002) suggests that the first step of strategic planning is a situational and environmental analysis. These can be the issues of changes in political, economic, and social dimensions together with technological innovations and environmental impacts (Higher Education Funding Council for England 2000).

Strategic planning is the linking process between the management of an organisation's internal resources and external relationships with its environment. It needs solid support from management (Lynch 2000, pp.7-9; Isinak 2001). Isinak (2001) remarks that a good strategy should be formulated as an organisational plan and a guide, including factors and functionality which will lead the organisation to meet its overall strategic objectives. It is also mentioned that strategy in the digital world should place emphasis on the ability of an organisation to adopt new technologies and create/improve processes, methodologies, products, and services.

McNicol (2005) interestingly notes that there is a weak awareness of the parties concerned in getting involved with strategic planning. The author states, "*Library and information service involvement in institutional strategic planning is not a well-developed and embedded activity.*" (p.496). However, while feeling insecure by a state of flux from information technology development, librarians have to think about their roles and the future trends of services. They see benefits from strategic planning in having more opportunities to participate in, share ideas for the future activities, learn from each other, and improve organisational communication as well as develop the networking. Furthermore, it is evident that their management and services can be improved. Effectiveness is increased together with morale and motivation of staff. They can achieve better customer relations and more recognition. As cited by McNicol (2005, p.497), Jackson Feinman (1999) argues that the library plan must "*define the business of the organisation in which the library is situated*" while Birdsall (1997) considers organisational political factors as another important influence that library executives need to be aware of in planning. According to McNicol (2005, p.499), influential factors in strategic planning also include, for example, organisational culture and needs, government policy agendas, laws and regulations, best practice, and social changes.

Questions that library executives and managers should raise when planning are, for example:

- What part do libraries and their staff play in the institutional planning process?
- How closely do academic libraries align themselves with wider institutional goals and outcomes?
- How are library aims and outcomes communicated to other parts of the institution and how this might be improved?
- How can libraries align themselves more closely with institutional goals and outcomes?
  p.497

McNicol (2005) comments that there is a rare opportunity for libraries of HE institutions to have their own separate section in the institutional corporate plan.

Usually, the section concerning libraries and information services is mentioned just as "*subsidiary strategies, such as learning and teaching, widening access, flexible delivery, improving retention, and research*" (p.500). Thus, this has an impact on the chance of libraries to be involved in the institutional planning process. Some libraries have no chances while some play an active participatory role in planning. This mostly depends on the attitude and approach of executives of the parent institutions as well. The size of the institution is also a factor determining the participation in the planning process. Smaller institutions tend to offer more chance to participate in the strategic planning process than the larger ones.

Morgan (1998, pp.266-267) proposes that strategic planning of libraries needs to integrate both outward and inward environments. The '*outward integration*' refers to a policy or strategy of the parent organisation such as vision, mission, aims, and objectives that need to be integrated into strategic plans of the libraries in order to show uniformity of organisational development and to take part in corporate achievements. The '*inward integration*' means a process of policy formulation and planning which all stakeholders have chances to participate in or provide feedback. This integration can motivate staff to be aware of organisational strategies. Therefore, the management should motivate staff from time to time in order to keep them on track, and to be flexible to any modifications of a dynamic plan. Morgan (1998, p.267) adds that strategic planning also helps staff feel committed to their work and responsibilities. Having chances to participate in organisational management will encourage them to contribute more in implementation.

Barton (2004, pp.138-141) discusses one indispensable issue which is performance measurement of a strategic plan and its implementation. In order to manage the change, the author suggests the assessment be conducted from the top management to library staff at implementation level. User surveys are another useful approach because the results obtained can be used as strong supporting evidence and beneficial to policy review and service development. It is interesting to note that in many developed countries, there are specific

organisations which are responsible of measuring effectiveness of projects undertaken, namely electronic library projects. Examples of these organisations are the eVALUEd project in the UK which develops a model for the effective evaluation of electronic library services; the JUBILEE project which conducts assessment of user behaviour in the electronic environment, and LISU which organises seminar series and training for practitioners involved with evaluation. Bawden *et al*. (2005, p.457-458) view library statistics (the state of collections, acquisition, budgets, number of users) as useful in evaluating library performance. They also hold similar view of user studies. Other evaluation criteria are a wide range of information sources (for instance, books, periodicals, library collections, and bibliographic databases). Moreover, Morgan (1998, pp.269-270) suggests an evaluation method by using both internal and external review with respect to measuring service performance. In some public and special libraries external consultants are used to review library and information services. The concept of performance measurement also leads to quality control. As reported by Morgan (1998, p.270), quality management systems used by some libraries are, for example, BS 5750/IS09000, '*a Charter Mark*', and the use of benchmarking or impact studies.

Strategic planning and management has positive outcomes in generating more relevant and effective services, improving stakeholder satisfaction, and encouraging participation and team spirit (Corrall 2000, p.3). It provides models for supporting management and decision-making (Hayes 2001). In Dougherty's view (2002), strategic planning techniques deal with the relationship between an organisation and its environment and stakeholders, for instance, an academic library and its campus. Environmental scans are also suggested as an approach which could be used to investigate the context within an organisation. Advantages of strategic planning are that it "*enables an organisation to assess its internal Strengths and Weaknesses in relation to the external Opportunities and the Threats it faces*", or a so-called SWOT analysis. Edwards and Walton (2002) also indicate other techniques for strategic planning and management which focus more on team working and collaboration with a range of different groups and individuals. These are TQM (Total Quality Management) exercises,

group planning exercises, programmes of visiting speakers, training needs analysis, environmental scanning, electronic discussion lists, user surveys, internal staff surveys, away days, external seminars, conferences and workshops, and shared experience sessions on the issues of understanding and managing of change.

These strategic activities are a foundation for a new paradigm in the concept of "*library consortia*". This refers to a collaborative model of information resource sharing, or a network of interconnected libraries and related organisations (Electronic Library Image Service for Europe 2002; Nfila and Darko-Ampem 2002, pp.204-205). For this to be effective, library professionals and staff need to be fully involved in all decision making which affects the management of information (Houseton 1999). Meanwhile, library staff must adapt and retrain to cope with changing job demands in the information, computing, and telecommunications arena.

3.3.3 Strategies of Joint Information Systems Committee (JISC) in supporting the research community

JISC describes itself as a national body on developing environments for lifelong learning in UK further and higher education (FE and HE). Its responsibility is to provide strategic guidance, advice and opportunities to use ICT to support teaching, learning, research and administration. As stated on the JISC website http://www.jisc.ac.uk/, activities related to the development of the infrastructure in the five-year strategy include:

- new environments for learning, teaching and research;
- access to electronic resources;
- a world-class network – JANET;
- guidance on institutional change;
- advisory and consultancy services;
- regional support for FE colleges (RSCs)

In enhancing the innovative use of ICT for educational and research purposes, JISC's working scope includes:

- developing digital content;
- supporting sharing of digitised learning and research resources;
- promoting innovative methods for accessing electronic materials;
- enriching learning and research processes;
- developing collaborative national networked service providers;
- providing interoperability based on common standards.

According to the mission, JISC plays different roles in steering towards an environment of electronic information service provision, such as being a funding agency for research and innovation, an adviser to other funding bodies, a provider of networks, a coordinator in content development and electronic resource sharing, a license negotiator, a consultant in ICT, interoperability system, and institutional training, a facilitator to resource accessibility and national and international networked services, and a promoter of learning, teaching and research.

JISC is funded by the UK FE and HE funding councils. Organisational operation is run through a committee system, with a governing JISC committee and six JISC subcommittees to administer different aspects of work. These work under the support of the steering committee and three advisory committees. (See Figure 3.2)
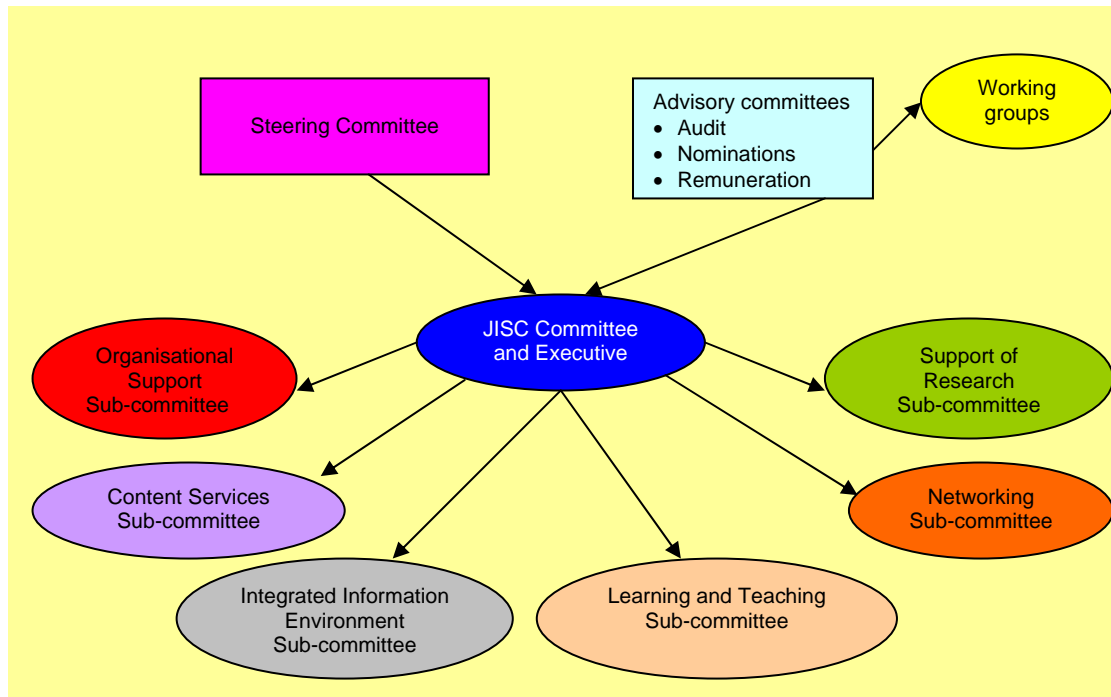
Figure 3.2 JISC's committee system

Members of the JISC committee are comprised of senior managers, academics and technology experts in UK FE and HE. Brophy (2004) states that JISC also acts as a strategic advisory committee for higher and further education in England, Scotland, Wales, and Northern Ireland. According to Brindley (1998, pp.271-275), the period of JISC's development can be divided into four phases: experimentation, consolidation, innovation, and maturity. Acting as a national body on developing the national information systems to support the education and research sectors, JISC has undertaken a large number of projects and activities during each phase (Pinfield 2004, pp.19-34). One of those outstanding projects is, for example, the eLib Programme (see the development of JISC, including key projects and activities in Appendix I.). Many documents have also been produced such as Guidelines for developing an information strategy and the Follett Report (also shown in Appendix I).

This following section will give an overview of the Guidelines for developing an information strategy as recommended by JISC in order to investigate the issues which should be included in an institutional information strategy, and

also the factors which should be considered when developing an information strategy.

Guidelines for Developing an Information strategy

This is a report written by Coopers & Lybrand and the JISC's Information Strategies Steering Group, and can be viewed from http://www.jisc.ac.uk/index.cfm?name=infostrategies_guidelines .

This paper offer guidelines for developing an information strategy at FE and HE institutions. It outlines the key steps in writing a strategy along with factors such as, the setting up of an information strategy, the context and definition of information needs, the definition of roles and responsibilities, implementation, and monitoring and review. Even though the paper is more concerned with the future of teaching and research of educational institutions rather than with computing or libraries, it is interesting to learn about the process of how an information strategy is developed and what factors needed to be considered.

An information strategy, as defined in the paper, implies a set of attitudes and values which is clearly specified by having:

> a clear, accepted and efficient means by which information of all kinds
> is created, handled and used to support and deliver the aims of the
> institution. (p.7)

In other words, the strategy should include policies on information, decision making mechanisms, individual and organisational responsibilities and an information system.

When developing a strategy, it is recommended that emphasis should be on the process rather than output. An information strategy can be described as a vision for the future of the institution which embraces the whole community. This shared vision must be shared, understood and implemented by the parties concerned and it should be renewed to keep the strategy up-to-date. Any

changes that happen should derive from a fundamental reassessment of teaching and research activities until it becomes a set of integral strategies which can guarantee the quality education for students and secure the best research and teaching environment for staff.

In developing an information strategy for education institutions, an interesting point of view is given:

> the production of an Information Strategy in a higher education institution is more complex than in almost all other organisations; this is because while, in one sense, a higher education institution needs to act in a 'business-like' manner, in fact most also behave like loosely connected, anarchic groups of dedicated individuals. Thus any attempt to develop a set of attitudes simply by a top-down, hierarchically driven process is doomed to failure. The process must also have a bottom-up analysis.
> (p.8)

Three important aspects are suggested:

• Teaching

This involves a shift to self-paced student learning, the balance of the use of materials in providing knowledge to students, the future development of the education process, for example, in the arena of course design, networked support, the use of virtual laboratories and libraries, and the balance between local and remote access.

• Research

The balance of investment between local, regional and national facilities including the uses of databases, processing capacity, and research material is considered important for research purposes. Moreover, the concept of working across disciplinary boundaries should be encouraged as well as the networking environment either within the institution, with other institutions, or with the national facilities.

• Management

The management concept deals more with staff training and development. It is critical to raise staff awareness by providing them with information for decision making. Meanwhile, information needs must be investigated with a consistent basis of monitoring and evaluating.

In developing an information strategy, a concern lies in the environment where staff and the community need to be prepared to understand and accept those changes, for example:

- A paradigm shift of learning, teaching (for FE and HE), for example, different approaches of teaching, long distant learning, etc., and research activities (specialisation, multi-disciplinary of research, research income;

- Constraint funding (cost-effective use of staff, facilities and space);

- Increasing emphasis on accountability and the use of delegated budgets.

Another issue is the use of technology. Because new technology is expensive, any investment needs to be carefully planned. It is also important to make known to the community that the budget is reasonable for achieving the intended plan. Moreover, a situation of '*technology fashion*' should be avoided. Most institutions failed in implementation as their strategies were too obsessed with state-of-the-art information technology. Meanwhile, an inappropriate balance of investment awareness at local, regional and national levels should be raised, coupled with inflexibilities, incompatibilities and duplications of systems, which can cause a waste of funds.

Development of an information strategy covers these following processes:

1. Set up;
2. Setting the context;
3. Defining information needs;
4. Defining roles and responsibilities;
5. Implementation;
6. Monitoring and review.

Relations of the processes are as shown in Figure 3.3.
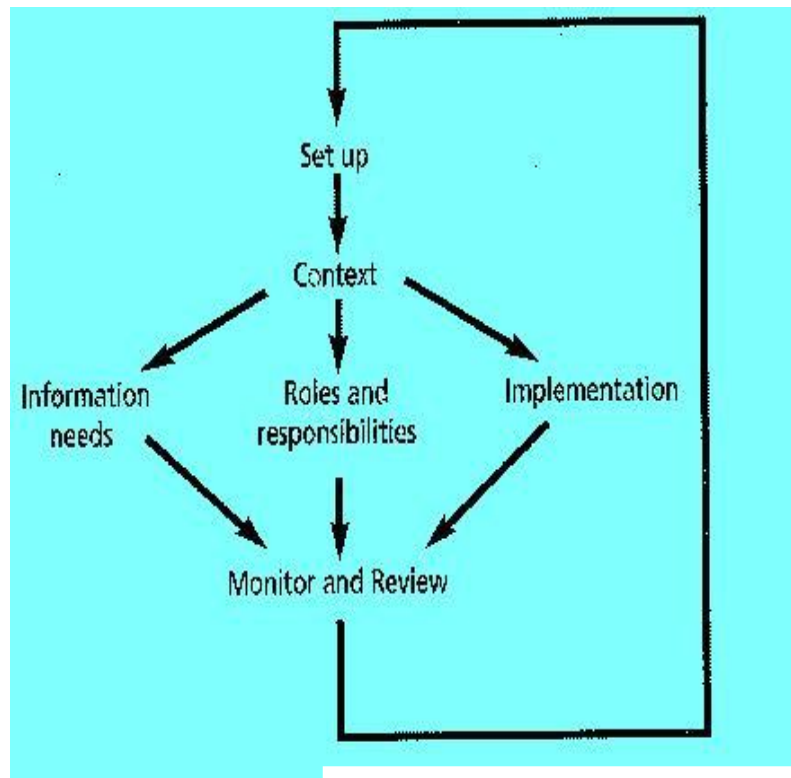
Source: JISC's Information Strategy

Figure 3.3 An Information Strategy framework set up

1. Set up

One recommendation is that an Information Strategy Committee along with working groups be established. It is important for the top level to commit to the concept of an information strategy as this will ensure financial support throughout the implementation. In setting up the committee and the team, all members of the community must be encouraged to share in the process. The scope, process and clear responsibilities in strategy development need to be identified. As an information strategy is a set of institutional attitudes which is obtained through sharing, it is also remarked that at the end of strategy production, the people involved must understand the need and content, and be prepared to accept and follow the strategy.

2. Setting the context

The context of an information strategy should include a series of institutional policies concerned with the future. This should be based on the overall vision for the future direction of the institution. It is recommended that the production of an information strategy needs to run in parallel and interactively with the production of the overall strategy. Each will depend on the other. Eventually, the main output is a series of policy statements which reflects the institution's future, for example, in teaching and learning, together with statements about future research. An information strategy should specify future infrastructure, for example, on physical, networking and access issues). Moreover, future organisational and management arrangements of the institution are also considered important.

3. Defining information needs

Information needs concern the information content of an information strategy, both in terms of its coverage and the standards to be applied. The information needs can be defined as different attributes based on the contextual analysis, for example, the needs of students, staff, a course module, research projects, etc. However, these different groups need to set their own standards and the area where they will share information. Standards and infrastructure for sharing overall information are needed, which should be appropriate to the context of sharing. Possible projects are recommended in order to solve the problems which might occur from any gaps or inconsistencies, incompatibilities, duplications and overlaps in standards.

4. Defining roles and responsibilities

It is suggested that the strategy should be mingled with the normal operations of the institutions or represent "a living concept (p.26)." There are five roles which are considered important in steering the production of an information strategy. These include:

- Information Strategy Committee;
- Information Strategy Manager;
- Information Strategy Custodians;

- Information users; and
- Information service(s).

● **Information Strategy Committee**

The role of the Information Strategy Committee is to oversee the operation of the strategy and the monitoring of any changes that will occur. Even when the initial development of an information strategy is completed, the Information Strategy Committee is required to take part in further implementation. One important responsibility of the Committee is to deal with resource allocation.

● **Information Strategy Manager**

The main tasks of the Information Manager involve:

- management of the implementation of the strategy;

- maintenance and monitoring of effectiveness of the information strategy;

- initiation of changes.

It is suggested that the Manager should possess experience both in project management and change management. Moreover, in order to help the Manager work effectively, it is better to have an individual to deal with information registry (setting and maintaining records).

● **Information custodians**

Information custodians work with the Information Strategy Manager in maintaining standards for information items (for instance, teaching material for a course module, information on lecturers) and to ensure that those standards are practised as defined. For instance, Information custodians will audit the use of the specified information to ensure that it complies with information standards.

● **Information users**

As defined in the paper, information users can be categorised into two groups: Internal and external users. Internal users include students, academics and administrative staff, while external users include prospective students, alumni,

industry, the funding councils, research councils and others. Users within the institution must be aware of the information strategy and recognise the benefits of compliance with the standards.

• **Information service(s)**

This involves the provision of advice about the operation of the information strategy. The advice will cover two areas: the definition of information which embraces:

- accessibility of sources of information;
- the operation of the network (s);
- the process of changing, definitions of terms used or standards;
- issues of security, copyright, data protection;
- creation of a new set of information;
- purchasing issues;

and the information content (for instance, books, journals, grey literature, and datasets).

5. Implementation

It is suggested that the strategy development process should be developed through a process of consultation (interviews, discussions and workshops) with academic and non-academic staff. The paper states:

> An important part of that process is to develop an understanding of the need for, and the essence of, an information strategy (p.29).

Implementation is a two-way process between the strategy development team and staff. Topics for communication between the team and the staff are, for example, updating of changes, asking for more participation to minimise resistance to changes, to carry on further work or new work which requires planning and time. Implementation of an information strategy, therefore, requires continuous updating.

Even though the development of an information strategy is focused on a process rather than a product, it is suggested that a tangible output of the whole process

should be "*a written statement which provides a high level overview of the information strategy, which explains how it fits the institution's strategic plan and which sets out its main implications*" (p.30).

Factors to achieve the purposes of a strategic plan vary from institution to institution. However, there are three key tasks leading to the success including:

- Project assessment;
- Project management
- The development and delivery of awareness raising, staff development and change management

6. Monitoring and Review

Monitoring and review of an information strategy is beneficial to ensure the effectiveness of the strategy. The tasks also focus on monitoring either external or internal changes. The monitoring process is advised to be built in as part of the strategy. Strategy implementation processes involve two types of monitoring:

- Monitoring by the users of the strategies;
- Monitoring the behaviour of users in relation to adoption of the attitudes and requirement of the strategy.

The context of the strategy also needs to be monitored and reviewed because technology and opportunities change rapidly. Identification of changes, therefore, is necessary. In this regard, an understanding of future changes and expectations is recommended. A review process is suggested in order to support the updating of the strategy. Failures also need to be reviewed in order to ensure that the parties concerned in the information strategy will take action.

Hughes (1997) reports that six HE institutions volunteered for the JISC pilot project on developing an information strategy. This initiative was developed to help tackle the universal problems encountered by most HE institutions at that time: reduced funding but increased numbers of students. HE institutions found that there was a need to share and allocate limited resources and set their

priorities to fit learning, teaching and research purposes. The sharing of information via new and effective technologies was seen as the first priority in supporting these purposes. In doing this, an information strategy for each institution was needed together with a wide range of activities to achieve the aims and objectives of these information strategies.

Feedback from the six pilot sites and those staff involved reflected both positive and negative aspects. For example, comments about the guidelines laid to them being rewritten, as the following statement on the JISC website shows:

> "The findings were that the guidelines in essence worked, and were a
> valuable approach to strategy development. However, the presentation of
> the guidelines was found not to be helpful and the co-ordinator re-wrote
> them in a more practical style."
> (Joint Information Systems Committee 2003)

Hughes (1998) mentions the six pilot sites viewed the development of an information strategy as a demanding and time consuming process, but it was valuable for members as they obtained better understanding of each others' problems and concerns. Further, it was observed that problems can be solved by learning from each other and a solution can be found by collaboration.

The development of the JISC information strategy took two years (1996-1998). Later, nine more institutions were chosen as exemplar sites to explore the development and implement of information strategies. There was also a revision of JISC information Strategy Guidelines. The JISC's Communication and Information Strategy Steering Group (CISSG) remarked that the 1995 guidelines needed to be improved to be more flexible and appropriate given to the diverse nature of higher education community. According to Arbuthnott (1998):

> "the diverse nature of the higher education community has meant that
> the Guidelines have not proved to be of equal value to all institutions.
> The experiences of the six pilot sites have provided us with invaluable
> feedback. It is clear that most institutions wish for a more pragmatic

document offering a clearer "how to" approach to the task."

(p.1)

The University of Glamorgan, one of the six pilot sites, commenced work on the development of a JISC pilot on Information Strategy in 1996. In 1998, the University finished the production of comprehensive draft Information Strategy by using the JISC Guidelines. However, it was not announced or implemented officially as the team leader saw that the draft Information Strategy document had too many diverse information objectives to make it usable. The University needed to find a more effective approach for the development of its Information Strategy. Therefore, the draft Information Strategy document was further developed to suit the University's objectives and activities.

It is also stated in the case study report of Staffordshire University (2001), one of the nine exemplar sites, that the development of an information strategy according to the JISC guidelines consumed too much time and produced vast quantities of paperwork. These two problems were caused by the different types of information needed for students and staff. The student information problem was perennial, while the information provided to staff had a longer life cycle. Printing vast quantities of paper also caused an environmental problem. The problem of a lot paperwork seemed to be contrary to what had stated by JISC that an information strategy focused on "*a set of attitudes*" rather than a report. Finally, the University agreed to provide information to staff and students via the Intranet, which was single sources of accurate information, linked electronically, rather than paper based handbooks. However, according to Rothery and Hughes (1997), it was useful for the pilot sites to produce written draft information strategies, which later could be revised and become more succinct. As stated by the authors, an information strategy should not be "*technology–led but led by information users' needs. An Information strategy will dictate the IT strategy, not the other way round*". The authors also believed that, the introduction of the JISC's Guidelines for Developing an Information Strategy was, more or less, useful to the HE community as it could induce an interest in the use of information strategies to tackle the shortage of resources

and to ensure that the money invested in technology was well used. Last but not least, the processes proposed by JISC were attempting to bring about a change in attitudes, especially towards the ownership and accessibility of information within the institution. Hughes (1997) states that other institutions could obtain benefits in learning from the experiences of the pilot sites while they have freedom to develop their own strategies which suit their needs later on.

3.4 Theoretical framework

The theoretical framework used in this research is derived from how the S&T information sector can support the research community. An examination of the literature on strategic management of information services indicates that the three issues concerned with this are scientific communication and science information systems, information-seeking behaviour and information needs of scientific researchers, and information network models for the research community.

3.4.1 Scientific communication and science information systems

A communication model in this context refers to "*the formal and informal processes by which the research and scholarship of faculty, researchers, and independent scholars are created, evaluated, edited, formatted, distributed, organised, made accessible, archived, used, and transformed*" (Iowa State University 2003). As the processes of communication have evolved, Buckland (1999, pp.3-7) considers that there are three points to focus on. He states that "*science information systems overlap the history of science, the history of information systems (previously documentation) and the history of technology*", p.3.

Scientific or scholarly communication is distinguished by a stress on the freedom to communicate. The National Academy of Science (1982) states that

free communication among scientific researchers is an essential factor in scientific advance as it promotes systematic scrutiny, verification and criticism. Each researcher conducts the research based on previous studies by others. This process of accumulation requires the free availability of information so it can be the foundation for further studies and prevent redundant work. The authors state that the most formal medium of communication is publication in the form of a journal. Other means of scientific communication include meetings and symposia, informal discussions among colleagues, preprints of research papers and international exchange programmes among scholars and experts. However, journals are viewed as the core medium because of their universal distribution and their increasing numbers (Odlyzko 2003; Iowa State University 2003). This view is also supported by Schofield (1999) who says that in the 17th and 18th centuries the formats of scientific knowledge were journal articles and journal abstracts. In the 20th century, the scientific literature became huge, resulting in a shift to abstracting journals and secondary publications.

Lewenstein (1999, pp.15-16) compares the patterns of scientific communication systems in different periods as shown in Figures 3.4 and 3.5:
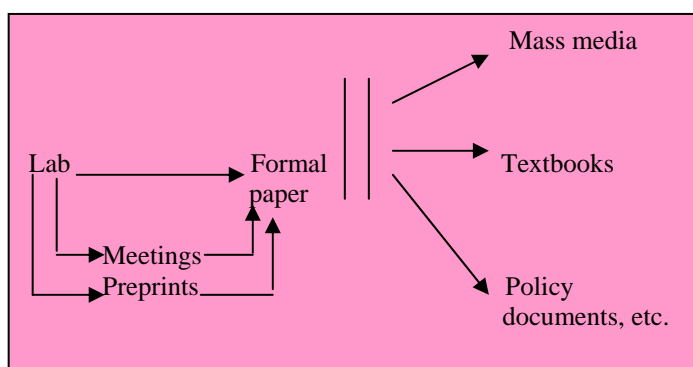
Figure 3.4 The formal communication system   in the 1970s

Based on a diagram in William D. Garvey, Communication :
The Essence of Science - Facilitating Information Exchange
among Librarians, Scientists, Engineers and Students
(Oxford/New York : Pergamon Press,1979, p.169)

(Lewenstein 1999, p. 16)

Figure 3.4 shows that the communication system of the science community in the 1970s primarily featured a linear interaction and a lack of feedback in the model of scientific information. The information obtained from laboratory research in a fixed form was communicated only to a narrow group of fellow researchers through the formal publication processes. However, after the mid-1970s, dissemination of scientific knowledge was discussed with wider audiences, especially via the mass media, which came to have a central place as shown in Figure 3.5. This resulted in more complex exchanges of information aided by modern use of ICT.
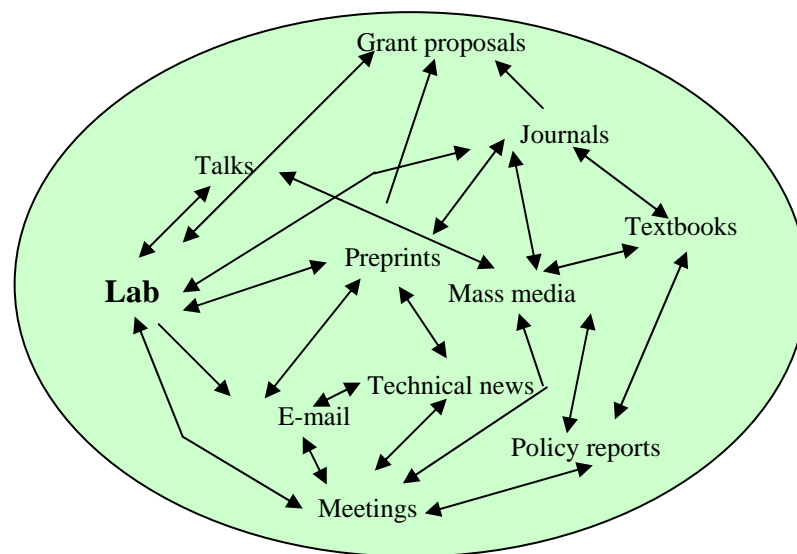
Figure 3.5 The present-day non-linear   interaction of
science communication model: **the web of**
science communication contexts

(Lewenstein 1999, p.23)

Further, the popularisation of scientific knowledge has been encouraged, for instance, by the Royal Society, the UK's national academy of science (The Royal Society 2006, p.16). Three groups of audience are targeted including policy makers, young people, and industrialists. Apart from an annual series of regional workshops and a national forum, the use of web-based discussion forums is also promoted.

As a result of these changes, Ash and Bavins (2000, pp.165-168) suggest that an identifiable trend in scientific communication for the 21st century could be characterised as networked organisations exploiting innovative ICT to build up knowledge capital. This phenomenon reveals a situation where electronic media has been widely developed and used to support scientific communication (Kling *et al*. 2003). Various studies have showed that the Internet is the primary electronic communication medium (Topping 2004; Kling *et al*. 2000; Searing 2001, pp. 77-96; Hurd 2000, pp 1279-1281). The Internet has been used in many ways, such as the communication of conference programme, the provision of preprints, the access to electronic versions of journal articles, and the provision of electronic forums for discussing and sharing information and knowledge. Kling *et al*. (2000) state that a new model of scientific communication has been developed as "*socio-technical interactive networks*" using online technology to create an "*online scholarly communicative forums*" as an alternative to the traditional standard model, such as face-to-face meetings, conferences, and paper journals. Further, the term "*collaboratories*" was coined by Wulf (1999), as quoted in Kling *et al*. (2000) as "*a centre without walls, in which users can perform their research without regard to geographical location – interacting with colleagues, accessing instrumentation, sharing data and computational resources, and accessing information in digital libraries*". The term stems from a combination of the words "*collaboration*" and "*laboratories*". Networked computers are used to connect with the instruments to facilitate laboratory work. Scientists are also linked together via a use of electronic mail without face-to-face meetings. The networked technologies also allow for the provision of digital libraries; therefore, digitised publications become more popular. The latest scientific communication model can be drawn as described by Hurd (2000) in Figure 3.6:
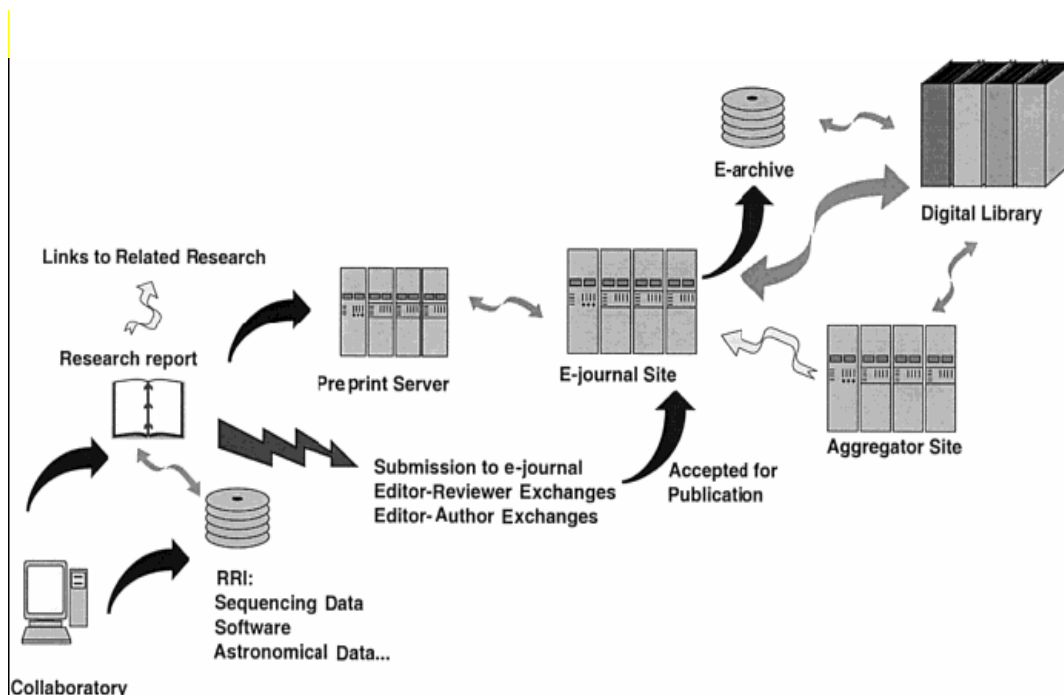
Figure 3.6: A new model of scientific communication

(Hurd 2000, p.1281)

The model proposed by Hurd (2000, pp.1281-1283) identifies both modernised and transformed features. The modernised features refer to the use of technology to support and update traditional functions while the transformed features can be described as the change of fundamental processes in the print-based system into new functionalities in the electronic environment. The term RRI can be defined as research-related information such as raw data which are stored on servers as depositories for other scientists to access. Membership of the science community will include both visible (face-to-face communication) and invisible (virtual communication) members. Hurd (2000, pp.1282-1283) concludes that the transformation of scientific communication is variedly accelerated depending on different norms and cultures of different disciplines. This indicates that the changing patterns of information flow are a direct result of the types of information required by scientific researchers.

It is apparent that traditional scientific communication has been affected by the growth in the volume of scientific literature, the increased costs of archiving paper publications, and the rapidly increasing use of electronic technology

(Topping 2004). However, communicating through journal articles is still the essential means used by scientists (Lock 2004, p.123) as they consider that having papers published in prestigious journals implies a successful career for them, for instance, in gaining funding or the respect of their peers. Lock (2004, p.122) also reports that there is a trend of scientific communication, which, in the near future, will make research papers freely available online. The term "*open access*" is defined and widely discussed among librarians and the relevant parties in scholarly publications. In this context, it refers to the situation when research papers are electronically published and freely accessible online via digital library services of non-profit and academic organisations, such as universities, research institutions, and scholarly societies (Lock 2004, p.122; Van de Sompel *et al.* 2004). Kwasik and Fulda (2005) define the term "*open access*" as the conditions where:

1. The right of access to the research articles electronically published is given free to users by author(s) and copyright holder(s). This right also include a licence to copy, use, distribute, perform, and display the research work publicly, and "*to make and distribute derivative works in any digital medium for any reasonable purposes, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use*".

2. A complete version of the research work and all supplemental materials is deposited in a standardised electronic format in at least one online repository managed by an academic institution, scholarly society, government agency, or other professional organisation that agrees to enable open access under conditions of unrestricted distribution, interoperability, and long-term archiving.

Lock (2004, pp.122-123) explains that the publishing industry and technologies have put some pressure on scientific communication. The price of scientific journals continues to spiral, resulting in a lower number of subscribers each year. Access to electronic articles in some cases does not help much as most for-profit publishers usually sell print journals altogether with electronic

versions. Therefore, scientists try to find an alternative to promote accessibility to their papers as they realise that their research findings cannot be widely distributed due to the sky-high prices of subscription charges and restricted access to scientific journals. Most scientists and academic researchers find electronic versions of articles becoming indispensable as the technologies linking large databases together can facilitate quick searches. However, they believe that their research work can be of ultimate benefit when those research results can be easily accessed without financial constraints.

3.4.2 Information-seeking behaviour and information needs of scientific researchers

Vickery and Vickery (1994, p.44) explain that communication activity is determined by a complex interaction of factors. There are two types of factors: external and internal, which influence behaviour through psychological processes. The external factors comprise people and cultural products (documents, channels, the environment), while the internal factors include states of knowledge, attitudes and opinions, motives and moods. The interaction of these factors can be represented in a diagram as shown in Figure 3.7.

(Vickery and Vickery 1987, p. 45)

Figure 3.7   A model of information behaviour

Figure 3.7 shows that an individual's information-seeking behaviour is a mixture of both external and internal factors.

Vickery and Vickery (1994, pp.94-95) describe that the needs for information of scientific researchers are connected to the solution of intellectual problems.

In the process, apart from observation and experience, they also collect facts and explanations in order to solve problems. Their work is concerned with data collection and analysis. This yields information which can be further used as facts and explanations for a solution to another problem. The authors hold the view that the successful researcher "*needs a regular or intermittent supply of new information so that his practice may develop*" (p.95).

In Shoham's study (1998, p.115), the traditional information-seeking behaviour of scientific researchers or scholars had two patterns: searching through professional periodicals and searching through monographs. This is confirmed by Brown's study (1999) which reports that scientists rely greatly on the journal literature, followed by monographs and preprints. Further, they seek information by attending conferences and using current awareness services to keep abreast of current scientific research in their fields. Ucak and Kurbanoglu (1998) state that scientists and engineers have an interesting strategy in seeking information by following the references given in the bibliography of journal articles. Murphy (2003) argues that scientists in general tend to rely on personal networks for information while engineers rely on materials such as handbooks, standards, specifications and technical reports.

It is believed that journal articles in periodicals are the main sources used in science information systems (Callery 1999). Scientists in different fields have diverse information needs and information-seeking behaviours. These diverse information needs give rise to complex collections of documents (McCure and Bernward 2000, pp.1-4). It also results in the growing size of scientific document collections which gradually generate a time-consuming process in retrieval. This user group has a demand for new automated systems for information retrieval (Bowles 1999, p.156). The S&T information system, therefore, has been evolved in order to meet the scholarly needs of scientific researchers. Information needs and seeking behaviour have shifted from paper-based resources to electronic forms via computer systems and networks. Schofield (1999, pp.94-95) explains that, during the twentieth century, the vast majority of journal publication has been made accessible through abstracting

journals, which summarise the content of primary publications and act as a tool for tracing relevant references. More cooperation among computer scientists, librarians and scientists has been called for to develop informatics techniques for searching databases (Lewenstein 1999, p.24). Scientific and scholarly researchers tend to prefer the gateway approach in which resources are identified and access is provided to diverse collections within a single institution (Callery 1999, pp.84-85). This provides sophisticated "*end-user*" services, improvements in ease of use, with professional searching systems, and the proliferation of useful Web information.

However, Shoham (1998, p.118) argues that factors affecting the information gathering process of researchers depend on the researchers' needs, preferred approaches, channels of access to information, and information sources available. Even though there have been extensive changes in the patterns for obtaining information, some researchers remain conservative in their information-seeking behaviour and resist change. This might be caused by a lack of IT skills and unawareness of information resource location. It is important to investigate both internal and external factors that affect users in selecting the sources of information to satisfy information needs. These issues are related to users' competency in finding and using information to fulfil their needs in learning, studying, or doing their research. A lack of skills is also a problem obstructing scientists or any user from using electronic information resources. The term "*information literacy*" is defined by the American Library Association (ALA) as "*a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information*" (ALA 2006). The Society of College, National and University Libraries (SCONUL) also makes it clear that, having IT skills is different from having information skills (SCONUL 1999, p.1). It is described that the term "*information skills*" gives a broader meaning and directly involves "*the aims and processes of higher education as a 'knowledge creation' activity*". These two terms are viewed as vital parts of a wider concept of information literacy. For individuals to be information literate in the digital era, they must possess a basic competence in both information and IT skills.

This concept has stimulated many academic institutions to focus more on the development of information literacy for HE students on the basis of two related strands: study skills and lifelong learning skills (SCONUL 1999, p.5-6). The former relates to the skills that students "*will need to call upon in the process of undertaking study at a higher education level – a tool for the job of being a learner*". The second strand is about "*students being prepared to take their part fully in whatever subsequent occupation/employment/activity they may choose upon leaving higher education*". SCONUL proposes that "*the development of the idea of information literacy requires a collaborative and integrated approach to curriculum design and delivery based on close cooperation between academic, library and staff development colleagues*". Skills that students need for their studies include an ability to use an institutional library and its resource, to perform literature searches in some depth and complexity, and to demonstrate this in part by having good citation and references. The second strand which involves lifelong learning or skills students need to build for their future career can be defined as attributes of awareness and understanding of the way in which information is produced in the modern world, critical appraisal of the content and validity of the information, knowledge of how information is acquired, managed, disseminated and exploited, particularly with awareness of how professional groups use information to serve their needs (SCONUL 1999, p.6). Seven information skills are categorised as follows:

1. The ability to recognise a need for information.

2. The ability to distinguish ways in which the information "gap" may be addressed.

3. The ability to construct strategies for locating information.

4. The ability to locate and access information.

5. The ability to compare and evaluate information obtained from different sources.

6. The ability to organise, apply and communicate information to others in ways appropriate.

7. The ability to synthesise and build upon existing information, contributing to the creation of new knowledge.

<div align="right">(SCONUL 1999, p.7)</div>

These seven pillars of information literacy development is shown in a diagram by SCONUL (1999, p.8) as in Figure 3.8.
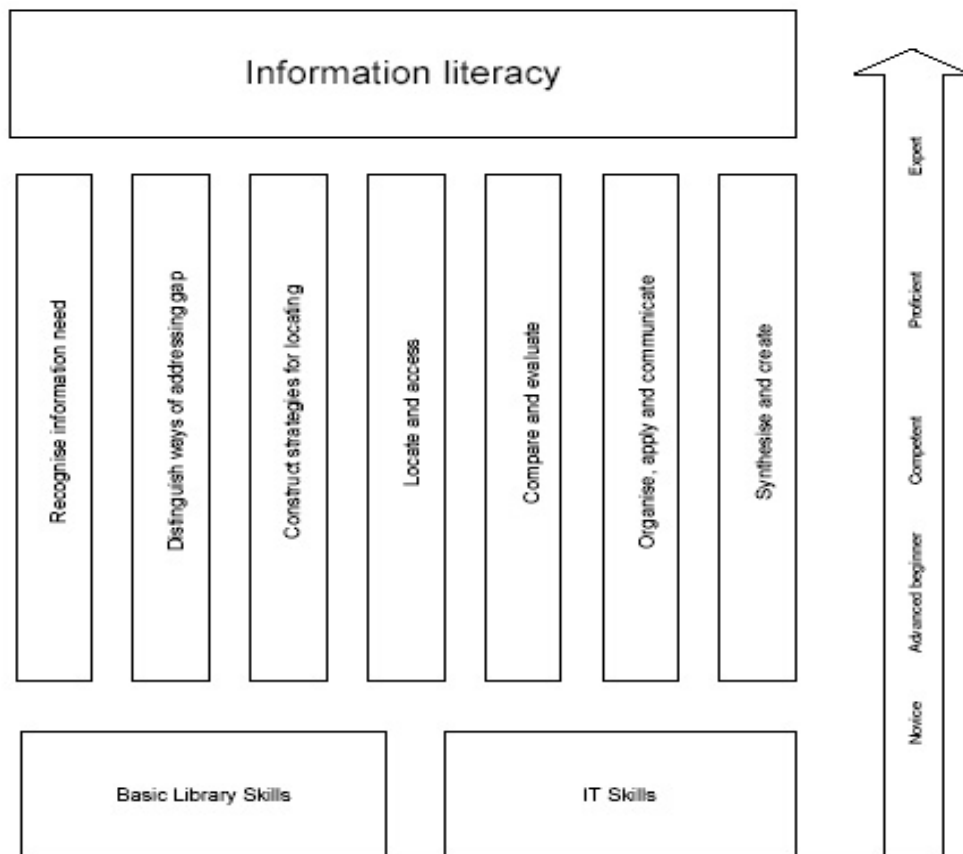
Figure 3.8 The seven pillars of information skills model by SCONUL

As the processes of information seeking behaviour vary depending on the information needs of the user, Fjällbrant (2000, p. 258) points out that the perceptions of information literacy will be changed through these processes. The author describes that subject-specific information literacy is related to the pattern of information flow within each discipline; and that "*different information channels and sources are suitable for different information needs or problems*" (p. 258). For example, information literacy in science and engineering involves an awareness of the pattern and speed of information flow as well as criteria for evaluation, and having a referee system for judging academic values of submitted articles to be published. Further, information literacy is also affected by information technology that helps users access information, such as full-text journals, easier. However, in accessing information via the Internet, users need to be aware of and be able to evaluate

authenticity, quality, accuracy, and timeliness of information. As commented by Fjällbrant (2000, pp. 258-259), users, especially inexperienced students, are still struggling with these activities. Therefore, they need support from librarians in various ways, for example, providing structured access to information, helping students to learn how to evaluate information from different sources. Similarly, Moore (2002) states that training users to be information literate should cover the stages of information need recognition, search formulation, source selection and integration, information evaluation, information synthesis and use.

Many studies report that most students are not very information literate (Andretta 2002, pp.105-114; Candy 2002 pp.1-17; Hepworth 1999; SCONUL 1999; Oberman 1991, pp.189-202). Most of them still lack critical thinking in defining the scope of a research question or the topic of research, thus reflecting the selection of inappropriate terminology and search strategies. Particularly in scientific learning and researching, students also need support from both the faculty and librarians in developing their scientific literacy along with their information literacy. Scientific literacy, as defined by the National Science Education Standards (NSES), refers to "*the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity. People who are scientifically literate can ask for, find, or determine answers to questions about everyday experiences. They are able to describe, explain, and predict natural phenomena*" (Laherty 2000). The author suggests that there must be strong partnerships between faculty and librarians in creating activities which integrate information literacy with science education. This is considered as the preparation stage in developing the information literacy of future scientists.

3.5 Strategies for research support

Users of S&T information in general include undergraduate, postgraduate and research students, academic researchers, academic staff, and researchers from both the public and private R&D sectors. As the nature of scientific studies and

research demands learners or researchers to acquire knowledge in the subjects or fields they are studying, these groups of users are likely to be familiar with information searching in the S&T area. According to Ball (2000, p.10), most users have been trained to search for information related to their studies:

> Equipped with these tools, the scientist was in a position to cope with all issues occurring in connection with literature and information searching throughout his scientific life.
> p.10

Information for scientific researchers as remarked by Ball (2000, p.10-12) has been developed over a number of years with differing techniques and technology, for instance, from print media to microfilming techniques, magnetic tapes, floppy disks, CD-ROM containing electronic databases, and online databases as well as electronic publications Since the late 1960s, electronic information has been steadily growing. Examples of these electronic information products include bibliographic information, specialised databases, fact databases and, later full text databases. This has required researchers to invest significant effort to familiarise themselves with information discovery and retrieval. Ball (2000, p.11) adds that new forms of S&T information can be found in electronic journals, digital monographs, pre-print servers and abstract databases, fact databases and bibliographic databases, which are usually provided by commercial providers such as publishers, aggregators and some large libraries. Access to these types of information sources also requires a costly membership subscription. Given the phenomenon of constrained funding, many libraries have tried to develop the best service provision they can whilst being as cost-effective as possible in their use of funds. In this effort, resource sharing schemes, therefore, have been initiated. University libraries are a good example undertaking a vast number of resource sharing projects. This has become possible because of the new electronic learning environment and the increasing ICT proficiency of library users which demand university libraries to work collaboratively in order to develop the gateways to information (Morgan and Atkinson (2000, p.449). Two resource sharing strategies used are document delivery service (DDS) including interlibrary lending (ILL), and library consortia and networked information services.

3.5.1 Document delivery service

Document delivery services originated from the practice of interlibrary lending. At an earlier period, libraries borrowed information resources such as books, conference proceedings, reports, articles and other bibliographic materials from each other (Jacobs *et al.* 2000, pp.3-4). Interlibrary lending has been practised for a long time in the developed countries such as the USA and the UK. In the UK, it was started in 1916 by the national Central Library (Elkington and Massie 2000, p.95). At first the lending process required only letters from one library to another to initiate the process. As demand grew, it became more complicated and a standard lending form was developed together with payment systems, which were originally introduced by the American Library Association (ALA), the Library of Congress, and the British Library. Organisations such as the Research Libraries Group (RLG), Online Computer Library Centre (OCLC), Research Libraries Information network (RLIN) were established to promote the interlibrary lending systems, for example, a development of union catalogue databases. The term '*interlibrary loan*' is less suitable as the photocopier is often used to reproduce documents. This means the borrowing libraries or users can retain the copied issues. Therefore, the term '*loan*' or '*lending*' is not suitable anymore (Jacobs *et al.* 2000, pp.3-4). The authors define the term 'DDS' as:

> Document delivery, in its broadest sense, therefore means the provision to a library user of any type of document that may be borrowed from another library, or purchased from a document supplier for retention by the requesting library or individual. (p.4)

Around the 1990s, the ILL and DDS came to their peak in terms of usage. A large number of online catalogues were used in the research library community whilst software for delivering documents over the Internet was developed. Jacobs *et al.* (2000, pp.4-14) discuss that the rapid growth of DDS originated from sky-high prices of serials and books, limited budgets, increase in publications, advances in computer technology, users' needs of online services, increase in student numbers at higher education, and promotion of distance

learning. The practice of using DDS or ILL is one of the strategies used by library consortia and many allied organisations (Elkington and Massie 2000, pp.96-97).

In the UK, the British Library Document Supply Centre (BLDSC), recognised as the largest document supplier in the world, used to play an essential role in the DDS (Jacobs *et al.* 2000, p.4). However, there is more collaboration between university libraries in the same geographical areas in order to play a part in supplying interlibrary document, for instance, LAMDA (London and Manchester Document Access), CURL (the Consortium of University and Research Libraries), and COPAC which is a union catalogue of the Consortium of Research Libraries (CURL) (Elkington and Massie 2000, p.150; Baker 2002, p.174). Baker (2002, p.174) notes that these '*clumps*' were developed to provide information services to group members with common characteristics such as libraries in the same geographical location or a subject specialisation. Members and users can benefit from clumps as:

> Clumps could therefore help to organise the content of the network and help searchers to select the right databases for particular searches.
>
> (Baker 2000, p.174)

In this regard, users can search through a union catalogue or use a regional interlibrary service.

In order to respond to the continuous development of ICT, the JISC of UK Higher Education (UKHE) became involved in the development of DDS with the aim of improving information service provision to support learning, teaching and research. Many projects funded by the JISC under the eLib Programme placed emphasis on process development of DDS, namely EDDIS (Electronic Document Delivery the Integrated Solution), *Infobike* later known as JournalsOnline Project (focusing on searching, ordering and retrieving articles electronically), LAMDA, SEREN (Sharing of Educational Resources in an Electronic Network in Wales), and FIDDO (Focused Investigation of Document Delivery Options). It can be concluded that this was influenced by

the rapid development of ICT and digital library technology (Jacobs *et al.* 2000, pp.9-11; Baker 2003, pp.105-107). Baker (2003, pp.105) points out that the ICT revolution is having an impact on the traditional services of libraries. The author also illustrates the stakeholders concerned in the document delivery service as shown in Figure 3.9.
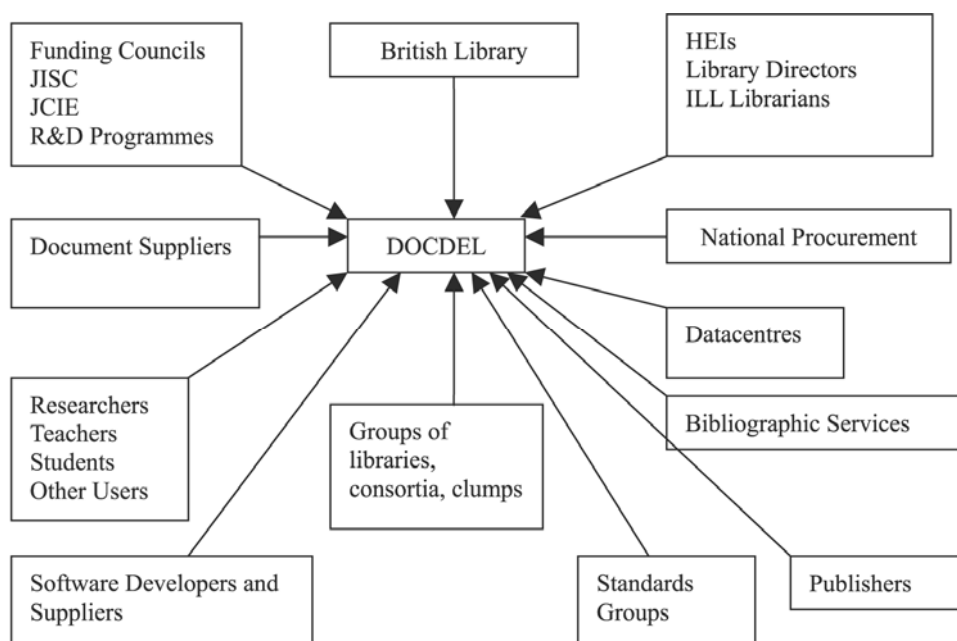
Source: Baker 2003, p. 109

Figure 3.9 Stakeholders in DDS in the UK

In Prowse (2000)'s article, the author points out that there has been a noticeable decline in ILL article requests since 2000, and the author concludes this is because of electronic full-text access. The author remarks:

> Increased access to documents at the desktop prompts a desire for more items to be available that way.
> p.189

However, the ILL and DDS are still important in Prowse's view (2004, p.103). For example, after reviewing the Final Report of the Research Support Libraries Group (RSLG) and the CURL study, the author suggests that UKHE should maintain the British Library as a firm base for document supply. Moreover, the report mentions the roles of the British Library, the National Library of Wales

and the National Library of Scotland as guardians of the national collections in the electronic environment. Meanwhile, continuing financial support should be provided to the British Library's document supply and inter-lending services. The study of CURL focuses on the development of UK monograph interlending infrastructure and a business model related to the service for the higher education research community. Prowse (2004) concludes:

> Two reports were produced in 2003 that look to shape the future of UK research provision. Although the focus for both was very much on HE, other sectors are likely to feel the impact.
> p. 107

3.5.2 Library consortia and networked information services

Cooperation amongst libraries has been initiated for different purposes. At an early period, libraries cooperated and grouped together with the purpose of lending materials to each other because there was scarcity of resources in terms of budgets and information sources (Piotrowicz 2003). Later with the emergence of library automation, academic libraries in particular, became involved more in the sharing of cataloguing records together with electronic information acquisition and provision (Hiremath 2001, p.81). Development of ICT has also had tremendous impact on the development of library consortia, enabling libraries to become dissemination centres rather than just storehouses. At the same time, ICT also changed user expectations and information-seeking behaviours. Users now expect to be able to find information electronically. Therefore, library consortia have developed, partly due to the shortage of resources, but also in attempt to enhance the quality of services and to satisfy user needs. New consortia have tended to be developed as strategic partnerships. Piotrowicz (2003) notes that the development of library consortia originally served the S&T research community as researchers in this field needed to search through scientific publications, of which acquisition prices were comparatively expensive. Piotrowicz (2003) feels that libraries cooperate and form a consortium because they believe that they can benefit by making

financial savings while improving their collections, resulting in better quality services and valuable information resources. Some consortia gain benefits from collective negotiation of licence agreements. Library consortia are also concerned with the implementation of new technologies in order to obtain access to integrated library systems. All consortia now are heading towards the sharing of electronic information resources via compatible network-based information systems (Bertot 2004, p.11). Hence, library staff can gain benefit from learning new skills or sharing their experiences in collaborative projects, for example, cooperation in the development of traditional and digital resources, interlibrary lending, document delivery services, union catalogues and collective purchase agreements. Nowadays, consortia services are mostly provided via web pages mapping library resources. Hiremath (2001) argues that being a member of a library consortium can increase effectiveness in financial management. The author states:

> As members of a consortium however, the buying power, risk-sharing capacity, collaborative technical expertise, and unified lobbying potential is exponentially increased.
> p.81

However, to make best use of shared resources, libraries have to ensure that their ICT infrastructure is up-to-date; this has funding implications (Bertot 2004, pp.16-17). Further, complications can arise in trying to ensure the fair use of resources that need reciprocal agreement between libraries and vendors (Hiremath 2001, p.81). Another issue is permanent archival access to information resources. This problem occurs because vendors tend to offer leasing rather than selling databases, and leasing requires annual renewable fees (Hiremath 2001, p.81; Piotrowicz 2003). Therefore, a library consortium needs to ensure it can gain access to the archives of journals it has subscribed to on a permanent basis. Piotrowicz (2003) suggests that, apart from negotiating on the issue of archives, more cooperation is needed amongst members in relation to storing and having unlimited access to information. The author adds:

> The agreements with vendors should contain exclusively clauses referring to total ownership of a license, rather than its lease.

Management of consortia may be '*centralized, well staffed and highly integrated*' such as OhioLINK in the USA (Hiremath 2001, p.82), or can be small with loose relationships and minimal cooperation. The author suggests that legal issues are also important in terms of good governance of consortia, for example, membership structure and legal status of the consortium. Legal documents are needed such as strategic plans and agreements defining the scope of cooperation and sharing.

In the UK, successful library consortia are the ones initiated by JISC, according to the Follett Report (Joint Funding Council's Library Review Group. For example, one UK consortia is NESLI (National Electronic Site License Initiative). In order to provide support to learning, teaching, and research of higher education through cost-effective use of advanced ICT, it is recommended that the UKHE should:

- establish subject-based consortia to collaborate in the development of electronic document delivery;
- establish metropolitan and regional consortia to collaborate in document delivery services of similar subject areas.

(Jacobs and Morris 2002, p.4)

Interestingly, Hiremath (2003, p.84-86) classifies the challenges faced by consortium management into four issues: freedom lost by librarians, uncertainty of subscription costs, uncertainty of pricing from different vendors, and lack of trust. Chartron (2001, p.86) gives an interesting view that a better degree of cooperation can be achieved through '*determined and wide-ranging*' policy at national level. O'Conner (2004) argues that, in sustaining a library consortium, every member should receive fair compensation for the services they share. Four significant key strategies for the future of successful consortia are given, which include:

- Content management which embraces access, new products, appropriate timing, and efficiency;
- Marketing aspects which deal with creating and anticipating the demand of users whilst developing an identity for consortium members;

- New partnerships from outside the library community; and

- Management capability which concerns governance, funding and staffing for long-term implementation.

Development of consortia must be cost-effective whilst the services offered to members and end-users must be broadened. O'Conner (2004) suggests that it should be performed simultaneously with skill development programmes for librarians and consortia staff.

3.5.3 Barriers and resource sharing strategies

The need to share resources amongst libraries has been driven by a number of factors: the information explosion, the rising prices of library resources, and budgetary restraints. Most libraries, therefore, have to cooperate with each other because they recognise that an "*individual library cannot provide everything*" (Schofield *et al.* 2002). Dempsey *et al.* (1998, p.267) identify that a framework of resource sharing might cover: collection management such as interlending, cooperative service development and resource provision, collaborative purchasing/negotiation, shared management of network infrastructure or information service provision, and skills sharing. However, some problems have arisen in implementing some of these processes and the key barriers found are mentioned by Soete (1995), Schofield *et al.* (2002) and the Higher Education Consultancy Group (2002) as follows:

- Lack of priority given to library development. As Dempsey *et al.* (1998) note: "*a major factor inhibiting technical development was the fragmentation that existed at policy and co-coordinating levels.*" (p.270);

- Preference to work independently and the reluctance of most libraries to give up ownership;

- Reluctance to take risks, for example in investment of new systems or ICT infrastructure;

- Reluctance to compromise;

- Fear of swamping or heavy external use. For example, in the case of open access, users from one institution tend to come and use other and better resourced libraries. This results in space usage and increase in staff workload , materials not being on shelves and ready for internal users;

- Reluctance to provide professional leadership;

- Unimaginative and unadventurous attitudes, resistance to change;

- Lack of compatible discovery systems, no single/virtual single national catalogue or low potential of ICT infrastructure;

- Over-reliance on the new technology;

- Lack of well-managed resources, for example materials remain uncatalogued or catalogues remain unconverted; and

- No deep resource sharing. Dempsey *et al.* (1998) define deep resource sharing as when there is "*participation in a wider system of provision.*" by libraries, for example, shared cataloguing. This is evident when there is a framework for seamless access to its collections or where collective resources are seen as a single collection. Similarly, according to Schofield *et al.*(2002), deep resource sharing refers to "*the treatment and management as a single collection of the collections of several institutions.*", and "*collaboration between or among libraries in which institutional autonomy in service provision is in some degree surrendered and which involves some degree of risk.*".

The Higher Education Consultancy Group (2002, pp.59-73) have analysed the causes of difficulties found in resource sharing and point out that the barriers to this process being successful lie in the areas of:

- Access and borrowing. The policy on open or restricted access and borrowing is still not clear for both print and electronic materials. For example, indexing of material is not available; the issue of off-site users needs to be solved and clearly stated. It is recommended that national purchasing arrangements could be an alternative to provide common principles of access for all.

- Collection development and management. Due to cost inflation, collaborative collection management is suggested with long term agreements.

- Technical services. In purchasing resources and procuring library management systems, the costs and benefits of different forms of procurement arrangement need to be evaluated objectively.

- Storage. Many libraries are running out of space. Off-site repositories are often needed to store resources. Collaborative storage might help solve this problem in this case;

- Library management. Many barriers occur from extensive differences in size, finances, culture, status of institutions, library governance systems, and the need for effective leadership. In addition, the history of relationships of the people involved can cause a problem as well;

- Funding. Continual funding is one factor indicating the success of resource sharing schemes. Therefore, assessment of projects to be funded and the ability to sustain projects are also important in terms of cost-effective sharing and fair dealing in financial matters;

- Legal issues. These concern, for instance, legal obligations, rights, and the status of libraries in a sharing situation, ownership rights, purchasing management, and site licence restrictions, which need to be legally defined and clearly stated;

- Staffing. Staffing in this context covers both staff management and their attitudes to resource sharing. As resource sharing concerns collaborative working and joint-staff development, staff's negative attitudes towards resource sharing might be found to be related to workload, the loss of autonomy, or fear of redundancy where collaborative activities might lead to reductions in staff numbers. To tackle these problems, the institution needs effective leadership and change management.

Soete (1995) believes that a single best way for resource sharing cannot be found unless there is a careful planning and the opportunity to correct errors during trial periods. The author suggests that an important factor in planning is

to analyse the environment and climate which help nurture resource sharing. Environment in this context refers to institutional budgets while climate concerns the availability of strategic partnerships or negative attitudes of potential partners towards resource sharing (fear of loss of control, fear of failure, and lack of commitment among partners). The resource sharing scheme can only be effective if it meets the needs of members and library users. Therefore, participation is considered important. Soete (1995) recommends that pilot projects be brainstormed in order to obtain a greater diversity of ideas and methods. Meanwhile commitment from parent institutions needs to be obtained. Strategies to achieve resource sharing include: realistic objectives, clear fundamental rules (for example, equity issues), written agreements, assigned responsibilities, and pilot projects. The skills needed in the sharing process are negotiating and creative problem solving (to be spontaneous and flexible). Moreover, the planning process must consider these important factors: politics such as inter-institutional relationships (competitive or distrustful feeling), staff's attitudes towards sharing, perceptions of users, governance, and the degree of commitment to participation.

Dempsey *et al*. (1998, p.265) suggest that the strategies of distributed library resources must focus on exploring motivations and constructing a system framework which benefits the access and management of resource sharing. Factors to be considered include the basic components of networked information systems which form the network infrastructure for the interconnection of libraries, content of new services and resources, interconnectedness or channels of access to remote databases, and retrieval systems which help discover journal articles and books. Schofield *et al*. (2002) suggest that a strong and effective case for resource sharing needs to be made to convince parent institutions and stakeholders concerned. Also support in relation to these further issues are required: more flexible terms and agreements of consortial e-licences, digitisation of resources to be shared, digital archiving, empowerment of librarians in the deep resource sharing process, leadership of funding bodies, and other necessary resources.

3.5.4 Information network models for the research community

Ash and Bavins (2000, pp.165-168) give an overview for S&T informatics development as follows:

- 1980s - The information challenge was data collection and there was growth in the use of databases for storing and retrieving data.

- 1990s - Due to high data volumes, increases in data complexity and in-house needs for data distribution, the focus was on data analysis, effective conversion of data to knowledge, and the use of data interpretation tools.

- The 21st century - The informatics trend is towards e-R&D which puts trust in innovative infrastructures, collaboratively networked organisations and information resource management.

This has resulted in the concept of research collaboration which is facilitated by the new dimensions of ICT. Knowledge networks and the development of interconnected advanced computational resources are considered to be influential factors (Busquin and Liikanen 2000).

Owen and Wiercx (1996, p.3) view the role of libraries as "*a component of the information chain, acting as a link between knowledge sources and users*". Libraries, thus, are considered to be "knowledge mediators". This means that libraries are the "*knowledge organisation*" which becomes expert not only in traditional means of knowledge acquisition but also in the new area of access and knowledge sharing. The authors propose three application models of a networking system. Characteristics of collaboration are also mentioned, ranging from hierarchical and simpler models to more complex ones and stand-alone models to mutually integrated ones.

The networked library model

The Networked Library Model

Characteristics
- The highest level of integrated network services
- Independence and self-sufficiency
- Possession of all or most of the functions needed to provide full services to users without relying on other libraries

The network represents an individual library which has its own complete internal functions, systems and processes. The library in this model should consist of five components:

- Storage facilities for conventional and electronic resources;

- Integrated resources discovery system (catalogue);

- Support system providing any type of assistance required;

- Workstations allowing users to access the catalogue and resources;

- Administrative system.

(Gorman and Cullen 2000, pp.137-138)

Since this model is of a fully networked library, which creates its own collections, and provides its own bibliographic control and its own access services, Owen and Wiercx (1996) consider it to be the most effective for external networking and co-operation. It is also viewed as an ideal, which is difficult for developing countries to achieve. However, it is a model that can be used to define long term objectives for general libraries.

The co-operative network model

The Co-operative Network Model

Characteristics
- More efficient use of resources on a national scale, a larger number of libraries to offer networked services
- A national service level
- Networking between server libraries and client libraries

This model can be seen as a network of library functions which aims to make more efficient use of resources on a national scale. There are "*server libraries*" offering services to other libraries within a specific domain or a specific type of library. A large number of libraries can subscribe to be "*client libraries*" and use the network to provide services to their end-users. The systems, functions and processes deal with resource description, resource discovery, resource storage, and user support. Gorman and Cullen (2000) report that Owen and Wiercx (1996) remark that "*the relationship is based on close co-operation, a division of functionality and the mutual acceptance of standards*". *It is not necessary for the client libraries to develop all their services fully "in areas covered by domain-based or national server libraries; rather they act as an interface to these server libraries*". Thus, this approach is considered to be a part of the development of a co-operative network model. According to Gorman and Cullen, Owen and Wiercx (1996) argue that a fully co-operative model "*should be based on co-operation in the creation and management of resources as well as on shared use of resources*" in the following areas:

- Shared cataloguing of resources;
- Shared collecting and storing of resources;
- Shared resource discovery system;
- Shared document delivery procedures;
- Shared licence agreements;
- Shared user support procedures.

The knowledge environment model

The Knowledge Environment Model
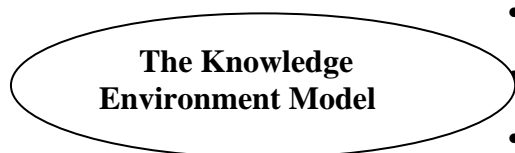
Characteristics
- A user-oriented perception of the library or network, more client-focused
- Co-operation is for improving services to meet users' needs and requirements
- Offers both sophisticated technological environment and traditional services

Owen and Wiercx (1996, p.129) describe the knowledge environment model as consisting of a networked library providing a variety of information-related activities for different user groups. It is an ideal public information portal for

acquiring, discovering and accessing knowledge resources. This model structure serves users both internally and externally; that is, to provide interlinked access to all local resources as well as total access to the global information through the networked resource discovery system and the Web. At the same time, it functions as a platform for accessing community and government information services at local, national and international levels. Gorman and Cullen (2000) explain that it embodies "*a user-oriented perception of the library or network*" and has a good support system to deal with diverse needs, requirements, expectations and skills of users.

In Brophy's review (1999, pp.14-15), these three models have been developed by examining traditional library functions in parallel with a series of "*application models to assist libraries to incorporate networked alongside traditional services*". He also remarks that this concept substantially contributed to the development of the "*hybrid library*" model in the UK. This also led to the development of a digital library, which comes to play an essential role in information service provision based on these following three functions:

- Making available various types of knowledge resource;
- Providing resource discovery mechanisms which allow users to identify relevant or requested resources and their locations;
- Providing mechanisms for delivery of specific resources to the users; delivery includes both obtaining a resource when it is not already available in the library, and passing it on to the user in a suitable way.

(Brophy 1999, p. 15)

Brophy (1999, pp.18-19) also refers to the Bawden and Rowlands' Model, which makes an explicit identification of three domains for providing information services under the framework of a digital library. They are:

- **The social domain,** which consists of information skills and literacy, and has impacts on organisations and the nature of work, and information law and policy;

- **The information domain,** which consists of knowledge organisation and discovery and has implications for the information transfer chain;

- **The system domain,** which consists of human-computer interaction, software agents and systems architecture.

One library network strategy is the consortium, which has been introduced to serve the objectives of the development of information service provision. As cited in Doner and Annear (2000), Hirshon (1999) defines the term library consortia as:

> a generic term to indicate any group of libraries that are working together toward a common goal, whether to expand cooperation on traditional library services (such as collection development) or electronic information services. The term is now used perhaps too broadly, and encompasses everything from formal legal entities (such as incorporated or governmental agencies) to informal groups that come together solely to achieve better pricing for purchasing electronic information.

Hayes (2001) proposes five factors to be considered for planning library network models.

1. **Network structure.** It can be classified under three headings:

   - **Highly decentralised systems** – each library can communicate directly with others.

   - **Hierarchical structures** - member libraries are organised into both regional and specialised groups, being combined through a switching centre and bibliographic centre.

   - **Highly centralised systems** – each library reports directly to a central switching point.

2. **Communications traffic.** The issues for planning include the communication systems among the nodes in the network configuration, configurations of switching centres, hierarchical arrangements of transmission among libraries, and relative costs and efficiencies.

3. Response time.   This is considered to be the most significant operational issue in network planning.   Hayes (2001) suggests evaluating the effective response   time through a network from a remote location and the response time from an information retrieval system on a basis of types of services, time schedules, work loads, and facilities.

4. User response. Regarding the characteristics of users of a library network, there are four factors:

- The availability and sources of information services;
- Users' information requirements: services needed, subject areas of interest, the response time needed;
- Users' expectations of quality and time of service from the library;
- The effects of both adequate and inadequate response time from the library on users.

5. Cost trade-off.   A benefit of the network or consortium should be some cost savings for the group to some extent, for instance, the savings in the costs of acquisitions, cataloguing, and storage of multiple copies.

3.6 Research framework

This research was undertaken on the premise that the Thai government's policy on building a knowledge-based economy and a learning society for Thai people would be implemented. As shown in recent Thailand Economic and Social Development Plans, the S&T sector was viewed as vital in the national development of the economy. Accordingly, it is of interest to investigate the policy and strategic matters of Thailand in promoting R&D in the S&T sector, especially the provision of S&T information services, one of the most essential elements in the support of R&D. The research was undertaken to develop guidelines to assist the S&T information sector in Thailand.

The information given and the literature reviewed earlier, both in Chapter Two and Chapter Three, described both the national and international trends of the research community, where information policies and information strategies are intertwined. The literature, as earlier reviewed, stressed the need for collaboration between the academic communities, government research agencies and private sectors to promote the sharing of knowledge and R&D information. Collaboration between academic and industrial-oriented research has had an impact in general, on both academic and special libraries which provide S&T information. The roles of libraries and librarians, for example, have been intensely revised. Librarians have been put under pressures to become equipped with professional skills, ICT skills, and mastery of particular scientific subject knowledge. Many libraries have also adopted advanced ICT to enhance the provision of information services related to R&D. Limited funding has forced libraries to be more careful with their investment and financial planning. This has fostered an active policy-based management together with strategic planning for information service provision. One major policy adopted by the information sector to support R&D is the promotion of information resource sharing in a networked environment. For instance, the JISC Guidelines for Developing an Information Strategy represents the UK's awareness in the development of the national information sector that supports research and innovation. Although the guidelines were viewed as having practical difficulties, they provide a good start and can be used as an example for any institution to develop an information strategy.

To keep pace with this global development, Thailand needs to be aware of policies and strategies which support R&D and develop S&T information services. Currently, Thailand still has to import many types of S&T information resources from developed countries, especially electronic online databases. However, progress is being made; a large number of academic and some special libraries in Thailand, for example, do share their in-house electronic resources. This has generated discussion about policies and strategies which might further develop S&T information services. For example, some information service providers in the academic sector, as presented in Chapter Two, thought that the

research library sector needed to be consolidated in order to become more actively involved in service provision. However, these ideas need to be developed into a written policy in order to gain effective implementation. Policies and strategies at a national level are deemed necessary for Thailand. To expedite this, a feasibility study needs to be undertaken to analyse the potential of the S&T information sector in Thailand and generate ideas for its future direction.

In the context of S&T information services, it is also necessary to explore the current situation regarding scientific or scholarly communication together with information seeking behaviour and user needs so that better quality services can be designed to meet those needs. A survey of current information policies is important as it could help guide the direction of S&T information service provision in Thailand and help ensure that any announced policies and implementations are aligned. Moreover, policies at an institutional level need to be investigated in order to find out if they could be aligned to the national policies. However, from the review of the national policies so far in Chapter Two, the role of the S&T information sector in Thailand has not been clearly stated at a national level when compared to several developed countries, for example, the British government's policy on the promotion of the S&T information sector for supporting science and innovation. This implies that policies at both levels need to be investigated in order to see how inclusive they are, especially of the S&T information sector. Further, it is interesting to know how a policy for the S&T information sector, if any, has been produced, and if people in this sector are aware of their roles in playing a part in creating a knowledge-based society.

As stated earlier, the S&T information service providers in Thailand mainly include academic and special libraries, which deal directly with end-users in the research community. There has been an attempt from these providers to improve their services by constructing a networked environment for managing S&T information resources and providing information electronically. Examples are found in the establishments of the S&T Information Network Centre under

THAINATIS (collaboration between academic and special libraries), THAILIS (collaboration within academic libraries), and Journal Link (collaboration between academic and special libraries). However, it appears that there is no indication showing how these institutions can improve their cooperation and continue their collaborative activities in the long run. It is noticeable that neither of these issues has been stated in the national policies so far. Although a few suggestions by some scholars mentioned collaboration between the academic and government sectors dealing with S&T information, it was proposed at an institutional level rather than at a national level. This implies a need to study the policies and strategies of the S&T information sector in Thailand.

Given that the S&T information sector in Thailand is developing a service model(s) for the provision of information services, the related key issues to be considered, as recommended by many studies and the public forums of the scholarly community, include:

- National and institutional policies;

- An information strategy, strategic planning and management both at national and institutional levels;

- Other dependent factors comprising resources (funding, personnel, information resources, facilities and ICT), organisational management (types of services, strategic positioning, and organisational potential analysis, and, last but not least, user aspects(an environment of scientific communications, information need and information-seeking behaviour, information literacy, and support mechanisms)

Based on the above literature review in this Chapter, a research framework has been developed by analysis of the relevant characteristics of each factor as shown in Figure 3.10. The output of this research is the development of an information model(s) of S&T information service provision in Thailand based on strategic policies at institutional and national levels. The model(s) is developed in such a way that networked systems could be designed to put it into practice for end-users through collaboration between information providers.

The diagram shown in Figure 3.10 presents the critical factors which should be incorporated into the development of the S&T information service.

Policies
- National level
- Regional level
- Funding bodies level
- Institutional level
- Operational level

Tactical Management (Master Plan)
- Money
- People (Roles)
- Equipment (ICT)
- Space
- Facilities
- (Location)

Models

Strategic Management
- Institutional policies
- Types of service
- Interlibrary cooperation
- Barriers
- Information resource management
- Accessibility
- Future plans

End-user Aspects
- Preferred information sources And formats
- Frequent use of electronic data
- Attitudes to services
- Convenience
- Easy access
- Information literacy
- Cost
- ICT training/Skills
- Access equipment
- Support mechanisms

Figure 3.10   Theoretical framework: management of information service provision for the S&T information service sector in Thailand

The research concept is based on the role of information to support R&D in science and technology by using advanced ICT for information service provision (Prytherch 1998). The prospective roles of academic and research libraries are viewed as an information portal or a single point of access with open-linking technology. In this regard, Rowley (2001) suggests that ICT acquisition or development should be those that support networking, group

working, and the effective communication of information. Thus, the concept of information resource sharing or library consortia is considered necessary for the provision of S&T information services in Thailand. Hierarchical policies are also important for effective implementation.

In this research, the framework in Figure 3.10 is of great advantage to the process of developing research tools for data collection. Moreover, it demonstrates how the key factors are related to each other in information service provision. As recommended by several theories and factors in strategic management and planning for academic and research libraries (Lougee 2002, Hayes 2001, Gorman 2001, Jacobs *et al.* 2000, Corrall 2000, and Gallimore 1997), the key factors include policies, tactical management (a master plan) and strategic management (implementation). However, user aspects are also included in this diagram as there is still a lack of studies about the information needs and behaviour of users in the Thai research community. An investigation of users' expectation and needs will help the academic and special libraries in Thailand learn about the position and perceptions of their users in the networked environment. As feedback from users will be obtained, this is expected to be beneficial to the formulation of policies and strategies that could meet the needs of users in the S&T community.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

As society moves towards an IT-dependent culture, libraries need to respond and be at the cutting edge of development. The rapid change of innovation in electronic information sources and ICT is the factor that drives libraries to transform themselves (Bourke 2002). Most libraries are striving to pursue a variety of complementary tactics to present their services as a portal or single point of access exploiting the power of linking technology. Gallimore (1997, pp.235-242) observes that the concept of the library is changing from being an information store to an access point for electronic information retrieval or even an active information provider. However, in a changing context, libraries can only survive if they formulate clear and coherent strategies for the future. Explorations of strategic planning and policy-making, therefore, have focused on both national and institutional levels. The need for a strategic approach has been discussed by national governments, local authorities and individual organisations. Academic libraries and S&T information providers which play important roles in providing information resources to the research community and higher education are also facing this challenging environment (Dougherty 2002).

This research examines trends in the strategic management of the S&T information sector integrating the application of information technologies and information resource management in order to gain optimum benefit for scientific R&D. The core of the research focuses on the development of S&T information service provision supporting the R&D community in Thailand. As stated by

Jacobs *et al.* (2000, p.153), the strategic management of academic libraries covers two key points: strategy and organisation. Academic libraries playing essential roles in scholarly communication are highlighted in this research with an aim of identifying their current roles and status. Moreover, special libraries are included in the investigation due to their prominent roles in providing S&T information services in the resource sharing environment.

In order to build up a picture of all the relevant factors, other stakeholders in S&T information services are also examined, that is, organisations supportive of the development of S&T information services: funding bodies, end-users, and policy-makers who are involved in the planning of information policies at all levels.

The factors explored in the research include:

- The roles and policies of academic libraries or other organisations that provide S&T information services in Thailand;

- The strategic management of S&T information within academic libraries and S&T information providers in Thailand;

- The policies and goals or targets of achievement concerning information service and information technology at all levels;

- The barriers to S&T information service development in Thailand, awareness of those barriers and potential solutions;

- Information literacy in Thailand within the S&T community;

- End-users' attitudes to and expectations about the S&T information service centres as they are currently organised; and

- An information service model or roadmaps appropriate to the modernisation of S&T information service in Thailand.

These factors were investigated in order to identify the future role and contribution of academic libraries and S&T information providers to the higher education and research community. A holistic approach was applied to focus on the whole process and draw a broad picture of information service development in Thailand. This includes:

- innovative strategies;

- the unique role of libraries and library staff as supporters in the changing shape of teaching/learning in higher education and e-research;

- The values of libraries and information services in promoting S&T information;

- the critical skills needed by staff to meet future demands;

- a needs analysis or study of expectations of end-users in relation to product, process and service quality (Houseton 1999; Office of Government Commerce 2002, pp.18-19).

The organisation and working of JISC is also included in the research in order to investigate its role in supporting further and higher education in the use of ICT to support teaching, learning, research and administration. This is considered as an important model for the development of S&T information sector in Thailand.

This chapter presents the research design which consists of a justification of the methods used, the research population and sample selection, the data collection frame, and the approach to the analysis of data.

4.2 Research methods

4.2.1 The research design

To meet the objectives of the research, the purposes of this research are to explain the present situation of S&T information service provision in Thailand and to seek a new model(s) of development. The research is designed using both exploratory and explanatory types of method as classified by Robson (2002, pp.59-60).

Exploratory
- To find out what is happening, particularly in little-understood situations.

- To seek new insights.
- To ask questions.
- To assess phenomena in a new light.
- To generate ideas and hypotheses for future research.
- Almost exclusively of flexible design.

Explanatory
- To seek an explanation of a situation or problem, traditionally but not necessarily in the form of causal relationships.
- To explain patterns relating to the phenomenon being researched.
- To identify relationships between aspects of the phenomenon.
- May be of flexible and/or fixed design.

(Robson 2002, p.59-60)

The possible research methods, both qualitative and quantitative are   reviewed in this chapter.

Coombes (2001, pp.30-31) describes qualitative research as subjective. More values, biases and judgements tend to occur in the information gathered. However, the information obtained is at a deep level. Scanlon (2000) gives as examples of qualitative research, participant observation and unstructured interviews, where "*the resulting data is presented in the form of quotations or descriptions, though some basic statistics may also be presented*" (p.7).

Quantitative research is often based on questionnaires and surveys. It possesses the characteristics of being structured, logical, and measurable. Generalisations can be developed from such studies and can be used to explain or predict some phenomenon. However, Coombes (2001, p.31) also adds that the results from quantitative research can be applied for further qualitative investigation so as to gain an in-depth viewpoint. In Balnaves and Caputi's view (2001), quantitative research requires observable and testable evidence in order to avoid bias in the results while, in very small fragments of "*cultural data*", for example, a poem, an advertisement, etc., qualitative methods "*can generate just as fruitful findings*" (p.5).

Robson (1993) suggests that the '*multi-method approach*' is often the best approach because "*similar patterns of findings from very different methods of*

gathering data increase confidence in their validity." (p. 69). In addition, Robson (2002) describes the quantitative method and qualitative method as "*a fixed design strategy*" and "*a flexible design strategy*" respectively (p.87). That is to say, a fixed design strategy deals with numerical data in the forms of numbers while a flexible design deals with textual data. It is also suggested that "*while a design cannot be fixed and flexible at the same time, it could have a flexible phase followed by a fixed phase (or more rarely, the reverse sequence). Or there could be a separate flexible element within an otherwise fixed design*" (p.87).

According to Gorman and Clayton (2005, p.12) the use of mixed methods, so called '*triangulation*', will give more benefits than one method alone as "*two or more methods employed, the research is able to address different aspects of the same research questions, thereby extending the breadth of the project.*" The authors argue that only one investigative approach cannot portray a holistic picture and obtain the fullest understanding of the area investigated. Moreover, more than one method used can help cross-validate the information obtained (pp.12-13) as information has been collected from several different sources.

Consequently, three instruments were used in this research, with a mix of quantitative and qualitative methods. The instruments used were questionnaires, semi-structured interviews, and focus groups. Other methods were considered such as statistical analyses of information providers or library records. However, these were discounted as being too problematically. Many providers and libraries do not keep complete records nor would they allow a third party access to them. The focus of this research was to obtain broad as well as in-depth information from a variety of stakeholders about S&T information provision in Thailand. The constructions of instruments selected were ideally suited for this purpose.

4.2.2 Methods of data collection

• Questionnaire

This method was selected because information was needed from a large number of stakeholders spread over a large geographical area. This technique also enables a large amount of data to be collected at relative low cost in a short period of time. Further, information was provided anonymously which encouraged frankness of informants (Robson 2002, pp.233-234).

• Semi-structured interview

Interviews were chosen because an interviewer can follow up ideas, probe response and investigate motives and feelings which cannot be done using a questionnaire. While the questionnaire was useful for collecting 'broad' information, the interview was necessary to obtain more in-depth data on opinions and attitudes from a selected, but representative, number of stakeholders. According to Hinds (2000, p.47), there were two types of interviews: structured and unstructured. He explained that both approaches can be used simultaneously, starting with structured questions and followed by the exploration of general themes related to those questions. In the case of this research, a semi-structured interview approach was used to encourage more dialogue and thus elicit more detail about people's opinions.

• Focus group

Focus groups were used for this research to obtain further in-depth information from stakeholders. Bringing a variety of stakeholders from various types of institutions together was necessary in order to generate free-flowing discussion about S&T information provision in Thailand, in particular the problem facing the profession and the ways in which these could be resolved. Hinds (2000, p.49) says the principles of focus groups are based on self-disclosure to a particular type of question, in a comfortable environment and under focus group rules. Robson (2002, p.283) indicates the term "*focus group*" can be used interchangeably with "*group interview*". It is characterised as an open-ended

group discussion about a specific topic guided by the interviewer. He states that a focus group inquiry is appropriate when the interviewer wants to gain information relating to how people think, to explain perceptions of an event, idea or experience, or to seek the perspective of the customer.

Focus group tasks can be categorised as exploratory, experiential or clinical (Fern 2001, pp.5-10):

- Exploratory tasks are used for creating, collecting, identifying, discovering, explaining and generating thoughts, feelings and behaviours. Particularly in applied research, they include creating new ideas; collecting unique thoughts; identifying needs, expectations, and issues and explaining puzzling results from quantitative research.

- Experiential tasks deal with an observation of the "natural attitudes" of focus group members from a predetermined population. Natural attitudes can be described as "*the learned behaviours*" (p.7) which can be observed from shared life experiences, preferences, intentions, and behaviours.

- Clinical task have been predominately used in the field of marketing only (Fern 2001, p.9). This method is used with the purpose of uncovering an individual's motives, predispositions, biases, and prejudices, which are the kinds of thoughts and feelings an individual is not consciously aware of.

Krueger and Casey (2000, pp.7-9) remark that the focus group yields various benefits. It is suggested that it is used for determining the perception, feelings and thinking of people about issues, products, services, or opportunities in order to gain understanding about a topic. It can also be used as a pilot test of a design in order to improve products, services or programmes. In addition, the focus group task is appropriately applied for evaluating customer satisfaction, planning and setting goals or policy, assessing needs, developing and maintaining quality improvement, understanding concerns of stakeholders, testing strategies prior to implementation, and identifying the criteria needed for successful results. The pattern of the tasks performed facilitate a spontaneous discussion among group members, thus useful information can be obtained.

As focus groups are ideal for finding the range of opinions of people across several groups and can be used as a basis for the planning and setting of goals of achievement, this   method   was considered appropriate for   this research.

4.2.3 Population and sample selection

In order to explore all facets of the factors influencing   the development of S&T information services, the target population in this research includes three major stakeholders. These are:

- Relevant S&T information centres including academic and special libraries;
- Funding agencies; and
- End-users.

The first two stakeholders are the main organisations involved in the development of S&T information service provision for the promotion of R&D in Thailand, while the last is those individuals who make use of the S&T information service system.

S&T information centres (academic/special libraries)

The S&T information centres selected in the sample were members of the S&T Information Networks in Thailand as list below:

1. The Referral Centre for Research;
2. S&T Information Network having the Ministry of Science and Technology as a coordinator; and
3. Scientific and Technological Information Network Centre under the THAINATIS.

In addition, a few other centres, which are not members of any networks, were included because they play an essential role in providing S&T information services to academics, students, and researchers countrywide.

The S&T information centres, then, were sampled based mainly on those in the institutions under the supervision of the Ministry of Education (Office of Higher Education Commission), the Ministry of Science and Technology, including some government offices and private institutes mentioned in TIAC's website http://server.tiac.or.th/tiacweb/science.htm as the bodies which provide S&T information resources and services in Thailand. A total of forty-six S&T information centres took part in the research, of which forty-two were under the Information Networks. These institutions are located in different regions of Thailand as shown in Table 4.1.

Table 4.1 Regional distribution of academic libraries and

S&T information centres in Thailand

Region	Academic libraries	Research libraries	Total
Central	18	17	35
Northern	3	0	3
North-eastern	4	0	4
Eastern	1	0	1
Southern	3	0	3
Total	**29**	**17**	**46**

This research survey focused on the stakeholders or the parties concerned in the S&T information service sector including:

- Executives /Policy makers of S&T information centres;
- Library managers;
- Librarians /Library staff; and
- End-users

Funding agencies

Two major funding agencies in Thailand were studied in relation to their roles and policies in promoting R&D in Thailand via the support of S&T information services.

A list of institutions of both S&T information centres and funding agencies surveyed is shown in *Appendix II*.

End-users

In this study, the term '*end-users*' covers any individual who undertakes research work in S&T subjects or uses S&T information via the S&T information centres. They include:

- Students (undergraduate, postgraduate and research students);
- Academics;
- Researchers; and
- Research staff.

The end-users were sampled from forty-five institutions as one institution did not provide walk-in library services. The survey period was two weeks.

The sampling process for the questionnaire survey

The questionnaire survey was conducted with forty-five institutions. One institution was excluded because it did not provide walk-in library services as mentioned earlier. The stakeholder groups included:

Executives/Policy-makers of S&T information centres

This group of stakeholders can be defined as top executives of institutions which provide S&T information. In this research, they are directors, or persons assigned by directors of academic libraries, academic resource centres, and research or special libraries in the target group.

Library managers

Library managers are persons who are in charge of running libraries, or heads of concerned library divisions. They might be managers in the resource development divisions, acquisition divisions, serials divisions, or service divisions.

Librarians/Library staff

This group includes persons who work as librarians or information specialists or '*documentalist*s' in libraries.

Library users

These include end-users of academic libraries, and research or special libraries. End-users in this research might be academics, research staff, undergraduate, postgraduate and research students, researchers or any other people who may be interested in using any services provided by those libraries.

Executives/Policy makers of funding agencies

These refer to persons who are at the management level of the funding agencies, or who are responsible for policy making.

The questionnaires were administered to:

- Executives/policy makers of S&T information centres, library managers, librarians/library staff, and end-users in forty-five institutions as shown in Table 4.1.
- Executives/policy makers in two funding agencies.

The questionnaires for each stakeholder group were designed differently and contained the issues relevant to each group (see Section 4.2.3).

As there were many stakeholder groups involved in this research and it was considered necessary to survey all of them, quota sampling, which is a non-probability method, was employed in this research. According to Robson (2002, p.264), quota sampling is a research strategy used to obtain representatives from

different groups of a population. Statpacs (1997) states that quota sampling is equivalent to stratified sampling where the stratum and their proportions or representatives in the population are firstly identified. However, these two strategies are different in that stratified sampling deals with random sampling while quota sampling is based on non-random sampling techniques and only needs numbers of respondents from each stratum. Therefore, convenience or judgment sampling can be used to select the required number of respondents from each stratum. Robson (2002, p.264) argues that '*representatives*' in quota sampling represent "*only in number, not in terms of the type of persons actually selected*". The quota sampling in this research, therefore, was conducted following these instructions. Five stakeholder groups were categorised as discussed earlier and a quota was assigned to each group. As only one person was generally in charge of each institution, questionnaires for all groups were sent to the top executive of each S&T information centre. These top executives were asked for their cooperation in distributing questionnaires to the staff concerned. Therefore, one questionnaire was for the top executive and another one was for the library manager.

As for librarians and library users, '*proportionate sampling*' (Robson, 2002, p.262) was employed by considering that the numbers in each group need to be related to the numbers in the population as a whole. Therefore, a phone call was made to each library to obtain the whole numbers of librarians and staff as well as end users per day. Then the numbers of representatives in librarian and user groups were determined by applying statistical processes based on a normal distribution as recommended by Snedecor (1956, pp.45, 60). The sample size was obtained at a 95 percent level of confidence and a 10 percent population difference was allowed.

The sampling process for interviews

The technique of semi-structured interview or face-to-face interview was applied at the second stage of information gathering by using volunteer sampling (Coombes 2001, p.34-35). The volunteers for interview were mainly selected on

the basis of responses to the questionnaires received from executives/policy-makers of S&T information centres, library managers, and executives/policy makers of funding agencies. However, a few people declined to complete a questionnaire but agreed to be interviewed.

The sampling process for focus group

The participants or interviewees for the focus group method were selected by using the purposive sampling strategy. Morgan (1998, p.56) explains that "*the strategies for selecting samples in focus groups are quite different from those in survey research or experimental designs. Like most other qualitative methods, focus groups rely on purposive samples*." This is done by choosing the participants according to the project goals or depending on the purposes of the project.

The focus group methods were organised into three groups to discuss topics on:

- Roles, policies and strategic management of S&T information service in Thailand;

- Barriers to S&T information service provision in Thailand; and

- Opportunities for resource sharing or consortia development in Thailand.

Each focus group contained representatives of each set of stakeholders concerned. Participants in each group were from different stakeholders.

4.2.4 Framework for data collection

Questionnaire structure

Questionnaires for each stakeholder group covered the following issues:

- **Funding agencies**
    1. General data or the background characteristics of respondents:

institutes, position/status, subject, age, gender, academic qualifications, length of work experience;

2. Vision, mission, policies, and strategies in funding and promoting S&T research;

3. National information policy and S&T information network in Thailand;

4. Funding criteria; and

5. Funding of S&T information development in Thailand.

- **Executives of institutions**

1. General data or the background characteristics of respondents: institutes, position/status, subject, age, gender, academic qualification, duration of work experience;

2. Institutional policies and information policies: national level, regional level, institutional level;

3. Barriers to development of S&T information service in Thailand;

4. Tactical management of information services: money, people (roles), equipment (ICT), space, facilities (location), future plans, barriers and solutions; and

5. S&T information resource sharing in Thailand and its barriers.

- **Library managers**

1. General data or the background characteristics : institutes, position/status, subject, age, gender, academic qualification, length of work experience;

2. Institutional policies and information policies at institutional level;

3. Strategic management: types of service, roles, interlibrary cooperation, information resource management, personnel's competence, user survey, communication media, future plans, barriers and solutions;

4. Resource sharing scheme and S&T information network; and

5. Barriers to S&T information resource sharing in Thailand.

- **Librarians/library staff**

  1. General data or the background characteristics : institutes, position/status, subject, age, gender, academic qualification, length of work experience;

  2. Institutional information policy;

  3. Strategic management: types of service, roles, and professional development;

  4. S&T information resource sharing in Thailand; and

  5. Barriers to S&T information resource sharing in Thailand.

- **End-users**

  1. General data or the background characteristics: institutes, position/status, subject, age, gender, academic qualification, length of work experience/study;

  2. Preferred information sources and formats;

  3. Frequency of use of electronic information in comparison with printed information;

  4. Attitudes to services;

  5. Convenience/easy access/speed of use;

  6. Information literacy;

  7. Financial costs;

  8. ICT training/skills;

  9. Access to equipment and resources including printing;

  10. Support mechanisms.

Examples of questionnaires for each group, definitions of terms together with cover letters are shown in *Appendix III.*

Interview structure

The questions for interviews were tailored for each stakeholder group but covered the following issues: information policies, development of S&T information services in Thailand, barriers to the development, strategic plans,

and promotion of collaboration, information resource sharing policy and implementation, goals/targets of achievement, barriers and suggested solutions.

Examples of interview questions for executives of funding agencies and S&T information centres are shown in *Appendix IV-V*. Examples of interview questions for Thai library managers are shown in *Appendix VI*.

Focus group structure

As suggested by Krueger and Casey (2000, p.10), each focus group contained five to ten people, which is considered large enough to provide a sufficient diversity of perceptions. Following the recommendations of Krueger and Casey, it was decided that the focus group tasks would involve a broad range of groups including people from both the institutions directly concerned in the study (S&T information centres) and the participants of secondary stakeholder (funding agencies and users). Even though they are different stakeholders, a common understanding of the issues was possible because they come from the same community. Krueger and Casey (2000, p.28) remark that "*non-profit and service organisations typically have three categories of people who are of special importance to listen to –advisory groups, employees, and clients*". Thus these three mentioned categories are included in the research. The tasks were performed in three groups:

Group I: **Roles, policies and strategic management of S&T information service in Thailand**

Group II: **Barriers to S&T information service provision in Thailand**

Group III: **Opportunities for resource sharing or consortia development in Thailand**

Members in each group were invited to brainstorm and discuss the topic concerned as guided by the question route, beginning with general and moving to more specific issues. The session took about two hours.

4.2.5 Data collection framework

The pilot study

During the process of preparing the survey questions, an initial exploration was undertaken in order to see how acceptable the questionnaire that had been developed was and to test the methods of data collection chosen. In the study, the pilot tests of the research methods used were conducted for questionnaires, interviews and focus groups.

Pre-testing questionnaires

Respondents from three institutions in the group of interest to the research were involved in the pilot test of questionnaires. These respondents included the population in each target stakeholder group, which could be primarily categorised as:

- Respondents from academic libraries;
- Respondents from special libraries which comprise R&D institutions, S&T centres, and non-government organisations;
- Respondents from funding agencies; and
- Respondents from an end-user group

The draft questionnaires were sent to respondents concerned in each group together with formal letters to the executives of each institution, asking for their cooperation in filling in the questionnaires and their permission to contact the staff members. In this pre-testing process, the draft questionnaires were sent to one academic library, two special libraries of two R&D institutions, one funding agency, and three libraries for end-user group. Only one comment was made; respondents said there should be '*definitions of terms*' attached with the questionnaires in order to make the questions easier to understand and to interpret (as shown in *Appendix III*).

Questionnaire distribution

Due to the limited availability of ICT and accessibility to the Internet in Thailand, it was decided that both the pilot and real surveys would be conducted through the mail system. Another reason for the choice was that it would be convenient for respondents to work on the questionnaires at their leisure (Colorado State University Writers' Center 1999).

The problem of low response rate, which is the major weak point of mail survey were solved by follow-up letters, and further follow-ups as suggested by Robson (2002, pp.250-251).

Interviews

The target groups for the pre-test interviews were selected using two methods: from respondents to the questionnaires, or by a direct telephone contact to executives and library managers. That is, the stakeholders in the same three institutions were involved. The steps to pilot the interviews were:

- Asking for permission to approach each interviewee by sending formal letters to the executives of each institution;

- Contacting interviewees via telephone, to arrange the interviews;

- Conducting the interviews;

- Analysing the results obtained, and using them to improve the questions and review the way to conduct interviews.

Focus groups

A list of questions prepared for the focus groups were shown to the pilot respondents to obtain feedback. The questions were altered in accordance with the suggestions.

4.2.6 Processes of the methods

Questionnaires

Questionnaires for library groups were sent either by post or by hand to executives, or assigned persons who were given authority by executives to fill in the questionnaires. A summary of the research project and definition of terms were also attached together with a letter asking for cooperation. However, due to limitations of time, distribution of questionnaires to the regions other than the central one was done only by post.

The survey of end-users was conducted in a set period of two weeks. The questionnaires were administered only to the end-users who used the S&T information service in each library during that period of two weeks. Distribution of questionnaires to end-users was carried out mainly via each library, which had been asked to cooperate in the handing of questionnaires to users in its own library.

Personal contact was also used to ask for cooperation from academics, lecturers, undergraduate, postgraduate and research students, researchers and research staff to distribute questionnaires to the end-users. Two weeks were allowed for returning of the questionnaires.

The distribution of questionnaires to funding agencies was done by hand and by post. Distributing by hand was done after personal contact and executives of that funding agency had agreed to be interviewed.

Follow-ups of questionnaires

Respondents who failed to return the questionnaires in the allotted time were firstly, sent a letter to remind them, and secondly, phoned to encourage them to respond. Most of the calls were answered by their secretaries who had handled questionnaire distribution in the libraries. Therefore, they could give definite

answers and promised to send questionnaires back to the researcher by post, or made an appointment for the researcher to collect the questionnaires.

As for the provinces, follow-ups were also carried out both by sending a letter and making a phone call.

Interviews

Interviewees were obtained using two processes. Firstly, questionnaire respondents were asked to tick in the "yes" box in the questionnaires, and provide their contact details, if they wanted to participate in an interview. Secondly, direct contact was made by a phone call or face to face to executives or library managers, asking for their volunteer in interview. Official letters asking for permission to interview staff under their supervision were also given when required by them. However, only a few cases needed this level of intervention.

Conversations were recorded only when interviewees had agreed. For those that did not agree, the researcher wrote down what interviewees said and repeated this back to the interviewees, in order to confirm that the dialogues were not misunderstood. Conversations, then, were transcribed and analysed using the ATLAS-TI programme. This software was chosen because it could help identify the codes of each conversation, thus providing convenience in categorising and analysing data.

Focus groups

The focus groups were conducted according to Morgan's process (1998), following four basic steps: planning, recruiting, moderating and analysing and reporting.

• **Planning of the focus group project**

The focus group project in this research was funded by the Thai National Documentation Centre (TNDC), a S&T information centre under the Thailand Institute of Scientific and Technological Research (TISTR). Due to limitations of budget, the scope of the target groups covered only academic libraries and special S&T libraries in the central region. The purpose of the focus group project was to collect data in order to fulfil the following research objectives:

1. To investigate the present roles, policies and strategic management of the S&T information service sector in Thailand.

2. To investigate the awareness of the barriers to service development, and consider potential solutions.

3. To seek opportunities for resource sharing or consortia development.

4. To develop an information service model appropriate to modernisation.

It was expected that the project could capture "*the picture*" of the development trends in the S&T information service in Thailand in the areas of policy making and strategic management, barriers to the development of the S&T information service and potential solutions. It would also identify opportunities for resource sharing or consortia development in Thailand, and modernisation of the S&T information service model appropriate to country demands.

In this research, three focus group sessions were organised in order to fit the budget and time. Therefore, each focus group was assigned only one of the three key topics as mentioned earlier. Purposive samples of participants were chosen according to Morgan (1998):

> The goal in focus groups is to gain insight and understanding by hearing from people in depth, and this requires selecting a purposive sample that will generate the most productive discussions in the focus groups.
> (Morgan 1998, p.56)

The purposive sampling strategy led to participants being chosen from the target academic libraries, special libraries, and selected S&T researchers of TISTR who were interested library users.

The three focus groups were organised as a one-day project at the Conference Room, TISTR. Each focus group session lasted one and a half hours.

• **Developing a discussion guide**

As proposed by Greenbaum (2000, pp.85-104), developing a thorough and comprehensive discussion guide was very useful in the focus group process since it helped "*direct the flow of the session*"(p.87*)*. The discussion guide also provided an opportunity for others involved to offer suggestions for change and facilitated the flow of the conversation during the session such that a balance was achieve between the issues covered and time allocated to each question. Krueger and Casey (2000, p.40) suggest that developing a list of sequenced questions is important because focus group activities involve interaction between group members and the cognitive processes of humans. They explained that:

> As participants answer questions, their responses spark ideas from other participants. Comments provide mental cues that trigger memories or thoughts of other participants- cues that help explore the range of perceptions.
> (Krueger and Casey, p.40)

Thus, a discussion guide or a questioning route can partly help control the quality of the focus groups too.

The questions for the three focus groups in this research were developed based on the guidelines given by Morgan (1998), and Krueger and Casey (2000). They recommend that not more than twelve questions should be asked during a one to two-hour discussion and that questions should be easily understandable, brief, open-ended, one dimensional, and in a conversational tone, not in formal style or full of jargon. Once devised, the questions used in the focus group sessions were then sequenced from general to more specific or focused ones. A topic guide or questions in brief was distributed to participants before the start of each focus group, while a questioning guide, giving full details of each question, was prepared for moderators.

• **Pilot testing the questions**

The questions developed were given to an expert in the area of S&T information services for review and comment. This step was to make sure that the potential questions were clear, understandable and communicable as was intended. The expert was given a list of the questions in written form. Each question was then discussed verbally.

• **Recruiting**

Recruitment of participants was collaboratively managed with the Training Department, TISTR, which provided full facilities and staff to undertake the project. Potential participants were initially contacted by mail. Invitation letters were sent to the top executives of 17 information providers in the central region of Thailand in order to ask for their cooperation. Memoranda were also sent to selected researchers in TISTR who were in-house users of the Thai National Documentation Centre. Therefore, participants in each group were all composed of library managers, librarian or library staff, and users. There were in total ten members in each group.

• **Moderating**

As the three focus groups were arranged at the same time, each focus group was directed by the three different moderators. Each group had one moderator to ask questions, one assistant to deal with recording and note taking, and one presenter who was selected from the group members to present the points of view of his/her group in a plenary session. The researcher developed the questions as a discussion guide related to the explored issues and gave the script of questions to each moderator to follow. Meetings amongst the three moderators were also organised in order to clarify the questions and create a better understanding of the process in running the focus groups. After the plenary session, participants were provided with the opportunity to ask questions or give any feedback in the Questions and Answers session.

It was agreed amongst the moderators to facilitate the groups in a flexible and casual style. As observed by Davies (2003), the author gave a view that Asian people were less open and always kept their opinions to themselves. Regarding this, the moderators were asked to encourage participation, create a comfortable environment for talking, and minimise the stress of the situation as much as possible.

• **Analysing and reporting**

Materials used in the focus group activities in this research were an overhead projector, transparencies, field notes, and tape recorders. The data collected from each focus group, therefore, was mainly in the form of transcripts from recording, field notes, transparencies, and notes from debriefing session. In this research, reporting of group results was conducted in two formats: oral presentation and written summary report. The oral presentation of the preceding discussion was given by the representative of each group in the plenary session after the focus group tasks. Then a summary report giving a brief overview of the discussion was produced and distributed to group participants. This was carried out based on Krueger and King's recommendations (1998). They advised that the initial summary served the purposes of providing participants an opportunity to verify and to expand or modify the discussion results if needed.

Three focus groups were held at the same time in a one-day seminar at Thailand Institute of Scientific and Technological Research (TISTR). Each group had one interviewer and one secretary to facilitate participants in sharing their ideas and opinions. The researcher interviewed participants in Group III, while two other well-trained interviewers, one is the Director of Media Production and Dissemination, TISTR and another is from Training Department, TISTR, conducted interviews for Groups I and II. After the interviews, a representative of each group presented discussion results in a panel discussion. A session of Questions and Answers was also opened for more discussion.

Lists of questions for interviewing each group are presented in Chapter Seven.

CHAPTER FIVE

DATA ANALYSIS: QUESTIONNAIRES

5.1 Introduction

As this research aims to develop a model(s) of best practice in modernising the S&T information service in Thailand, it is necessary to explore the potential of the S&T information sector. The investigation concerns the domain of policies and strategic management, current state of service provision, together with barriers to the development. In order to obtain a wider range of data from multiple sources, methodological triangulation was applied in the data collection. The methods used consisted of questionnaires, interviews, and focus groups.

This chapter presents the results from the analysis of data collected from the questionnaire survey. The data presented will describe attitudes and opinions of four stakeholder groups which are executives/policy makers of the S&T information centres, library managers, librarians/staff, end-users, and executives/ policy makers of funding agencies. A total of 45 institutions participated in the questionnaire surveys comprising academic libraries and special libraries. Two funding agencies were explored in order to see if their policies support the development of R&D in the area of information service development. A user survey was also conducted in order to obtain data relevant to the information service development.

Two hundred and eighty-nine questionnaires were sent to executives, managers, and librarians/staff of those forty-five institutions by post or by hand where possible. The response rate was 72.67 percent, or a total of 210 questionnaires returned. Seven hundred and three questionnaires were sent to end-users of the

forty-five S&T information centres. The response rate of end-users was 65.15 percent or a total of 458 questionnaires returned. Two questionnaires were sent to the executives or policy makers of two funding agencies by hand, both were returned.

Calculation and statistical data were analysed using the SPSS and Microsoft Excel software packages. Frequency analysis was conducted using the SPSS and Likert scores were then calculated.

The following sections present the results from the questionnaire analysis, which were divided into five categories: executives or policy makers of the S&T information centres, library managers, librarians or staff, end-users, and executives or policy makers of the funding agencies.

5.2 Executives or policy makers of the S&T information centres

This section discusses the results obtained from a questionnaire survey of 25 executives of S&T information centres which include academic libraries and special libraries.

5.2.1 Background information

This part of the questionnaire presents the background information of respondents. As can be seen from Figure 5.1, the majority of the executives' ages were between 51-60 years old (14).
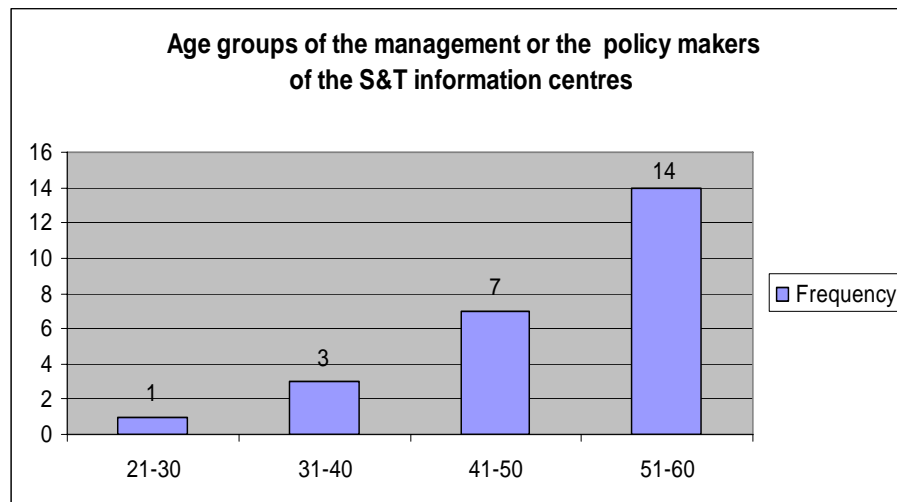
Figure 5.1 Age groups of the management or the policy makers

of the S&T information centres

Most of the executives were female (16). Their education degrees were varied. The majority had Master's degrees in Arts, Business Administration, Science or Engineering (11), four of them held Doctoral degrees, another four executives graduated with a Bachelor's degree in Science or Arts, and six of them held degrees in other subjects which   were   Medicine, Social Sciences, and IT Management.

Most of the executives (19) had work experience of more than 10 years (see Table 6.1).

Table 5.1 Work experience of the executives or

the policy makers of the institutions

Years of work experience	Frequency
More than 10 years	19
5-10 years	3
Less than 5 years	2

The majority of them (17) were working in academic institutions or universities, followed by government agencies (7), and a private organisation (1).

5.2.2 Policies and strategic management

1. Familiarity with Thailand's national information policy

Approximately, two-thirds (16) of the executives were either familiar or very familiar with Thailand's national information policy (see Figure 5.2). However, not all of these (14 of all the executives) were familiar or very familiar with the S&T information proclamation within Thailand's national information policy (see Figure 5.3).
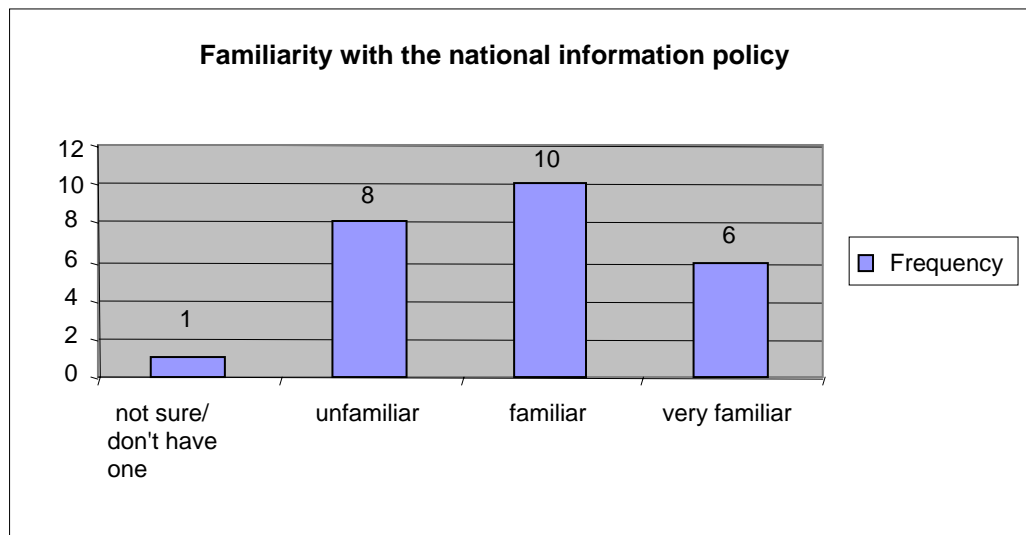
Figure 5.2 Familiarity with the national information policy
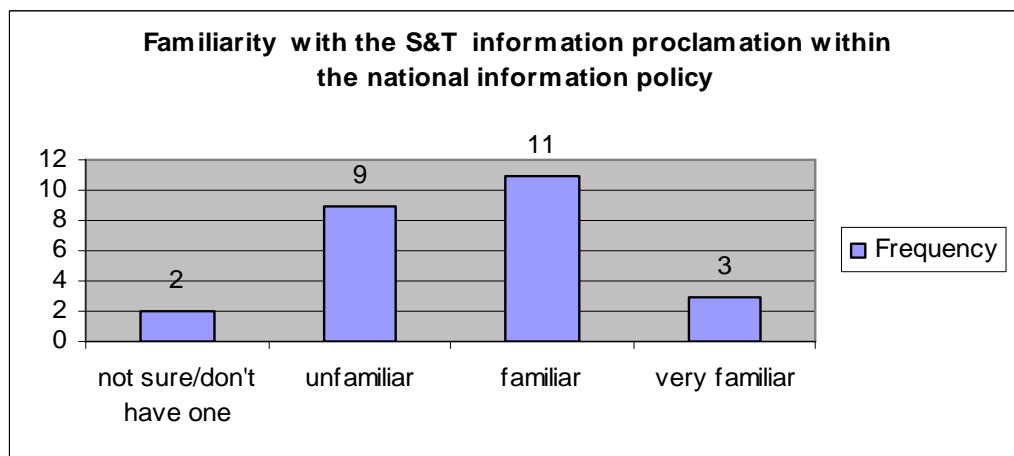
Figure 5.3 Familiarity with the S&T information proclamation within the national information policy

2. Familiarity with the institution's information policy

While nearly all of the executives (23 of 25 executives) were either familiar or very familiar with the institution's information policy, only three quarters or 19 of the executives were either familiar or very familiar with the S&T information proclamation within the institution's information policy (see Figures 5.4 and 5.5).
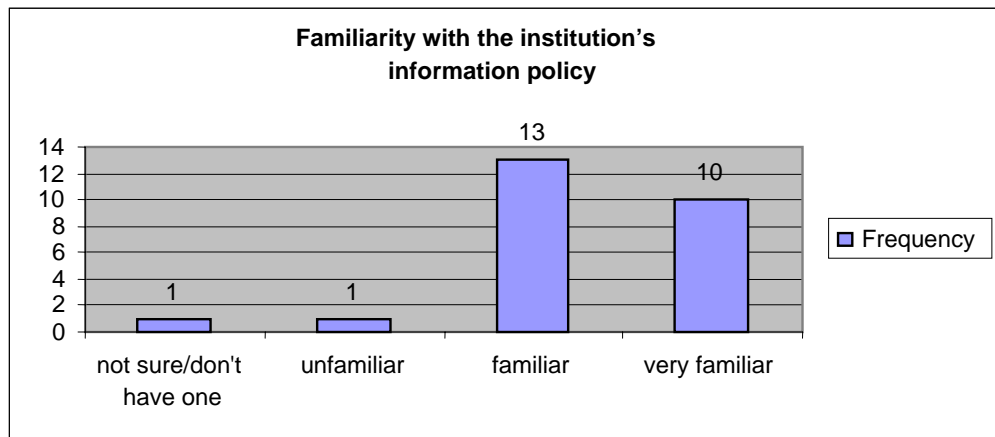
Figure 5.4 Familiarity with the institution's information policy
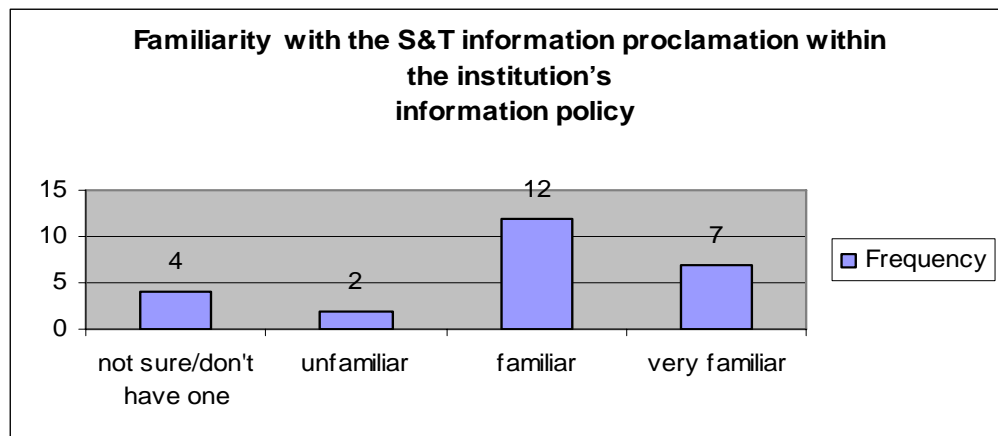
Figure 5.5 Familiarity with the S&T information

proclamation within the institution's

information policy

3. Familiarity with the institution's strategic plan for information management and services

All, apart from one executive, were either familiar (13) or very familiar (11) with the institution's strategic plan for information management and services.

5.2.3 Thailand's information policy

Of the 25 executives of S&T information providers in Thailand, nine of them were either not familiar or not sure about Thailand's information policy. Therefore, only the remaining 16 executives were required to answer detailed questions about Thailand's information policy.

It can be seen from the Likert scores (see Table 5.2) that the executives of academic and research libraries in this research thought that Thailand's information policy had an effect on their institution, had increased awareness of the role of S&T information in promoting competitiveness, was easy to understand, and had increased the demand for S&T information. However, they were less inclined to believe that the policy was well known by S&T information providers and easy to implement. In addition, the majority were not convinced that the national information policy had shaped the provision of information policies for each region of Thailand, or had an effect on the overall provision of S&T information in Thailand.

Table 5.2 Likert scores for Thailand's information policy

Had effect on the institution	4.13
Increased awareness of the role of S&T information in promoting competitiveness	3.92
Easy to understand	3.56
Increased the demand for S&T information	3.06
Well known by S&T information providers	2.94
Easy to implement	2.94
Shaped the provision of information policies for each region of Thailand	2.88
Had an effect on the overall provision of S&T information in Thailand	2.31

5.2.4. Barriers to development of S&T information services in Thailand

The 25 executives were asked to rank the top five barriers to the development of S&T information services in Thailand. All the items ranked by the executives were given scores as follows:

Rank	Score	Meaning
1	5	The highest score for the most important barrier
2	4	The second most important barrier
3	3	The third most important barrier
4	2	The fourth most important barrier
5	1	The lowest score for the last most important barrier

The total scores of each item were added up, and then they were ranked from the highest to the lowest ones. As can be seen from Table 5.3, the main barrier, by far, was the lack of collaboration between institutions.

Table 5.3 Top five barriers to development of S&T

information services in Thailand

Rank	Barrier	Scores
1	Lack of collaboration between institutions	85.00
2	Lack of skilled personnel	51.00
3	Lack of clear institution's policy	44.00
4	Inadequacy of budget	43.00
5	Lack of clear national information policy	41.00
	Lack of information management	41.00

The remaining barriers were thought to be as shown in Table 5.4:

Table 5.4 Other barriers to development of S&T

information services in Thailand

Rank	Barrier	Scores
7	Lack of ICT provision	29.00
8	Poor user's information literacy	17.00
9	Restriction on laws and regulations	9.00

5.2.5 Institution's information policy

As can be seen from the Likert scores (see Table 5.5), nearly all the executives who were familiar with the institution's information policy (23) considered that information service and library system development was important when promoting R&D. Furthermore, the executives believed that their institutions had clear policies in promoting R&D and actively promoted the S&T information service.

Table 5.5 Likert scores for the institution's information policy

The information service is considered important by the institution when promoting R&D	4.55
The institution considers library system development to be important	4.45
The institution actively promotes the S&T information service	4.40
Had clear policies in promoting R&D	4.35

5.2.6 Strategic plan for information management and services

It can be seen from the Likert scores (see Table 5.6) that the 24 executives who were familiar with their institution's strategic plan thought that their library staff had a chance to participate in formulating the institution's strategic plan for information management and services. They also believed that the strategic plan increased the effectiveness of the information service provision, and that it addressed the integration of ICT and S&T information resources, the end-user oriented strategy, the transition to an electronic library environment, the collaborative activities for resource sharing with other institutions, and the professional development of library staff.

Table 5.6 Likert scores for the institution's strategic plan for information

management and services

Stated a goal to integrate ICT and S&T information resources	4.43
Increased effectiveness of the information service provision	4.42
Mentioned the end-user oriented strategy	4.29
Stated the transition to an electronic library environment	4.29
Allowed staff to participate in formulating the institution's strategic plan for information management and services	4.25
Stated the collaborative activities for resource sharing with other institutions	4.21
Stated the professional development of library staff	4.00

5.2.7 Library service types

All but one of the executives thought that their libraries were hybrid libraries.

5.2.8 Current state of S&T information services in each institution

All 25 executives of the surveyed libraries were asked about their attitudes towards the current state of S&T information services in their institutions. The results are shown in Table 5.7.

Table 5.7 Likert scores for the current state of information services

Overall satisfaction with the information services provided to end-users	2.76
ICT provision (quality)	2.40
ICT provision (quantity)	2.20
The budget allocated for information service provision	2.20

In general, the executives were not satisfied with the information services provided to end-users. Nor were they very happy with the provision of ICT, both in quality and quantity. The budget allocated for information service provision was considered to be "unsatisfactory".

5.2.9 The S&T information resource sharing in Thailand

Familiarity with the S&T information network in Thailand

The results show that the majority of the executives (18) were either familiar or very familiar with the S&T information network in Thailand. The remaining executives (7) were not familiar with it (see Figure 5.6).
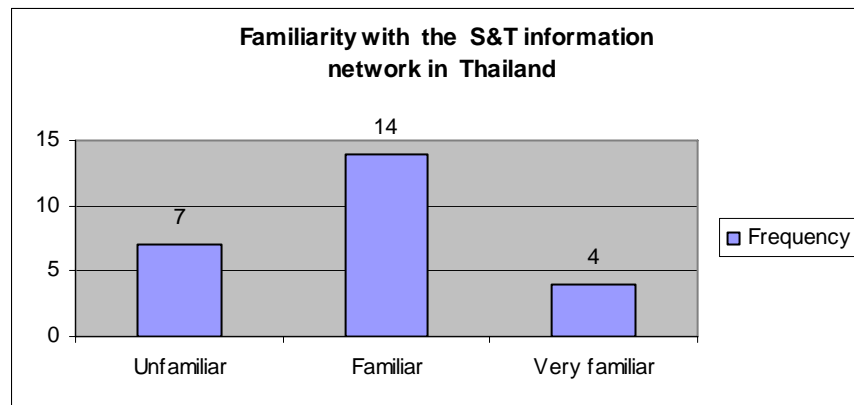
Figure 5.6 Familiarity with the S&T information
network in Thailand

It can be seen from the Likert scores (see Table 5.8) that the executives who were familiar with the S&T information network in Thailand (18) thought that the S&T information network and resource sharing benefited the S&T information service sector in Thailand. Furthermore, the S&T information network helped increase collaboration with other institutions, reduce the cost of S&T information, and increase the demand for S&T information. It was mentioned that their institutions made a lot of use of the network, obtained some benefit in using it,

and that their institutions wished to play a more active role in the network. They also did not think that the network increased workload in their libraries.

Table 5.8 Likert scores for the S&T information network and the situation of resource sharing in Thailand

Benefited the S&T information service sector in Thailand	4.56
Increased collaboration with other institutions	4.06
Reduced cost of S&T information	3.94
The institution made a lot of use of the network	3.94
Increased the demand for S&T information	3.89
The institution wished to play a more active role in the network	3.89
The institution saw some benefit in using the network	3.28
The institution had been informed about the network	3.00
The network increased workload in the library	2.72

For those who were not familiar with the S&T information network (7), only five of them responded when asked if their institutions lacked information about S&T information network. The results show that two of five executives agreed that they lacked information about the S&T information network, while one of five executives believed that their institutions had been informed about the network. However, the remaining two executives had no comment.

5.2.10 Barriers to S&T information resource sharing in Thailand

The 25 executives were asked to rank the top five barriers to S&T information resource sharing in Thailand, similar to the score ranking earlier mentioned in 5.2.4 (Barriers to development of S&T information service in Thailand).

As can be seen from Table 5.9, the main barriers were thought to be lack of policies and unavailability of ICT equipment.

170

Table 5.9 Top five barriers to S&T information

resource sharing in Thailand

Rank	Barrier	Scores
1	No policy from parent institution	45.00
2	Unavailability of ICT	43.00
3	Lack of skilled ICT staff for electronic access	33.00
	Lack of information about S&T information network	33.00
5	System incompatabilities	29.00

The remaining barriers were thought to be as shown in Table 5.10.

Table 5.10 Other barriers to S&T information

resource sharing in Thailand

Rank	Barrier	Scores
6	Fears of unbalanced sharing	26.00
	Increase of workload	26.00
8	Cost	23.00
9	Staff attitudes and laws and regulations	16.00
10	Lack of time from staff	14.00
11	Not necessary to share	6.00
12	Lack of national information policy and Lack of organising body	5.00

5.2.11 Other comments

One executive gave the comments in four issues as follows:

1. A problem occurred in the sharing of commercial databases with respect to a user licence. It appeared that larger libraries which had larger budgets also had much more opportunities to subscribe to more commercial databases. Therefore, they could provide better services to their users when compared to the smaller libraries. It was suggested that there should be a national licence

which allowed users from any library to access databases from any location. However, it is recognised that this would have budget implications.

2. There should be a manual for searching databases in order to help users access and search the databases more effectively. This also might attract users to use the databases more and result in the more effective use of subscribed databases.

3. Librarians/library staff should be trained in searching skills in S&T   databases.

4. There should be more development of S&T full-text databases specifically to hold Thai related S&T information.

5.3 Library managers

5.3.1 Background information

This section discusses the results obtained from a questionnaire survey of 36 managers or heads of concerned divisions of academic libraries, research libraries, and S&T information centres. As can be seen from Figure 5.7, the majority of the library managers' ages were between 41-50 years old (21).
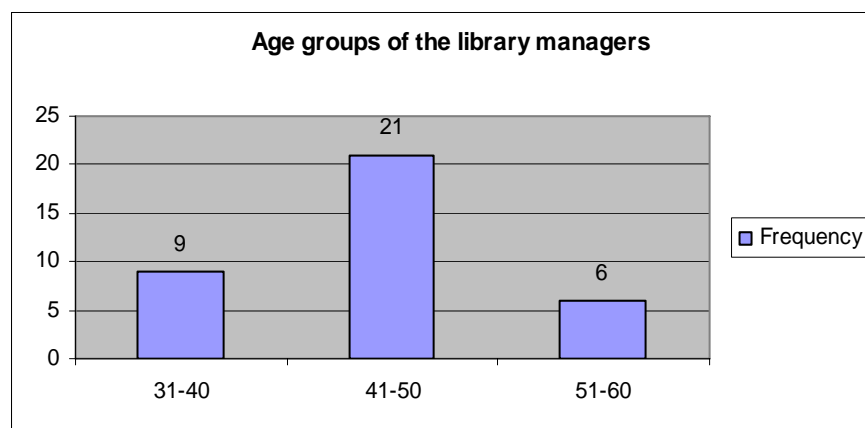
Figure 5.7 Age groups of the library managers

All but two of the library managers were female. The majority of the library managers held Master's degrees in Arts or Business Administration (23). Moreover, eight held Bachelor's degrees in Sciences or Arts, three held Master's

degrees in Sciences or Engineering, and two held Doctoral degrees. Most of the library managers had work experience of more than 10 years (see Table 5.11).

Table 5.11 Work experience of the library managers

Years of work experience	Frequency
More than 10 years	27
5-10 years	7
Less than 5 years	1

The majority of them (22)   were working in academic institutions or universities, although 13 worked in   government agencies, and one in a private organisation.

5.3.2 Familiarity with policies and strategic management

1. Familiarity with the institution's information policy

The majority of the library managers (27) were either familiar or very familiar with the institution's information policy (see Figure 5.8). However, not all the library managers were familiar or very familiar with the S&T information proclamation within the institution's information policy (see Figure 5.9).
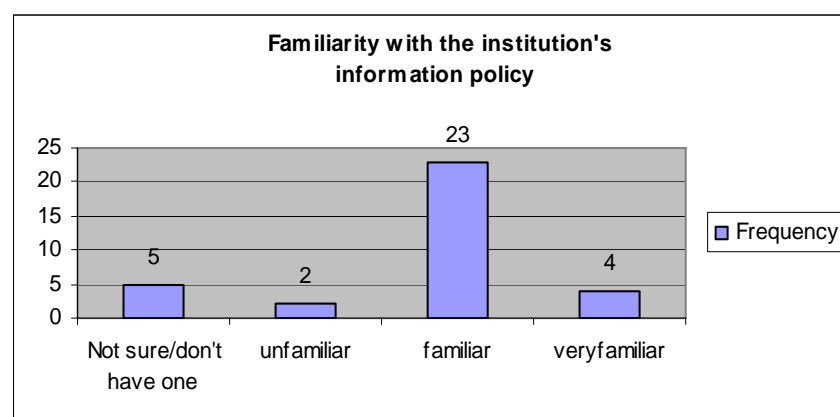
Figure 5.8 Familiarity with the institution's information policy
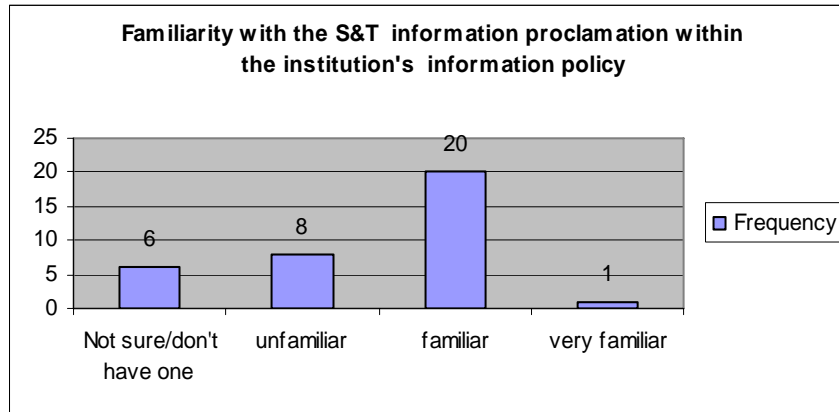
Figure 5.9 Familiarity with the S&T information proclamation within the institution's information policy

2. Familiarity with the institution's strategic plan for information management and services

Nearly all of the library managers (32) were familiar or very familiar with the institution's strategic plan for information management and services (see Figure 5.10).
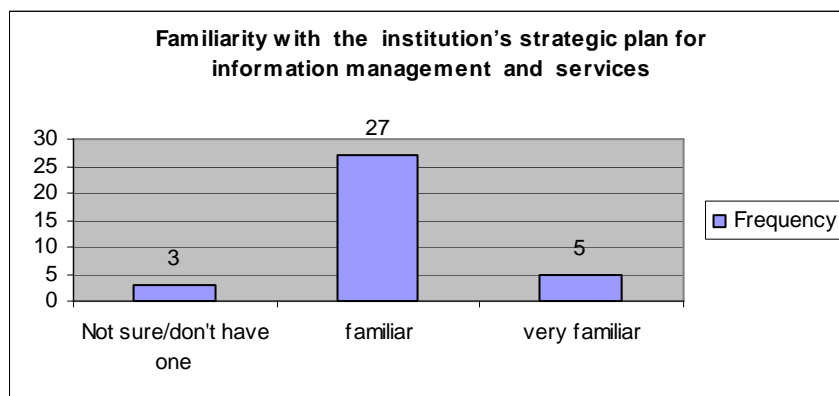
Figure 5.10 Familiarity with the institution's strategic plan for information management and services

5.3.3 Institution's information policy

Of the 36 library managers, 7 of them were either not familiar or not sure about the institution's information policy. Therefore, only the remaining 27 library managers were required to answer detailed questions about their institution's information policy. Further information about how policies were developed is provided in Chapter Six (Data Analysis: Interviews).

It can be seen from the Likert scores (see Table 5.12) that the library managers of academic and research libraries in this survey thought that their institution's information policy was easy to understand, had increased awareness of the role of S&T information in promoting competitiveness, had shaped the provision of information services in the institution, had an effect on the overall provision of S&T information in the institution, and also was easy to implement. However, they were less inclined to believe that the policy was well known by the library staff.

Table 5.12 Likert scores for   institution's information policy

Easy to understand	4.07
Increased awareness of the role of S&T information in promoting competitiveness	3.93
Shaped the provision of information services in the institution	3.93
Had an effect on the overall provision of S&T information in the institution	3.85
Easy to implement	3.59
Well known by library staff	2.92

5.3.4 Strategic plan for information management and services

It can be seen from the Likert scores (see Table 5.13) that the library managers who were familiar with their institutions' strategic plan (32) thought that the

strategic plan increased the effectiveness of the information service provision and was useful for conducting activities in information services. They agreed that they had a chance to participate in formulating the institution's strategic plan for information management and services. Furthermore, they gave a view that the strategic plan addressed the end-user oriented strategy, the collaborative activities for resource sharing with other institutions, the integration of ICT and S&T information resources, the professional development of library staff, and the transition to an electronic library environment. They also believed that responsibility for implementation was clearly identified in the strategic plan. In addition, they mentioned that, in some cases, the library staff had a chance to participate in formulating the strategic plan, so they thought that it was generally known to the library staff.

Table 5.13 Likert scores for the institution's strategic plan for information management and services

Increased effectiveness in information service provision	4.38
Was useful for conducting activities in information services	4.34
Allowed a library manager to participate in formulating the institution's strategic plan for information management and services	4.25
Mentioned the end-user oriented strategy	4.13
Stated the collaborative activities for resource sharing with other institutions	4.13
Stated a goal to integrate ICT and S&T information resources	4.09
Identified clear responsibility for implementation	4.00
Stated the professional development of library staff	3.97
Stated the transition to an electronic library environment	3.90
Allowed staff to participate in formulating the institution's strategic plan for information management and services	3.78
Was generally known to the library staff	3.63

5.3.5 Library service types

The majority of the library managers (30) thought that their libraries functioned in a hybrid manner. Only two managers considered their libraries to be traditional.

5.3.6 Current state of S&T information service in each institution

All 36 managers of the surveyed libraries were asked about their attitudes towards the current state of S&T information service in their institutions. The results are shown in Table 5.14.

In general, the library managers were not satisfied with the information services provided to end-users. Nor were they very happy with the budget allocated for information service provision. Moreover, the provision of ICT, both in quality and quantity, was considered to be "*unsatisfactory*".

Table 5.14 Likert scores for the current state of information services

Overall satisfaction with the information services provided to end-users	2.67
The budget allocated for information service provision	2.42
ICT provision (quality)	2.33
ICT provision (quantity)	2.28

5.3.7. Services provided to end-users

The Likert scores (see Table 5.15) show that the library managers agreed that their libraries provided end-users with library usage skills and ICT training. Furthermore, they regularly advertised new resources to their end-users and conducted user surveys at least once a year.

Table 5.15 Likert scores for services provided to end-users

Provided end-users with library usage skills	4.42
Advertised new resources to end-users	4.36
Conducted user surveys at least once a year	3.86
Provided ICT training for end-users	3.64

5.3.8 Personnel management

It can be seen from the Likert scores that (see Table 5.16) the library managers believed that their library staff had adequate skills, both in terms of librarianship and ICT. However, they were less inclined to agree that their institutions had adequate staff to deal with a high workload in the libraries.

Table 5.16 Personnel management

Library staff had adequate skills in librarianship.	3.58
Library staff had adequate skills in ICT.	3.44
The institution had adequate staff to deal with a high workload.	2.25

5.3.9 Resource sharing scheme

As part of the investigation, the library managers identified the resource sharing schemes practised in their libraries (see Figure 5.11). Libraries were heavily involved in interlibrary lending but much less involved in collaborative collection and storing. The future of resource sharing schemes was also studied in order to identify development trends with respect to information resource sharing (see Table 5.17). Collaborative projects in the future were production of union lists, union catalogues, and bibliographic utilities, and co-cataloguing, which are collaboratively undertaken by six libraries each. It is observed that no future collaboration in licence agreement for online commercial databases or electronic resource subscription was mentioned.
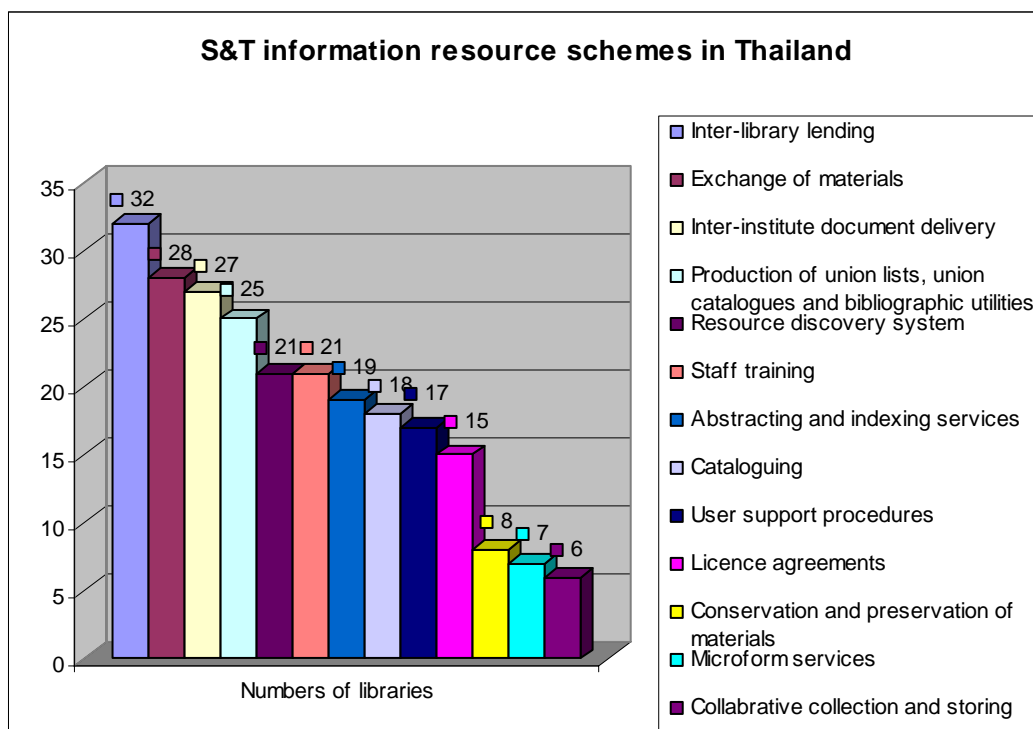
Figure 5.11 S&T information resource sharing schemes in Thailand

Table 5.17 S&T information resource sharing schemes amongst

academic and special S&T libraries in Thailand

Resource sharing schemes	Yes	No	To be developed
	Frequency	Frequency	Frequency
Inter-library lending	32	4	0
Exchange of materials	28	6	2
Inter-institute document delivery	27	7	2
Production of union lists, union catalogues, and bibliographic utilities	25	5	6
Resource discovery system	21	12	3
Staff training	21	14	1
Abstracting and indexing services	19	14	3
Cataloguing	18	12	6
User support procedures	17	19	0
License agreements	15	20	0
Conservation and preservation of materials	8	26	2
Microform services	7	28	1
Collaborative collection and storing	6	26	3

5.3.10 The need for improvement of the library

The 36 library managers were asked to rank the priorities for improvement of their own libraries. All the items ranked by them were given scores as follows:

Rank	Scores	Meaning
1	6	the highest score for the first mostly needed
2	5	the second mostly needed
3	4	the third mostly needed
4	3	the fourth mostly needed
5	2	the fifth mostly needed
6	1	the lowest score for the last mostly needed

The total scores of each item were added up, and then they ranked from the highest to the lowest ones. As can be seen from Table 5.18, the first priority was the improvement of ICT, and the last one was the location of the library.

Table 5.18 Priorities for improvement of the library

Rank	Need for improvement	Scores
1	ICT	156.50
2	Budget	140.50
3	Staff skills	144.50
4	Service performance	139.00
5	Space	90.00
6	Location	55.50

5.3.11 The S&T information resource sharing in Thailand

Familiarity with the S&T information network in Thailand

Of the 36 library managers of the S&T information providers in Thailand, 10 of them were not familiar with the S&T information network (see Figure 5.12). The remaining 26 library managers were required to answer the questions.
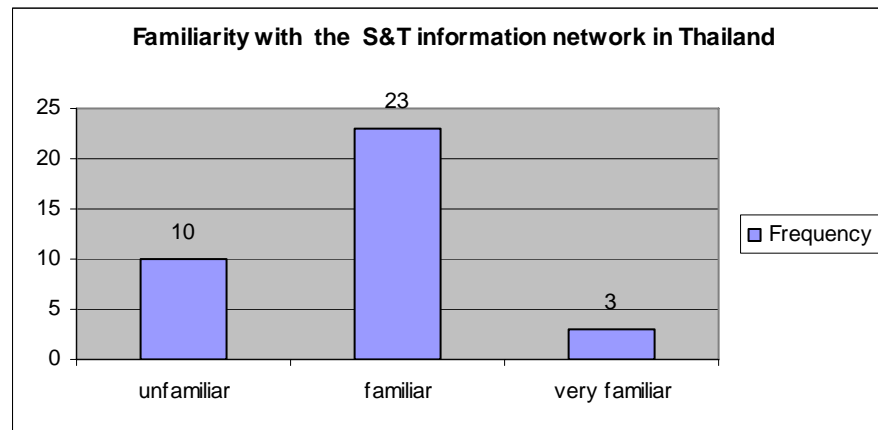
Figure 5.12 Familiarity with the S&T information network in Thailand

It can be seen from the Likert scores (see Table 5.19) that the 26 library managers who were familiar with the S&T information network in Thailand thought that the S&T information network and the resource sharing benefited the S&T information service sector in Thailand. Furthermore, the S&T information network enabled them to obtain S&T information more quickly, increased collaboration with other institutions, reduced cost of S&T information, and increased the demand for S&T information. They accepted that their institutions made a lot of use of the network and obtained some benefit in using it, and that their institutions wished to play a more active role in the network. However, they disagreed that the network increased workload in their libraries.

Table 5.19 Likert scores for the S&T information network and

the situation of resource sharing in Thailand

Benefited the S&T information service sector in Thailand	4.46
Enabled to obtain S&T information more quickly	4.42
Increased collaboration with other institutions	4.35
Increased the demand for S&T information	4.28
Eliminated duplication in acquisition of S&T information resources	4.27
Reduced cost of S&T information	4.19
The institution wished to play a more active role in the network	4.12
The institution had been informed about the network	3.40
The institution saw some benefit in using the network	3.12
The network increased workload in the library	2.68

The 10 library managers who were not familiar with the S&T information network   were asked if their institutions lacked information about the network. The results show that only one of 10 library managers agreed that they lacked information about S&T information network, while three of them believed that their institutions had been informed about the network. However, the remaining six library managers   had no comment.

5.3.12 Barriers to S&T information resource sharing in

Thailand

The 36 library managers were asked to rank the top five barriers to S&T information resource sharing   in Thailand, similar to the score ranking earlier mentioned in 5.3.10 (The need for improvement of the library). The scores given represent as follows:

Rank	Scores	Meaning
1	5	the highest score for the most important barrier
2	4	the second most important barrier
3	3	the third most important barrier
4	2	the fourth most important barrier
5	1	the lowest score for the last most important barrier

As can be seen from Table 5.20, the main barrier, by far, was the unavailability of ICT.

Table 5.20 Top five barriers to S&T information resource sharing in Thailand

Rank	Barrier	Scores
1	Unavailability of ICT	68
2	Lack of skilled ICT staff for electronic access	54
3	No policy from parent institution	52
4	Restrictions on laws and regulations	48
5	Fears of unbalanced sharing	40

The remaining barriers were thought to be as shown in Table 5.21.

Table 5.21 Other barriers to S&T information resource sharing in Thailand

Rank	Barrier	Scores
6	Lack of time from staff	38
7	Lack of information about S&T information network	34
8	Cost	32
9	System incompatabilities	30
10	Increase of workload	24
11	Lack of organising body and lack of national information policy	10
12	Not necessary to share	7
13	Staff attitudes	6

5.3.13 Other comments

A few library managers gave their additional comments about   the S&T information service in Thailand as follows:

1. The low speed leased line used resulted in low performance of online searching system. (1)
2. More budget should be allocated for subscribing to online full-text databases.(1)
3. An effective central organising body should be established in order to run the network continuously. More funds should be given for personnel recruitment and acquisition of materials and facilities. (1)
4. The policy of balanced sharing should be set. (1)
5. Institutions concerned should urge the government to realise the importance of S&T information sector. The S&T information system should be developed on a national scale. (4)

5.4 Librarians/library staff

5.4.1 Background information

This section discusses the results obtained from a questionnaire survey of 149 librarians and library staff of academic libraries and special libraries. As can be seen from Figure 5.13, the majority of librarians and library staff were between 41-50 years old (38 percent). There were smaller groups aged   between   31-40 years old (32 percent), between 21-30 years old (21 percent), and between 51-60 years old (9 percent).
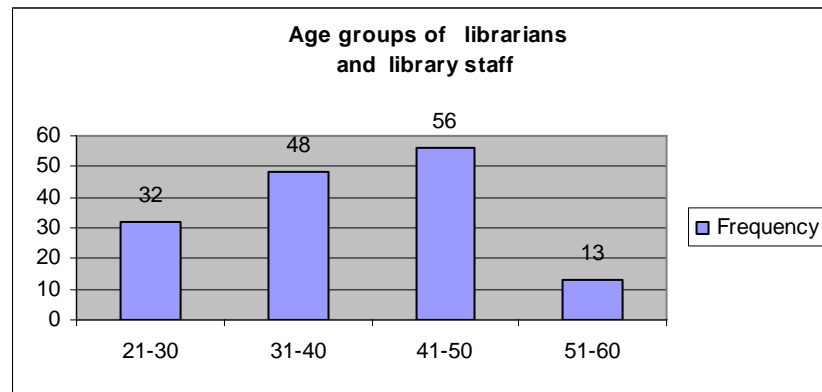
Figure 5.13 Age groups of librarians and library staff

Nearly all the librarians and library staff were female (81 percent). The majority of librarians and library staff held Bachelor's degrees in Sciences or Arts (52 percent). Moreover, 36 percent held Master's degrees in Arts or Business Administration, and eight percent of them held other degrees including Bachelor's degrees in business administration, educational technology, certificates in vocational education, education, and teaching. Three percent held Master's degrees in Science or Engineering. Only one of them held a Doctoral degree.

Most of the librarians and library staff surveyed had work experience of more than 10 years (see Table 5.22).

Table 5.22 Work experience of the librarians and library staff

Years of work experience	Frequency	Percent
More than 10 years	78	52
5-10 years	43	29
Less than 5 years	28	19

Three quarters of the respondents (76 percent) were working in academic institutions or universities. The remaining either worked in government agencies (23 percent) or in private organisations (1 percent).

5.4.2 Familiarity with policies and strategic management

1. Familiarity with the institution's information policy

Almost three quarters of the librarians and library staff (72 percent) were either familiar or very familiar with the institution's information policy (see Figure 5.14). However, only 55 percent of all the librarians and the library staff were familiar or very familiar with the S&T information proclamation within the institution's information policy (see Figure 5.15).
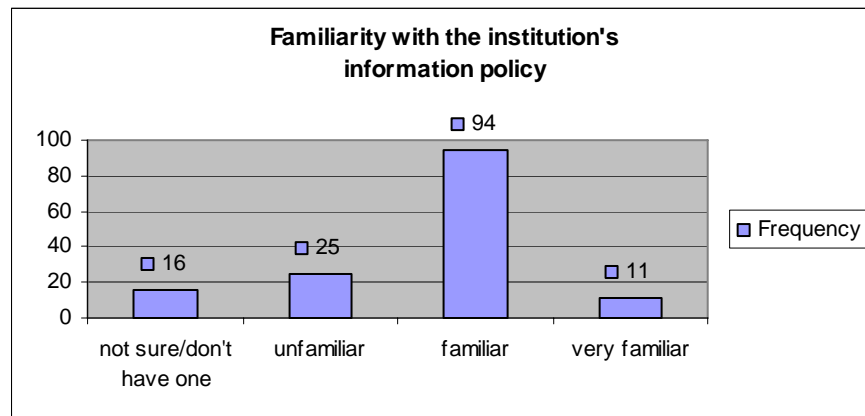
Figure 5.14 Familiarity with the institution's information policy
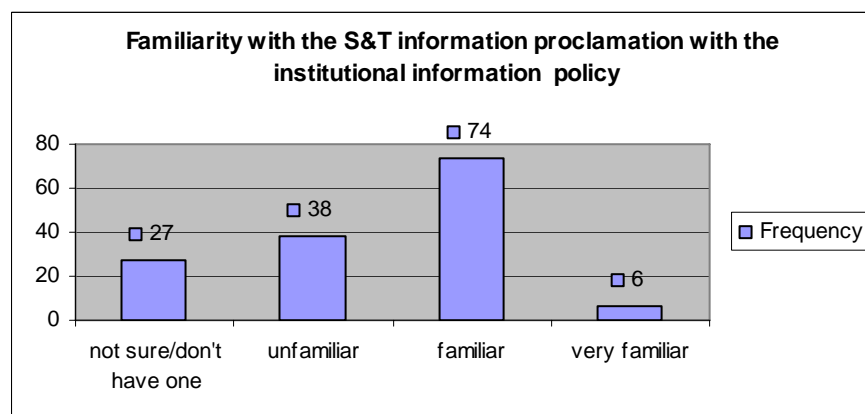
Figure 5.15 Familiarity with the S&T information proclamation with the institutional information policy

2. Familiarity with the institution's strategic plan for information management and services

Nearly three quarters of the librarians and the library staff (72 percent) were familiar or very familiar with the institution's strategic plan for information management and services (see Figure 5.16). The remaining respondents (28 percent) were not familiar or did not know about it.
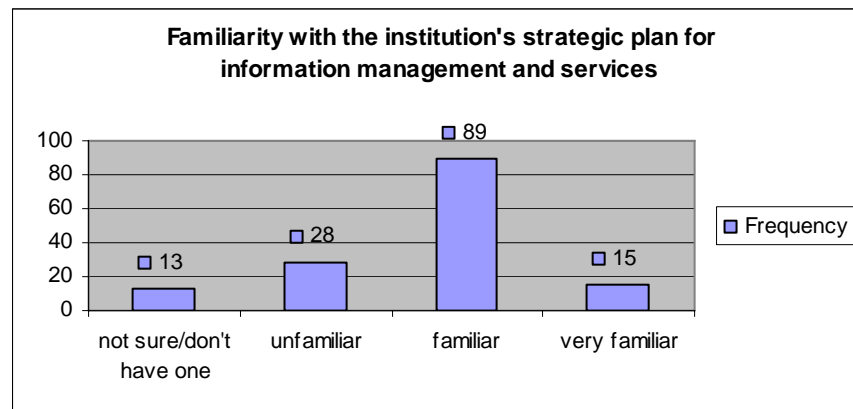
Figure 5.16 Familiarity with the institution's strategic plan for information management and services

5.4.3 Institutions' information policy

The 105 librarians and library staff (approximately 72 percent) in the survey who were either familiar or very familiar with the institutions' information policy were required to answer detailed questions about their institution's information policy.

It can be seen from the Likert scores (see Table 5.23) that the librarians and the library staff of academic and research libraries in this survey thought that their institutions' information policy had shaped the provision of information services in the institution, had increased awareness of the role of S&T information in promoting competitiveness, was easy to understand, had an effect on the overall

provision of S&T information in the institution, and was easy to implement. They also believed that the policy was well known by the library staff.

Table 5.23 Likert scores for institutions' information policy

Shaped the provision of information services in the institution	3.93
Increased awareness of the role of S&T information in promoting competitiveness	3.84
Easy to understand	3.81
Had an effect on information service in the institution	3.65
Easy to implement	3.63
Well known by library staff	3.14

5.4.4 Strategic plan for information management and services

It can be seen from the Likert scores (see Table 5.24) that the librarians and library staff who were familiar with their institutions' strategic plan (105) thought that the strategic plan was useful for conducting activities in information services and increased the effectiveness of the information service provision. They considered that the strategic plan addressed the integration of ICT and S&T information resources, the collaborative activities for resource sharing with other institutions, the end-user oriented strategy, the transition to an electronic library environment, and the professional development of library staff. They also believed that responsibility for implementation was clearly identified in the strategic plan. Furthermore, they agreed that it was generally known to the library staff and that they had a chance to participate in formulating it.

Table 5.24 Likert scores for the institution's strategic plan for information management and services

Was useful for conducting activities in information services	4.12
Increased effectiveness in information service provision	4.11
Stated a goal to integrate ICT and S&T information resources	4.02
Stated the collaborative activities for resource sharing with other institutions	4.01
Mentioned the end-user oriented strategy	4.01
Stated the transition to an electronic library environment	3.95
Stated the professional development of library staff	3.75
Identified clear responsibility for implementation	3.71
Was generally known to the library staff	3.63
Allowed staff to participate in formulating the institution's strategic plan for information management and services	3.29

5.4.5 Library service types

Almost all of respondents (96 percent) considered their library to be hybrid. The remaining four percent considered their library to be traditional.

5.4.6 The roles and professional development of librarians and library staff

All 149 librarians and library staff were asked about their current roles and opportunities for professional development. It can be seen from the Likert scores (see Table 5.25) that the librarians and library staff in the survey agreed that they had opportunities to attend training courses regularly. They believed that they could manage new ICT with strong institutional support. In addition, they thought they had a chance to be involved in teaching information literacy skills to end-users. They were satisfied with the workload given, and also with the quality of service provided to end-users by their libraries. They thought that they had opportunities to participate in library management, had adequate skills in

librarianship, and had adequate skills in ICT. They also considered that they were involved in managing knowledge of the institution. However, they were less inclined to agree that they had conducted research in the field of information science or library systems.

Table 5.25 Likert scores for the roles and professional development of librarians and library staff

Had opportunities to attend training courses regularly	3.78
Could manage new ICT with strong institutional support	3.65
Were involved in teaching information literacy skills to end-users	3.59
Were satisfied with workload given	3.58
Were satisfied with the quality of service provided to end-users	3.57
Had opportunities to participate in library management	3.50
Had adequate skills in librarianship	3.44
Were involved in managing knowledge of the institution	3.42
Had adequate skills in ICT	3.27
Had conducted research in the field of information science or library system	2.98

5.4.7 The S&T information resource sharing in Thailand

Familiarity with the S&T information network in Thailand

Approximately, two thirds (64 percent) were familiar with the S&T information network (see Figure 5.17).   The respondents were required to answer questions relating to the S&T information network.
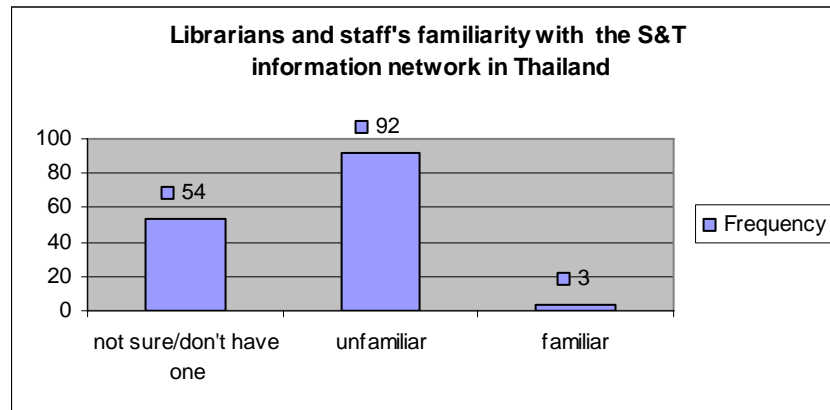
Figure 5.17 Librarians and staff's familiarity with the S&T information network in Thailand

It can be seen from the Likert scores (see Table 5.26) that the librarians and library staff who were familiar with the S&T information network in Thailand (95) thought that the S&T information network and resource sharing benefited the S&T information service sector in Thailand. Furthermore, they thought that the S&T information network increased collaboration with other institutions, increased the demand for S&T information, reduced the cost of S&T information, and enabled them to obtain S&T information more quickly. They also thought that the S&T information network eliminated duplication in acquisition of S&T information resources. They believed that their institutions wished to play a more active role in the network and saw some benefit in using the network. However, the librarians and library staff were less inclined to agree that the network increased workload in the library.

The librarians and library staff who were not familiar with the S&T information network (54) were asked if they, themselves, lacked information about the network. One third (32 percent) said they had been informed about the network but 22 percent had never been informed about the S&T information network. A further 46 percent of respondents made no comment.

Table 5.26 Likert scores for the S&T information network and the

situation of resource sharing in Thailand

Benefited the S&T information service sector in Thailand	4.42
Increased collaboration with other institutions	4.24
Increased the demand for S&T information	4.20
Reduced cost of S&T information	4.16
Enabled to obtain S&T information more quickly	4.13
Eliminated duplication in acquisition of S&T information resources	4.06
The institution wished to play a more active role in the network	3.88
The institution saw some benefit in using the network	3.71
The institution had been informed about the network	3.10
The network increased workload in the library	2.83

5.4.8 Barriers to S&T information resource sharing in Thailand

The 149 librarians and library staff were asked to rank the top five barriers to S&T information resource sharing   in Thailand. All the items ranked by the librarians and library staff were given scores as follows:

Rank	Scores	Meaning
1	5	the highest scores for the most important barrier
2	4	the second most important barrier
3	3	the third most important barrier
4	2	the fourth most important barrier
5	1	the lowest scores for the last most important barrier

The total scores of each item were added up, and then they were ranked   from the highest to the lowest ones. As can be seen from Table 5.27, the main barrier, by far, was thought to be the lack of availability of ICT.

Table 5.27 Top five barriers to S&T information

resource sharing in Thailand

Rank	Barrier	Scores
1	Unavailability of ICT	364
2	Lack of skilled ICT staff for electronic access	325
3	No policy from parent institution	249
4	Cost	243
5	Lack of information about S&T information network	23

The remaining barriers were thought to be as shown in Table 5.28

Table 5.28 Other barriers to S&T information resource sharing in Thailand

Rank	Barrier	Scores
6	System incompatabilities	177
7	Restrictions on laws and regulations	132
8	Lack of time from staff	116
9	Increase of workload	92
10	Fears of unbalanced sharing	82
11	Staff attitudes	64
12	Not necessary to share	22
13	- No clear national policy on S&T information system, or a policy changed or dissolved when governments changed - Access not convenient to prompt use	8

5.4.9 Other comments

The librarians and library staff gave some additional comments about the S&T information service in Thailand as follows:

• **National and institution's policies**

1. National and institutional information policies should be set forth clearly and widely. (1)

2. The government should offer lower tax rates of purchase of computer hardware and software for academic and educational purposes. (1)

3. The policy of balanced sharing should be established, for example, there could be reasonable service fees, at levels which are acceptable by all stakeholders, including service providers, network members and end-users.(1)

4. The restrictive laws and regulations particularly these associated with licences and copyrights should be examined to determine if they can be solved at national level. (1)

5. A balanced sharing measure should be set, placing special emphasis on sizes of institutions and user numbers. (1)

6. Top executives in institutions should communicate and make information policies well known to their staff at all levels, encouraging them to recognise the benefits of the whole nation and institutions. (2)

7. The problem of copyrights should be collaboratively solved among academic and research institutions. There is a controversy about the development of databases of research work, which is currently opposed by academics and researchers in some particular fields. For example, it is claimed that the know-how in agro-technological research cannot be opened to the general public because it can be used for commercial or industrial purposes. (1)

• **Strategic management**

1. Institutions should take a more active role in recruiting network members to strengthen the network. (1)

2. Activities and services of S&T information networks should be advertised to the members or end-users widely and regularly in order to make the best use of costly resources. (1)

- **Services**

   1. The current services and performance of networks in Thailand are still low in quality. (1)
   2. Not much information can be retrieved from free databases or trial-run databases from commercial providers. (1)
   3. Subject gateways need to be developed. (1)

- **Personnel**

   1. Personnel still lack a sense of need to fulfil their responsibilities and a cooperative mindset. (1)
   2. Professional development should be urged both in librarianship and ICT. The following attitudes should be built up: awareness of the importance of S&T information, service mentality, and positive reaction to changes particularly ICT. (1)

- **User development**

   Information literacy should be promoted among end-users. (1)

5.5 Library users

5.5.1 Background information

This section discusses the results obtained from a questionnaire survey of 458 users of academic libraries and special libraries. As can be seen from Figure 5.18, approximately half of the users (57 percent) were between 21-30 years old. Approximately, a quarter of the respondents were aged between 31-40 (24 percent), with a smaller number between 41-50 years old (15 percent).

Age groups of S&T library users
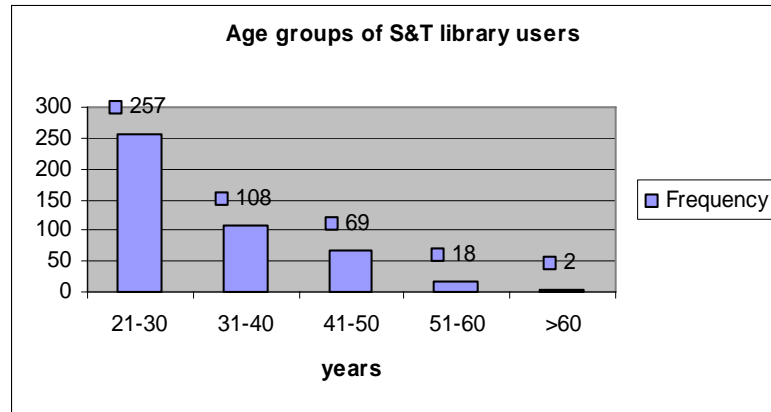
Figure 5.18 Age groups of S&T library users

The sample contained more female users (58 percent) than male users (42 percent). Library users were from various groups (see Figure 5.19). The majority of the S&T library users were postgraduate students (33 percent); although the sample also contained a large portion of academic staff (26 percent).
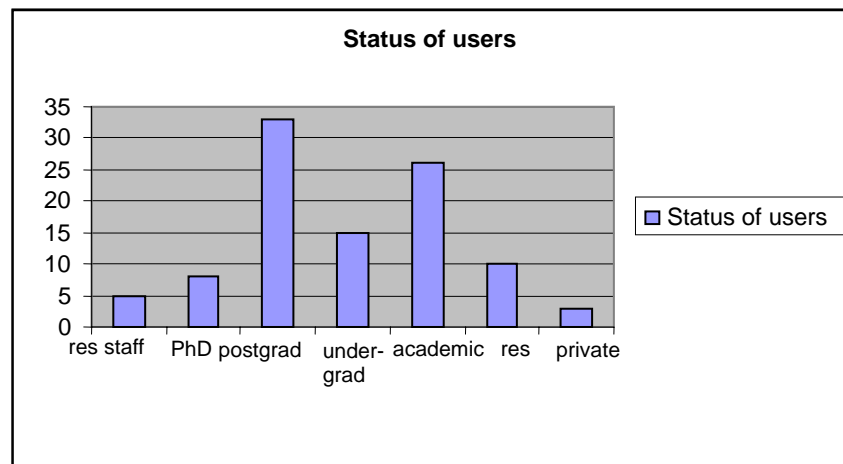
Status of users

Figure 5.19 Status of users

Approximately half of the 458 library users (52 percent) were either researchers, research staff, academic/technical staff or staff from the private sector, with most of them having more than 10 years experience (see Table 5.29) of working in government institutions, academic institutions or from the private sector.

Table 5.29 Work experience of the   library users

Years of work experience	Frequency	%
More than 10 years	95	42.0
Less than 5 years	72	31.9
5-10 years	59	26.1

The rest were students   either studying for a Doctoral degree, a Master's degree, or a   Bachelor's degree.

5.5.2 Library services

1. Frequent use of   libraries

Approximately, two thirds (65 percent) of the respondents used their library at least once a week (see Table 5.30).

Table 5.30 Frequent use of libraries

	Frequency	%
Daily	91	20.00
Once a week	140	31.00
More than once a week	65	14.00
At least once a month	83	18.00
Every 2 months	3	1.00
Once a term/at least once a year	25	6.00
Not certain (depending on free time or information need)	40	9.00
Rarely	3	1.00

2. Frequent use of library services

As can be seen from Table 5.31, most of the respondents used their library to borrow books or other materials (85.8 percent). However, large numbers of users also used the library to read periodicals, journals, and newspapers (64.8 percent), access the Internet (58.3 percent), and used the reference materials (43.2 percent).

Table 5.31 Services mostly used by S&T library users

	Services used	Used		Not used	
		Frequency	**%**	**Frequency**	**%**
1	Book/material borrowing	393	85.8	65	14.2
2	Periodicals/journals/ newspapers	297	64.8	161	35.2
3	Internet searching	267	58.3	191	41.7
4	Reference materials	198	43.2	260	56.8
5	Online full-text database searching	128	27.9	330	72.1
6	Online journal index searching	126	27.5	332	72.5
7	Online catalogue searching	108	23.6	350	76.4
8	Interlibrary loan	86	18.8	372	81.2
9	Government documents	85	18.6	373	81.4
10	CD-ROM searching	80	17.5	378	82.5
11	Videocassette viewing	60	13.1	398	86.9
12	Audiocassette/CDs	43	9.4	415	90.6
13	Union catalogue searching	24	5.2	434	94.8
14	Other	14	3.1	444	96.9
15	Microfiche	7	1.5	451	98.5

3. Information sources often used during the last six months and the formats users prefer

In the last 6 months previous to answering the questionnaire, approximately two thirds (76.3 percent) of users used books in the library as their main information source (see Table 5.32). However, large numbers of users also used periodicals/ journals/newspapers, reference materials, and technical reports as other information sources. Only 14.7 percent of users used statistics. Other information sources slightly used were theses/dissertations, audiovisual materials, and newsletters.

Table 5.32 Information sources often used during the last six months

Services used during the last 6 months	Used		Not used	
	Frequency	**%**	**Frequency**	**%**
Books	347	76.3	108	23.7
Periodicals/journals/ newspapers	302	66.4	153	33.6
Reference materials	166	36.4	290	63.6
Technical reports	136	29.8	320	70.2
Conference proceedings	87	19.1	368	80.9
Government documents	81	17.8	375	82.2
Standards	69	15.1	387	84.9
Statistics	67	14.7	389	85.3
Others	11	2.4	446	97.6

4. Users' preferences of information sources

Users preferred the paper-based format of information sources to electronic-based alternatives (see Table 5.33). They also tended to use paper-based resources more frequently than electronic-based products (see Figures 5.20 and 5.21).

Table 5.33 Users' preferences of information sources

Preference of types of information	Paper-based		Electronic-based	
	Frequency	**%**	**Frequency**	**%**
Reference materials	122	27.9	69	15.8
Books	337	79.1	40	9.4
Periodicals/journals/ newspaper	255	59.0	92	21.3
Conference proceedings	90	20.2	31	7.0
Technical reports	118	26.8	53	12.0
Statistics	55	12.4	41	9.2
Standards	68	15.2	34	7.4
Government documents	78	17.6	30	6.8
Others	3	0.7	8	1.8

Frequency of use of print format
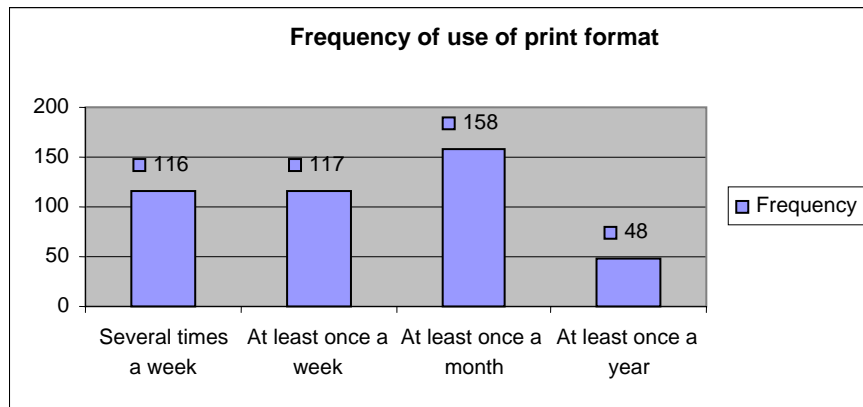
Figure 5.20 Frequency of use of print format

Frequency of use of electronic format
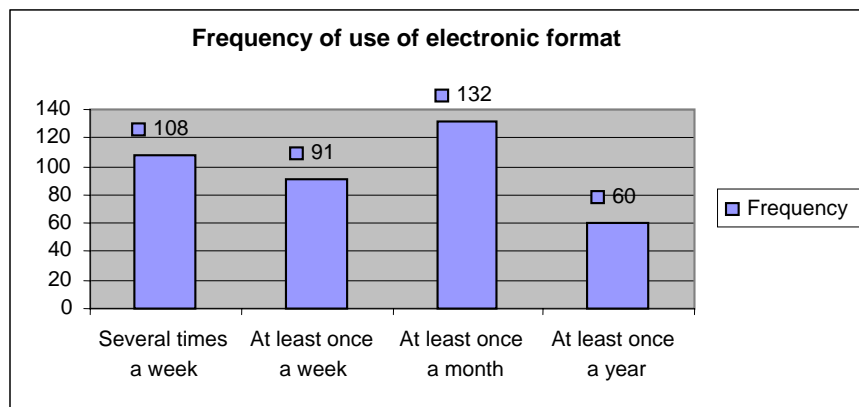
Figure 5.21 Frequency of use of electronic formats

5.5.3 Users' preference of print format or electronic format

It can be seen from the Likert scores (see Table 5.34) that the users of academic and research libraries in this survey strongly believed that searching using computer networks was more convenient and that searching through card catalogues consumed much more time. They also strongly believed that searching for material in electronic formats was faster and that they were used to using computers. The users thought that electronic materials were generally more up-to-date than print materials, and in general, they thought that they could find what

they were looking for from electronic information resources. The users agreed that they could search the library catalogue off-campus or off-library. In addition, they believed that libraries had a useful collection of electronic resources available, and that equipment provided in the library helped users in searching electronically.

However, the users were less inclined to believe that the ICT support staff were effective in dealing with ICT enquiries. Also, they were less inclined to believe that printed materials were more convenient to search, and that libraries had adequate computer facilities. The users disagreed that they were used to searching through library card catalogues and printed bibliographies or that searching for information electronically was complicated.

Table 5.34 Likert scores for Users' preference of print format

or electronic format

Searching through computer is more convenient	4.24
Searching for electronic format is faster	4.23
Users are used to searching by computer	4.05
Searching through traditional library services consumes much more time	4.02
Electronic materials are generally more up-to-date than print materials	3.76
Users can do the searching of library catalogue off-campus or off-library	3.70
In general, users can find what they are looking for from electronic information resources	3.68
The library has a useful collection of electronic resources available	3.52
Equipment provided in the library facilitates users in searching for electronic format	3.49
The ICT support staff are adequate to deal with my ICT enquiries effectively	3.07
Printed materials are more convenient to search	3.05
The library provides adequate computers for users	3.03
I am used to searching through library card catalogues and printed bibliography	2.47
The searching system through electronic information in the library is complicated	2.42

5.5.4 Provision of information literacy skills to end-users

Provision of induction course and ICT training to users

Just over half of users (59.7 percent) thought that induction courses were provided by the libraries. However, the majority of them (90.8 percent) agreed that their libraries provided the ICT training courses.

5.5.5 Training needs of users

As can be seen from Table 5.35, the courses which were mostly needed by more than 80 percent of users were training on online full-text database searching, online database searching, online journal index searching, and Internet searching. Other training courses required by users were on how to reserve books, obtain interlibrary loans, obtain ICT skills, and searching for materials at the National Library.

Table 5.35 Training needs of users

Training courses needed by users	Frequency	Percent
Online full-text database searching	375	89.3
Online database searching	370	88.5
Online journal index searching	343	85.3
Internet searching	330	81.3
Online library catalogue (OPAC)	311	77.0
E-mail using	202	56.6
Others	7	1.5

5.5.6 Users' information literacy

It can be seen from the Likert scores (see Table 5.36) that the users were information literate. They believed that they always looked for a variety of information resources when doing a research/assignment and used search engines on the Internet. The users thought that the evaluation of information on the Internet and the information obtained from every source in terms of currency, authority and appropriateness was important. They accepted that they usually

asked for help when having difficulties in locating a particular piece of information, often used search engines on the Internet, and usually knew how to phrase the search.

Table 5.36 Likert scores for users' information literacy

Always looked for a variety of information resources when doing research/assignment	4.44
Used search engines on the Internet	4.17
Evaluated information on the Internet	4.07
Evaluated the information in terms of currency, authority and appropriateness	4.05
Usually asked for help when having difficulties in locating a particular piece of information	3.84
Often searched for information from online databases	3.81
Usually knew how to phrase the search	3.77

5.5.7 Users' satisfaction with library resources

It can be seen from the Likert scores (see Table 5.37) that, over all, the users were satisfied with the quality of service provided by the libraries. They also thought that staff could deal with users' enquiries effectively, the layout of libraries made it easy for users to use, communication media used by libraries were satisfactory, and libraries provided an effective interlibrary loan service. However, the users were generally not willing to pay reasonable service fees even if they could get better services. They also believed that the range of electronic journals, printed journals and books held by the libraries were not adequate.

Table 5.37 Likert scores for   users' satisfaction with

library resources and services

Overall users were satisfied with the quality of service provided by the library	3.60
Staff dealt with enquiries effectively	3.44
The layout of the library made it easy for users to use	3.34
Communication media used by the library was satisfactory	3.22
The library provided an effective interlibrary loan service	3.11
Users were willing to pay for reasonable service fees if they could get better services	2.63
The range of electronic journals held by the library was adequate	2.56
The range of printed journals held by the library was adequate	2.52
The range of books held by the library was adequate	2.42

5.5.8 Users' comments

The majority of users gave comments which can be categorised as ones of policies and management, collection and acquisition of resources, user services and training, fees, and equipment and facilities. It can be concluded that users still preferred paper-based resources. However, they preferred searching using computer networks or online catalogues. Users wanted to make more use of the inter-library loan service, provided that the service given was more effective and delivery was in time. In addition, they suggested there should be more resource sharing among libraries. However, fee charging was still a controversy. Some users in special libraries thought that the current service fees they were charged were too expensive. Student users also did not want to pay for any extra service fee. They thought that this should be included in the tuition fee which was costly enough. However, some of the users in R&D institutions were willing to pay service fees at reasonable prices in order to obtain better services.

The list of comments in detail is given below.

1. Policies and management

1. A Central S&T library or National S&T information centre should be established.(1)

2. Libraries should play a more important role in developing the research minds of students. Librarians should participate in education development.(1)

3. Universities should pay more attention to the development of library systems and information services. Academic libraries should be substantially improved in terms of services, material collection, adequacy of facilities and performance of personnel.(1)

4. The government should establish a policy of encouraging the usage of electronic information resources nationwide and make it known to the public.(1)

5. There should be more collaboration in resource sharing between R&D institutes, S&T information centres, and academic libraries. This should focus on collaborative subscribing to e-journals and S&T commercial databases.(5)

6. A coordination centre among R&D institutes, S&T libraries, and academic libraries should be established as a central helpdesk for users countrywide, especially in locating resources collected or stored in those libraries.(1)

7. Gateways to S&T information in Thailand should be developed. (1)

8. Library personnel need additional training to develop searching skills in S&T subjects.(2)

9. R&D institutes should publicise their research works more widely. Those research publications should be distributed to as many libraries as possible.(1)

2. Collection and acquisition of resources

1. There should be a greater variety of S&T information resources in libraries. (11)

2. There should be a special collection of Thailand's research works.(3)

3. There should be a special collection of international research focusing on

state-of- the art of technology. (4)

4. More variety of resources should be provided, for example, newspapers, weekly magazines, fortnightly magazines, etc. (2)

5. Information resources for leisure should be provided too. (1)

6. S&T resources provided by some academic libraries do not cover all subject areas or courses taught in the universities. Students have to help themselves in finding information from other sources.(1)

7. Most resources were provided at a central library in Bangkok campus. Less were found in a provincial campus library.(1)

8. Reference materials and textbooks are inadequate.(1)

9. Book collection is out-of-date. (8)

10. More copies should be provided for the books which were highly used. (4)

11. The libraries should provide electronic books which users can read from computer screens.(2)

12. A S&T virtual library should be developed in Thailand.(1)

13. The new issues of printed materials should be on shelves not later than 3 months after the issued or published date. (1)

14. More subscriptions, on a continuous basis, are needed to international S&T journals. (13)

15. More subscriptions are needed to electronic databases and electronic journals, especially full- text ones.(20)

16. Full-text theses and dissertations in Thailand should be stored in PDF file format to make them more convenient for users. (3)

17. Electronic resources are good. However, printed formats are still needed. (2)

18. There should be seminars or meetings among librarians in specific subjects in order to help update new information sources.(1)

19. There should be a survey of user needs in specific subjects. For example, users should have a chance to recommend that libraries buy books or journals they need.(2)

3. User services and training

1. Guidebook or user manuals for S&T information resources should be provided to users.(2)

2. There should be an introductory session about each category of resources   in the libraries and how to access each of them. (5)

3. More user training is needed, especially searching and retrieving information resources provided by the libraries. (6)

4. Users need training on performing advanced search.(1)

5. More IT staff should be recruited to help users.(2)

6. Photocopy services should be provided in libraries.(1)

7. There should be online borrowing, reserving and renewing services. (5)

8. Bringing books and study materials into libraries should be allowed.(1)

9. Opening hours should be longer.(3)

10. There should be one system for inter-university or inter-institute service. Students or users can walk in to use all services from any academic libraries or S&T information centres, either in the public or private sectors.(3)

11. Libraries should provide users with free access to the Internet. (2)

12. Interlibrary loan service should be greatly improved, especially in inter-library searching system and delivery time which is too long, usually at least 2 weeks or more than one month. (7)

13. Users should be encouraged to use interlibrary loan services. (4)

14. Waiting time for counter service should be reduced.(1)

15. Users should be able to search online databases from any location by using password system. (3)

16. Librarians should investigate user needs for information sources in specific subjects.

17. New or updated resources should be advertised more regularly in   attractive media.(2)

18. Publicity of services needs to be improved. (4)

19. Libraries receive suggestions but do not feed answers back to users. (1)

20. Service providers, especially librarians or library staff, have negative attitudes to users. Some librarians or library staff are not friendly, not helpful, not

polite, and treat users as IT unintelligent and information illiterate.(3)

21. Some users do not pay attention to new technology searching system in libraries and do not cooperate in taking care of public facilities provided.(1)

4. Fees

1. Fine fees are rather high.(1)

2. Some student users strongly disagreed with charging of service fees. They thought the budget for library should be allocated from tuition fees which had been paid by students; this is a large amount of money each year.(3)

3. Service fees should be made known more to the public.(1)

4. Service charges for interlibrary loan are expensive, especially the photocopy service.(2)

5. Service fees for full-text online journals should be lowered to the rate acceptable both by providers and users on a non-profit making basis.(2)

6. Yearly service fee is suggested for economical reasons.(1)

7. Users in some R&D institutes are not happy with service fees charged. They want a free service. (2)

5. Equipment and facilities

1. Materials and facilities provided need to be improved, for example, quantity of computers, quality of audiovisual materials and computers.(11)

2. Online catalogue searching system for research work should be provided.(1)

3. OPAC system is more preferable to card catalogues.(1)

4. Keywords for searching of OPAC are too broad.(1)

5. OPAC did not give satisfactory search results, especially when users wanted to search from theses, reference materials or particular journals. Categories of information resources should be given, for example, theses, serials, reference materials, etc.(1)

6. A system for electronic search should be advanced but not too complicated.(2)

7. The current system for electronic search was always down and out of service. (1)

8. More ICT facilities should be provided, especially computers.(8)

9. Environment in some libraries did not support study, for example, light, noises, temperature, cleaning. More open areas should be provided. Library space was rather cramped and uncomfortable. (6)

10. Layout of libraries did not help users in finding materials easily. There should be a map of the library layout or library self guided tour. Location of categories of resources on shelves should be more clearly identified.(4)

11. Not much reading space is provided.(1)

5.6 Executives or decision makers of the funding agency

5.6.1 Background information

This section discusses the results obtained from a questionnaire survey of two decision makers of the funding agency in Thailand. The first respondent was female, aged between 51-60. The second respondent was also female, aged between 41-50. Both of them held Master's degrees in Science or Engineering. The first one had work experience between 5-10 years while the other one more than 10 years. One funding agency in this survey was a free standing agency and the other one was a Department. Both agencies are under the Government

5.6.2 Roles and policies of the funding agency

The first respondent strongly agreed that her institution set vision in promoting scientific R&D, had clear mission in promoting scientific R&D, had clear policies in promoting scientific R&D, and set strategies in promoting scientific R&D. She also strongly agreed that S&T information service was also included in those strategies. The first respondent believed that the information service had an

important role in promoting R&D. Moreover, she thought that her institution actively promoted S&T information services as well as library system development.

In comparison, the second respondent strongly disagreed with all answers listed above. It is interesting to note that the national funding agency had recently changed its funding policy such that it had reduced monies available for scientific R&D projects. So far, this funding agency did not provide funding to any information projects.

5.6.3 Familiarity with the national information policy and S&T information network in Thailand

The first respondent agreed that she was not familiar with either Thailand's information policy or the S&T information proclamation within the national information policy. However, the respondent agreed that she was familiar with the S&T information network in Thailand. Regarding this, she strongly believed that the S&T information network and the resource sharing helped increase collaboration with other institutions and increase the demand for S&T information. She also said that her institution had funded projects to help develop the network.

The second respondent from the other funding agency was not familiar with the national information policy, the S&T information proclamation within the national information policy, nor the S&T information network. Therefore, she did not have to answer more questions regarding the national information policies and the S&T networks.

5.6.4 Funding criteria

The first respondent strongly agreed that her institution had its own funding criteria. Moreover, she thought that her institution had specific criteria in funding

development projects of S&T information sector and had announced publicly those funding criteria.

The second respondent also strongly agreed that her institution had its own criteria, which were generally known by the public. However, she disagreed that her institution had specific criteria for funding projects of S&T information sector. She identified that her institution offered funding to research projects which had an impact on the national economic development according to the research strategies.

5.6.5 Activities of information system development of Thailand which have a potential to receive funding

The respondents were asked to rank the priorities of activities of information system development of Thailand which had a potential to receive funding. The first respondent thought that the resource sharing project had most potential to receive funding. The second most preferred activity was electronic/digital library development, and the third most preferred activity was development of library resources.

The second respondent thought that the first priority should be given to collection development, followed by information access, resource sharing, professional training, and user education.

CHAPTER SIX

DATA ANALYSIS: INTERVIEWS

6.1 Introduction

The results presented in this chapter were obtained from the analysis of the interviews of three stakeholder groups in Thailand: executives of S&T information centres, library managers, and executives/policy makers of funding agencies. The interviews included representatives from 34 of 45 target institutions involved with S&T information service provision. The data in this chapter is presented thematically covering the following issues: policies, strategic management, the development of S&T information service in Thailand, barriers to the development of the S&T information service in Thailand, resource sharing, and the role of libraries and librarians.

6.2 National information policy, institutional policies, and institutional information policies

6.2.1 National information policy

Interviewees had two contradictory opinions on the national information policy of Thailand. One group thought that the current Thai government had launched a national information policy which was widely known among the public, while

the other group thought that there was not a current information policy of the country, or if there was, it was not clear enough to implement.

a) There is a clear national information policy

For the minority of interviewees who thought there was a national information policy, the establishment of the Ministry of Information and Communications Technology (MICT) represented evidence of the government's awareness of the value of information. The interviewees expected that MICT, which has a responsibility to implement the government's policy on e-government, would have considerable impact on fostering information centres necessary for e-learning environments. This can be seen from some interviewees' responses; an example being:

> *"Our institutional policy must correspond to the national policy,*
> *whose theme is e-government."*

These interviewees, who believed that the national information policy really existed, thought that the government was trying to accelerate the use of ICT in information service provision. The interviewees assumed the country was at a transition both at government level and within the organisational structures of government offices. Correspondingly, the library was also in transition to keep pace with constant change in ICT systems. One interviewee said she thought that the government attached importance to information development and any organisation would have a chance to play a role in these changes.

It was notable that the interviewees in this group were from the academic sector. Therefore, they believed that their tasks were directly involved with the government's policy on e-learning and that libraries would play an important role in supporting learning and teaching and in research processes.

Moreover, they considered the e-learning policy to be advantageous since it comprised tangible programmes which could be implemented effectively, and in

which information service provision could be incorporated. In pursuit of e-learning environments, they used the national information policy to shape the institutions' information policy and generate related activities, namely, building up the information seeking behaviour of student users, and promoting information literacy and electronic searching. These kinds of user education were conducted not only in universities but also in the community such as in schools and collages nearby. One interviewee insisted that:

> *"I think our policy corresponds to the national information policy. At the beginning, it appeared that each of us started on our own. Then when the government announced a clear policy, it seemed that we are on the right track because we are following the government policy by speeding up towards e-learning and the e-library."*

b) The national information policy is unclear

In contrast to the above group, the majority of interviewees, both from the academic and other sectors thought that Thailand had in the past possessed a national information policy, but it had become out-of-date since it had not been revised to accommodate technological change. They argued that the current government did not have any clear information policy. What Thailand had now was only the government's policy on the issues of e-government and ICT, which gave no clear picture of information services. Some interviewees said there might have been a national information policy but it was not widely known, while some said the formulation of the national information was just at the beginning. Although one interviewee claimed that she was familiar with the national information policy, her comment was "*I think it's quite a broad policy. It's good, though. At least, we have it.*"

The following are examples of responses mentioning both the interviewees' unfamiliarity with the national information policy and the lack of a clear policy at the moment.

> *"About the latest government policy, I think it's, sort of, going out of our perimeter. It's not clear and some important issues which should have been included are still missing, for example, libraries' and librarians' roles. Even though the government mentions the importance of libraries and information, more weight was put on using ICT to provide information service instead. The government tries to promote the concept of a living library, to encourage people to read and to come to libraries and they think that ICT will be a good channel for information access, but they don't say anything about librarians' roles. That policy doesn't guide us to the direction we should go."*

> *"What's unclear in government policy is the role of information. I think it's still not clear even though now we have the Ministry of ICT. It's probably because the ministry is quite new. In the future, it might be better."*

Another interviewee who confirmed her unfamiliarity with the national information policy added that she only heard about the new project of the MICT in establishing the National Knowledge Development Centre, which would act as a coordinator for each sector concerned with reading activity, for example, writers, publishers, librarians, and readers. However, in her view, establishment of this organisation was rather an ideal project and the mission was not clear yet. The idea to establish this centre was initiated by the Prime Minister's policy on enhancing reading behaviour, which was still lacking among Thai people; hence a huge obstruction to the construction of a knowledge-based society.

The interviewees in both groups gave their comments on the current government policy related to information service provision. It appeared that the majority agreed that the statements in the mentioned policy were still broad, some key issues in information service provision missing, and, particularly, no S&T information service included. Some interviewees straight-forwardly criticised the policy and also expressed their expectations of the national information policy.

They expressed their demand for a policy for all information providers which should have "*clear key points in providing services, showing the synchronisation of the national trends. It should give importance to librarians' roles too.*"

The status of the National Library was also mentioned as having a low profile in taking considerable part in the government's policy. The interviewees thought the situation was perplexing when the roles of the National Library were missing from the scene and the organisation concerned did not seem to work collaboratively. The factual situation was described by one interviewee as follows:

> "*The National Library, the key organisation in providing information service, is under the Ministry of Culture. Then we have the MICT, which is responsible for promoting the wide use of ICT and computer learning. I see there is no coordination between these two sectors. In fact, the MICT is keen on technology while the National library should be responsible on content. But it seems that the National Library doesn't play any active role. I wonder how the project under the MICT can be achieved without cooperation from librarians or information professionals. There should be more cooperation. But now, it's like they play their roles individually.*"

Some interviewees tried to explore the issue of the information service provision in Thailand by focusing on the MICT's mission. When discussing the current policy and activities of the MICT, most interviewees shared the same view, as mentioned earlier, that the MICT rather "*played solo*" than cooperated with other organisations. While their mission has been set up to deal with computer systems and content, the potential roles of the library sector had not been mentioned. One interviewee expressed her concern that "*I hope the MICT will work collaboratively with other government agencies in the future to carry out the projects on information development.*"

One interviewee gave a comment about the MICT's project to establish the National Knowledge Development Centre:

"The activity under the policy also doesn't have a clear objective. It's quite broad and not focused. I also had a chance to give them comments. I tried to tell them that it was not a good approach to build up a new organisation to handle information resources. We already have institutions which are responsible for collecting the national information resources. Why don't we bring them together? We'd better stimulate cooperation among them and let them work in a concerted effort because now it seems that each of them just walks in their own ways, separately from each other."

Another interviewee had the same opinion:

"Or that might be the national information policy, I don't know. But the way the MICT are heading is like...they try to establish a sort of new organisation. Instead, they should equip the existing libraries or any organisations responsible at the moment with ICT. They should promote the existing libraries to extend their services, but no, their concept is to establish new libraries with full ICT equipment without bothering to stop and think whether users have enough information literacy. I think it would be better if they promote librarians to be providers on this matter instead of having IT staff in charge of these libraries. They might be good in ICT but they don't know much about the content and service provision. We have to consider various matters concerned. It also needs a lot of money for investment especially if we want to provide everything electronically...We must try to find the economical way in investment."

Another interesting comment was:

"The MICT is not well prepared. I think it still lacks readiness because the MICT has just been established...not many staff. Such kind of thing always happens in our country. The law has been enacted and enforced, but people concerned are not ready yet. The people who implement don't even have an idea how to deal with it. So I don't have any expectation right now."

Some interviewees gave the view that the current policy had no effect in the shaping of their institution's information policy, especially in terms of S&T information service. As they said, no national information policy was integrated in their institutions' policies due to the fact that those policies had no coverage of S&T information service. *"The government only sets up a policy to promote the social roles of libraries, to be as a living library as in Singapore. But it has nothing to do with scientific information,"* one interviewee said. Regarding the S&T information service, most interviewees agreed that the government had only a broad aim in promoting the acquisition of S&T information resources and the cost-effective use of them for educational and research purposes. However, this was not clearly enough expressed for implementation to be possible.

6.2.2 Institutional policy and Institution's information policy

Questions about policy formulation were asked with the aim of investigating the strategic planning process of the institutions for future development. A scrutiny of the policies in the interviewees' institutions was done hierarchically, from the institutional to the institution's information policy in order to find if the policy formulation was based on a consensus, had measures and strategies to achieve the goals both in the short term and long term, and included all affected stakeholders consisting of personnel, users, and other aspects such as resources and social or economic environments. Implementation of the policies was also studied.

a) Formulation of the institutional and institution's information policies

In exploring the institutional policy and information policy, it is crucial to study the organisational structure of the institutions in order to know the direction of the policy and its implementation. The target interviewees in this research can be categorised into two main library sectors: special and academic libraries. The organisational flow of policy formulation and implementation can be generally drawn in three diagrams (see Figures 6.1, 6.2 and 6.3.)
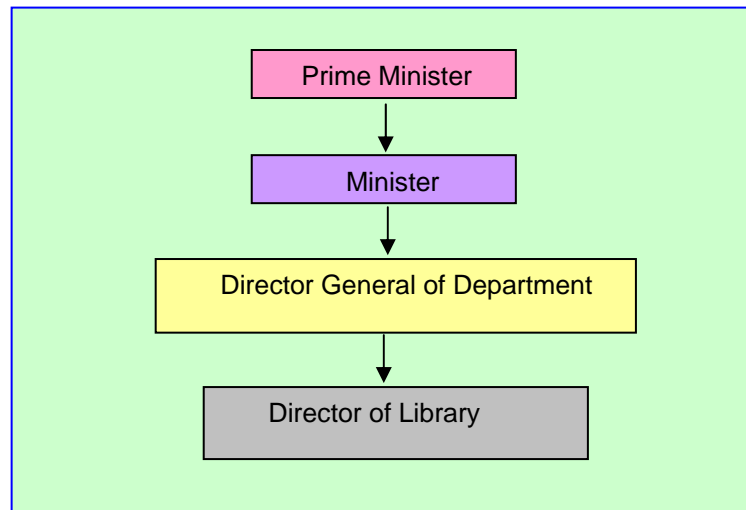
Figure 6.1. A hierarchical flow of policy formulation and its implementation in Thailand government library sector

Figure 6.1 shows a hierarchical flow of policy formulation and its implementation in the government library sector. These special libraries are supervised under different departments in each Ministry which provide information services both for the in-house staff and the public.
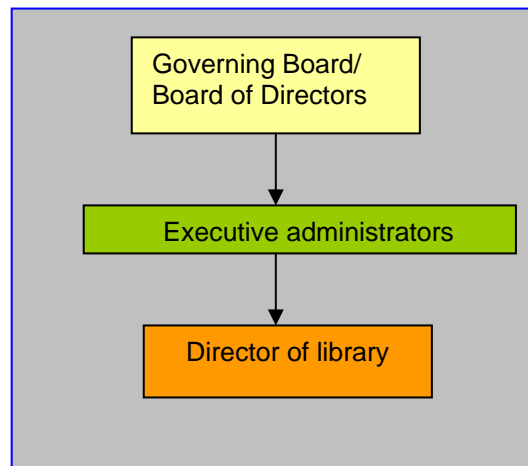
Figure 6.2 A hierarchical flow of policy formulation and its implementation in Thailand enterprise library sector

Figure 6.2 presents a hierarchical order of the flow of policy formulation and its implementation in the libraries which belong to private organisations, state enterprises, and public agencies. In some organisations, the Directors of libraries are also among the executive administrators.
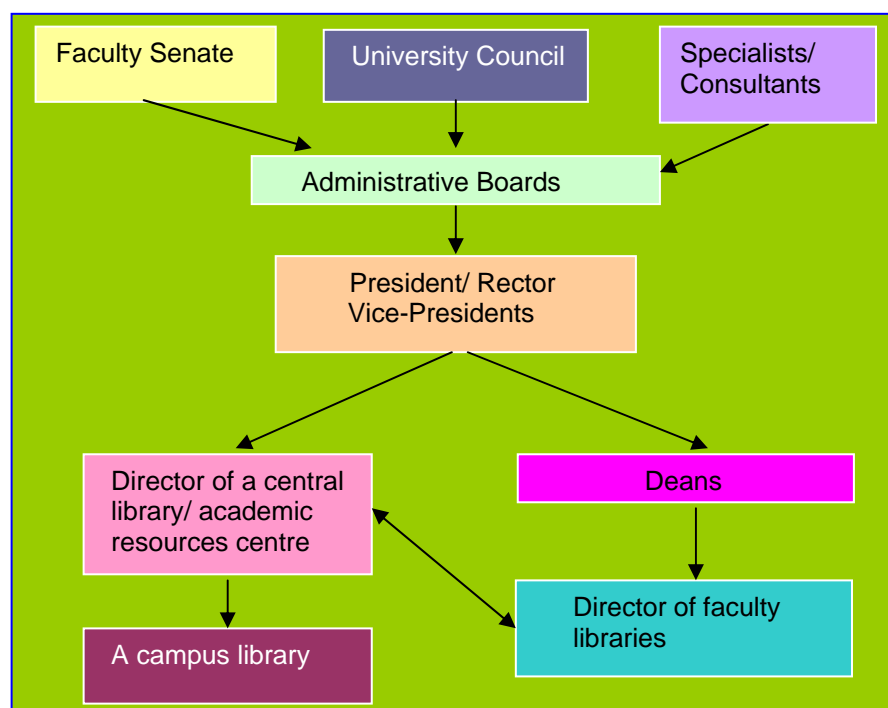
Figure 6.3.A hierarchical flow of policy formulation and its implementation in Thailand academic library sector

Figure 6.3 shows a general hierarchy of the flow of policy formulation and its implementation in Thailand's academic sector. A double-headed arrow means faculty libraries occasionally work in cooperation with central libraries/academic resources centres. The status of the Director of a central library/academic resources centre is equivalent to that of Dean.

The majority of the interviewees said that the formulation of the institutional policy was substantially influenced by government policy, particularly by the Ministries supervising them. Most interviewees who were Directors of libraries of either academic or government sectors agreed that they had a chance to formulate the institutional policy as they were members of executive administrators. Information service provision was a key concern that most institutions emphasised. Interviewees from academic libraries strongly believed that information service provision was an indispensable feature of the academic community where learning, teaching and conducting of research are the main activities.

The institution's information policy was formulated by the executives of the libraries, headed by the Director, who was the top executive of the library. It was agreed by the interviewees that it was important to formulate an information policy which has an institutional policy embedded in it, as mentioned by one interviewee, *"In formulating the policy, we have to consider the top policy from the government, and then the university policies"*. Most interviewees who were library executives said that they worked as a team or committee in developing the information policy. In various cases, the executives raised key priorities and then the measures for implementation were discussed in the meeting. A brainstorming approach was claimed to be used in the process, as one interviewee mentioned:

> *"We have the Board, chaired by the University President, comprising the Directors and distinguished members from outside. But in practice, the Director of the library is the key person behind the scene. The Board is like a group of consultants. But in managing the library,*

> *we give importance to executives of the library. They've contributed*
> *in giving vision and guidance how the library should be managed."*

The composition of teamwork was varied depending on the organisational structure of the institutions. For instance, one interviewee said the information policy was mapped out among executives and there was the Chief Information Officer of the institution as a consultant. In some institutions, the IT staff also played a key role in the policy formulation. Some examples of the interviewees' feedback which represent administrative structures of library management are as follows:

> *"As for our library, we looked at the overall policy of the university*
> *first, then we discussed among the team. We have the Library*
> *Committee as an administrative group, chaired by the Director of the*
> *Central Library and consisting of managers of each section in the*
> *library and other representatives from faculties and the alumni. This*
> *executive group will give a broad policy. Then there is another*
> *working group which runs all activities. The members of this group*
> *are managers in each section. The information policy and strategic*
> *planning come from this group."*

> *"The information policy was generated by the Director of the library,*
> *working cooperatively with managers of each section and other*
> *junior managers concerned. We've used the brainstorming technique*
> *to formulate the policy."*

> *"We have the ICT committee, chaired by the Chief Information*
> *Officer (CIO). The committee is represented by executives of each*
> *unit. The policy is set both for the short and long term period."*

The interviewees, who were executives of libraries, were satisfied with their participatory roles in formulating and implementing the policy. They said they were free to develop their own policies, which they were satisfied with.

b) Familiarity with the institutional and information policies

The following are the results showing interviewees' attitudes towards their institutional and information policies.

Talking about the institutional policy, all interviewees shared the same opinion that the policies had definitely stated the philosophy, visions, and missions and they were made known to all staff and the public. Most universities applied the Quality Assurance System (QAS) and so did some investigated institutions from the government and private sectors, which were using the quality control structure of the ISO 9000 system. Accordingly, the policy and the quality were the parts that had to work in parallel.

c) Communication of the policy

The question of how policies were communicated was raised for two purposes. Firstly, it was required to know whether staff concerned had a chance to give recommendations or comments during the policy formulation. Secondly, it was also important to know how the policy was communicated to staff.

From the interviews, it was evident that a widely used communication tool in most institutions was a staff meeting. All interviewees thought that a meeting was the best channel for communication among them, providing them with a supportive environment for generating new ideas, exchanging experiences, suggesting concepts, solving problems, offering feedback, and learning from each other. Some interviewees said they used a meeting as a forum for formulating the policy too. In some institutions, the meetings were done both formally and informally.

> *"The policy is also well known by staff because they have a chance to participate. We also hold meetings among staff to discuss and exchange ideas in conducting activities."*

"We've known about the policy, but not from an official meeting. It's like we discuss at lunch time, just talking and exchanging ideas among colleagues."

One interviewee said that her institution offered a chance for the library executive to have a seat on the Administrative Board of the university. She thought that was the best way of getting involved with the policy making because the executive of the library could propose ideas or justify projects the library needed to do. However, she made a comment that the way the policy was communicated to staff was still not satisfactory because, as she said, *"most of the time we have been told informally. Another channel to recognise the policy is in the monthly meeting. Anyway, it depends on the Director alone to decide what she's going to say in the meeting. If she doesn't tell us, it's hard for us to catch up with the new policy."*

The quality control system was another means used to coordinate throughout an institution. It played an essential part in connecting the top management and staff of all levels. In libraries which applied the quality control system, policies were communicated through a coordinator who coordinated between executives and staff. In communicating the policies, various issues concerned were also discussed, for instance, quality indicators and goals in each year, problems which obstructed achievement of the goals in the previous year, and continuous reviews to improve services. At this stage, staff were encouraged to give feedback or they could do so in the staff seminar or training sessions. In staff meetings, staff also could fulfil their participatory roles in discussing and giving comments. A library manager was a key person who dealt with staff communication. In some libraries, a monthly staff meeting was held in order to open a forum and update staff with any messages from the executives or interesting issues concerned with the policies and their activities.

One executive expressed her view that she would rather motivate staff to use analytical thinking and participate in planning. As she said:

"The policies or ideas might originally come from the executives and then we transfer the concept to make it understood among staff, throwing them questions to think and find answers. For example, if we're heading towards being an intelligent library, how can your section serve this policy? How can we improve our service to meet the needs of the research sector? How can we adapt ourselves with the changing situation?"

Another location where policies could be made known throughout an institution was to have them published in an annual report or shown on the website. A poster containing   policies expressed in slogans was also used to communicate them.

d) Benefits of policies

All interviewed participants considered that having institutional and information policies was a great benefit to institutions. They believed that policies were a strong base for accommodating planning, missions, budget, personnel development, and all relevant activities. Inevitably, integration of these items would lead to the success of an institution, as one interviewee remarked:

"Everything will be clear if the policy is clear. It must be well defined. The policy is an indispensable factor when you want to set goals and objectives. It will have an effect on an implementation too."

Not much different to the above comment, other interviewees saw policies as crucial guidelines for staff to recognise the direction they were steering towards. However, in order to fulfil the goals and objectives, policies have to be clearly stated. Some of them noted:

"Whether the implementation will be successful or not, it's quite complicated. It depends on the clarity of the policy."

> *"Definitely, the policy is important. If we don't have aims in working, we might walk out of the right track because the situation keeps changing all the time. The roles of libraries also change, as well as users' attitudes towards libraries. Therefore, clear policies are very important. Policies can help in developing the library or in forecasting which direction we should move forwards, to expand or to downsize."*

One interviewee raised an interesting point of view that *"a policy will be useful if only it makes sense or we have potential to implement it."*

e) Statements of policies

So far as the policies were concerned, universities were most likely to have well-prepared policies. Most of the academic interviewees thought that the missions and goals of these policies were set with clear-cut directions and well-defined stakeholders. It was probable that universities were governed under one Ministry, which was the Ministry of Education; therefore, they possessed similar key policy statements with regard to learning, teaching, and research and on providing academic and social services to the local community. Since academic libraries   form part of the university, they must also abide by the wider mission statements, policies, and goals. Both universities and their academic libraries were heading in the same direction.

Basically, the parent institutions of special libraries in the S&T sector were ruled by different Ministries or the private agencies, of which mission statements were naturally different. This resulted in a diversity of policies and organisational developments. However, the S&T institutions studied in this research share characteristic policies in being seen as mechanisms to build up the prosperity of the nation by means of scientific and technological progress. Therefore, the main task of these special libraries was to provide S&T information resources to both in-house researchers and interested members of the public. This generated

policies and activities which were entirely different from those of the academic libraries.

As regards information services, the current state of the academic sector was viewed as better than that of special libraries, as one interviewee from the S&T sector said,

> *"They are stronger because they have their own income apart from government budgets. They can earn money from tuition fees. They are more flexible in managing the budget. Moreover, one of their responsibilities is to support academic researchers, lecturers and staff in doing research. That's why they have to provide information at their best."*

The institutional and information policies were investigated during the interviews to gain an overview of missions and directions on which these institutions were focusing. In particular, policies with respect to promoting R&D, provision of S&T information service, resource sharing, and quality control.

1. General policies

The main policy of universities was to promote academic success by all means of teaching, learning and research. Whilst the overall policies of the parent institutions of special libraries had the same objectives for national development, their strategies were individually tailor-made as each institution played a part in different roles, for example, in strengthening the development of S&T, industry, commerce, or economics of the country.

2. Policy on promoting R&D

The majority of interviewees from both sectors believed that their libraries had an important role in promoting R&D. Only a few institutions in the S&T sector whose missions were not involved with research did not have a policy on

promoting R&D. Most institutions claimed that they were well resourced for conducting research. Interviewees from the government R&D departments also agreed that their libraries had been assigned with clear responsibilities to support R&D with S&T information services.

Interviewees also identified how their institutions promote R&D. Universities are expected to be research oriented and promote research amongst both staff and students. In many universities and research institutions, research papers were used as one indicator in measuring lecturers' or researchers' performance under the Key Performance Indicator (KPI) scheme. The quality of research was also controlled on a basis of increasing impact factor when publicised in international journals. Some universities had policies on escalating values of R&D for commercial purposes by cooperating with the government in creating innovative technology so as to gain the returns of investment and enhance the industrial growth of the country. It was notable that one interviewee from an academic sector mentioned the success of his university as a result of having a variety of members in the Executive Board Committee.

> *"Now, the executives of our university consist of members both from science and library studies background so they understand very well about the philosophy of the university. We can merge the different background knowledge together and formulate the policies which fully support both teaching and R&D of the university."*

3. Information policy and S&T information service provision

Given the fact that the academic sector is stronger in collaboration, it is not surprising that all the investigated academic libraries had an information policy on the development of an e-library. Initially organised as central and regional networks for each area, they have reinforced the collaboration to establish a consortium for sharing electronic databases. This collaborative project has been funded by the Office of the Higher Education Commission, in the Ministry of Education. Influenced by the e-government policy, universities have created their

own policy on providing an e-learning atmosphere, which needs extensive support from libraries. For instance, one university has announced a policy to be an *"e-university by promoting access to the Internet and shifting to a wireless campus."* A new executive has also been appointed to deal particularly with the ICT sector in the university. Therefore, libraries are expected to fully participate in promoting learning, teaching, and research in e-environments. One interviewee expressed her positive view about having written statements of policy that:

> *"Previously, the policy for library or information services was only communicated by talking, just blowing in the wind. It had never been written with a strong commitment before. But recently, each library tries to formulate its own policy which is clear to staff so they know the direction they are moving towards."*

Although moving at a slower pace when compared with the academic sector, special libraries in the S&T sector also shared the same statements of policies. They aimed to transform to be e-libraries and provide information services on the web. This was also inspired by the e-government policy of the Thai government.

It would appear from the interviews that recent statements of policies in both the academic and S&T information sector principally concerned the following issues:

- automation of libraries;
- extensive use of ICT in service provision;
- off campus services;
- preference for e-resources;
- construction of full-text Thai research databases including theses and dissertations;
- development of union lists, bibliographical data and indexes;
- free e-resources locating;
- acquisition of new low-cost e-resources;
- provision of web-based services;

- application of quality control system for library management;

- user education and enhancement of users' information literacy and research mindset;

- service improvement in terms of rapidity and convenience;

- development of a collection of national S&T research;

- provision of online full-text databases accessible from any location;

- enhancement of personnel skills in librarianship and ICT;

- educational media production and services;

- downsizing of print holdings and collection using criteria based on current research trends;

- building up a network with internal and international organisations;

- change management in staff attitudes;

- promotion of professional development and long-distance learning;

- knowledge management;

- provision of S&T knowledge and information for educational and research purposes to the community and the society;

- provision of S&T information for elevating people's standard of living; and

- provision of information on intellectual property including S&T patents and copyrights.

From the above list of statements, the majority of interviewees said that the policies in relation to S&T information services mostly focused on the provision of the S&T online databases and development of union lists and Thai research databases. Subscription of international S&T journals was also featured in the policies. Some libraries had a policy for reviewing subscriptions of journals more frequently depending on their current research, as explained by one library executive:

> *"It's not necessary to have a large collection. The Faculty has changed the policy in running the library. It's no need for us to be big. Instead, we focus on the current issues of our research. We have stopped subscribing to those journals that are not relevant to our research areas. At the same time, we*

are subscribing more to the journals which are largely needed by our users at the moment. We don't have a policy to have a large collection because we can't make valuable use of one."

Another executive talked about the information policy of his library which was in compliance with the goal of the university in being research-oriented:

"In order to correspond with the policy in being the research-oriented university, we have to be well-prepared; our information service must be ready for those researchers, either infrastructures, contents, or librarians' roles."

Another executive viewed seeking information partners as important in providing a networked S&T information service:

"Apart from librarians, we also cooperate with ICT staff to take care of some projects. It comes to the changing era of information service. International cooperation is another important aspect. We also seek cooperation with other international organisations. We're exchanging the ideas in changing our service patterns, working behaviours, and so on. Under this network, we have the policy that stronger countries shall give help to weaker countries."

4. Policy on resource sharing

Policies on resource sharing was another main item investigated, the aim being to find the current awareness of information resource sharing as written in the policies. It is interesting that the majority of the interviewees said that the promotion of resource sharing had been written in either their institutional or their information policies. However, the interviewees agreed that, in practice, the resource sharing policy had not been successfully implemented. Although policies existed, in practice, implementation was not clear and there were still numerous obstacles blocking the development.

As reported by the interviewees, the policies on resource sharing in general concerned various types and levels of collaboration. The academic sector seemed to give a clear picture of collaboration which was presented in continuing tangible projects, for instance:

- **A university consortium for reference database subscription**

The main consortium is UNINET which is the central inter-university network in Thailand dealing with supporting national education and research by providing network connections to all universities and higher education institutions countrywide. At an earlier stage, the consortium was managed by two main academic groups consisting of THAILINET (M) and PULINET, which were later combined into THAILIS. Even though joining THAILIS, PULINET is still running some of their own activities and maintains collaboration among provincial members of every region of Thailand.

- **Development of a networked library among faculty libraries**

Other than being consortium members, most universities are moving towards building a networked library among faculty libraries in order to develop special collections of the key subject areas including engineering, environment, etc. In each university, all faculty libraries are planned to be linked together to provide full-text databases of various disciplines for users.

- **Cooperation with international organisations**

Sharing resources with international organisations is also an alternative for some institutions in Thailand. For instance, one university has been engaged in a resource sharing project with UNESCO, and, as the interviewee said, the university could gain more than the resources shared. They also learned new ideas from sharing experiences as well as service patterns and working styles. Learning from the developed countries is one of the other benefits that the developing countries can obtain through cooperation.

- **Collaboration among special libraries in managing information resources and services**

Special libraries or S&T information centres either under the same or different Ministries are also involved in collaborative projects. Most libraries responsible for providing scientific and research information, either under the Ministry of Science and Technology or through a free-standing agency, are keen to seek collaboration. These libraries share the same policy in *"finding partnership in managing information resources and providing services"* and some concrete activities have been initiated, for example, construction of union catalogues and electronic databases.

5. Policy on quality control

A large number of the investigated libraries have applied the quality management tools such as ISO 9000 and Total Quality Management to control their performance and quality of service. For most universities, the quality assurance system (QAS) has been employed with the aim of controlling the quality of the whole education system provided including library services. The application of the QAS system has forced the library sector to have its own quality policy, plans, objectives, and strategies in providing services to users on the basis of best practice, continuous improvement, and user and staff-focused participation and performance. This concept of quality standards was also recognised by some special libraries.

The executives and library managers saw benefits in the quality control system. As commented, it helps to generate a channel for staff participation and communication, to make the policies written, known, and understood by staff, monitor the process of working, highlight weak areas, create continuous improvement, and promote the use of users' surveys. It was also noted that these activities were relatively beneficial to organisational change and the key persons in these changes were librarians.

f) Policy implementation

Policy implementation was viewed by interviewees as a crucial aspect of operating libraries. When asked about the impact of institutional policy and the information policy on accomplishable implementation, attitudes towards terms or statements of the policy seemed to be discussed and viewed differently. Interviewees had different points of view, depending on their status whether they were executives or library managers. Executives preferred to issue broad policies because they wanted to stimulate and create *"thinkers"* among library managers and staff, equipping them with analytical thinking skills in the environment of the *"learning organisation"*. Therefore, the policy and goals were given in brief, and then library managers had to brainstorm among staff on how to implement the policy and achieve the goals. Executives regarded themselves as facilitators and problem-solvers in the process of implementation.

In contrast, most library managers were not satisfied with the broad terms or statements of both institutional and information policies, which had originated from the top. Some said the policies neither had a wide coverage for all levels of staff nor enforcement and punishment, thus largely causing implementation failure. Most library managers saw no benefits of broad policies. Instead, they needed policies with clear direction and concrete activities, and to be supervised closely by executives.

As one library manager said,

> *"I think our policy is too broad. There is no strong command or punishment. It's like the executives just write it with excellent missions but those policies are far-fetched. Then they leave us alone to implement so we have to do our best, on our own."*

A frequent change of executives also had an impact on policy implementation in one institution. Once the executive announced the broad policy, they also gave another short term and more focused policy for staff to implement. In that

particular case, executives often left before their policies could be fully implemented.

Interviewees thought that participation and effective communication was the key for successful policy implementation. Tactics in building participation needed to be created. According to one library manager, staff should be encouraged to implement the policy cooperatively.

> *"Most of the time the implementation failed. Even though they had both a well written-plan and policy, it still failed because no cooperation was given when implementing. The problem is we don't take it seriously."*

Another manager gave the view that communication is also important at all steps of implementation, particularly when dealing with either top-down or bottom-up feedback.

While the library managers demanded focused policies and tangible projects from the top management, the executives expected their managers and staff to be proactive and *"think out of the box",* which could be defined as having creative and visionary thinking beyond the norm, an openness to new perspectives and a positive reaction to different things (Bernacki 2004; Crystalinks 2004). One executive shared this view as follows:

> *"In my opinion, even though we have a written policy or strategic plan, it's still not enough. It's lifeless, just statements on a paper. We can write them with any fantastic words. But, most important is how we can stimulate everyone concerned to be alert or to be active in making the policy work. We have to inspire them to share ideas, to change their attitudes and their perception."*

However, this executive agreed that a detailed written policy and planning document was *"more or less needed"* because it would help managers and staff

to understand all the concepts. She thought verbal communication was not enough.

One executive reported that he tried to accelerate policy implementation by encouraging staff to understand the concept of self evaluation, which can be applied both individually and organisationally. In his view, a library played a vital role in steering the learning organisation. Meanwhile, a library had to learn and evaluate itself in order to improve its organisation. Most executives shared the same views that library managers were the key people in determining the success or failure of policy implementation as they acted as coordinators between the executives and librarians or library staff. They were the people who transferred the policy and all its concepts from the executives to staff. The reason why the policy was claimed as not getting to all levels of staff was partly due to the fact that it was stuck at the library manager who failed to communicate or implement the policy.

Several library managers, however, blamed the lack of policy implementation on staff and their disinterest. They thought effective communication could be achieved only when staff changed their attitude. One library manager said, *"Staff just followed the orders without caring how better they could improve their services."*

As far as policy implementation is concerned, it would appear that there is a communication gap between the personnel involved; executives, managers, and staff. The management concept needs to be made clear so that everyone understands what is needed. As one executive said, *"We need to improve our presentation skills"*.

One interesting strategy used in some libraries to implement the policy effectively was to position the library organisation as *"a research assistant unit"*, which had its own integrated projects in supporting the research community. Another tactic used was breaking the broad terms of the policy into details of

activities for each section or division with its own goal, plan, and evaluation process.

Most libraries have attempted to use the quality control system in motivating staff to work more effectively. Executives viewed this strategy as advantageous to the policy implementation in the following areas:

- The system demanded strong commitments from any parties concerned, particularly from the management.

- The system has a compulsory requirement for the library to have an explicit quality policy and measurable goals with a continual basis of monitoring and improvement. This could create the achievable projects with more realistic funding.

- The system was customer-focused, placing emphasis on their satisfaction. Customers or users could give their feedback to the library via various channels provided, namely, suggestion box, e-mail, questionnaire survey, and help desk.

- The necessary documents in the system, for example, a quality policy, quality procedures, work instructions, were provided on-site for staff. Thus, they could consult those documents anytime in case of problems.

- The quality of processes, products, or services were monitored and controlled throughout the activity. Weak points could be predetermined or identified.

- The processes of meeting and quality audit also motivated staff to be involved more in sharing ideas and improve their services, thus providing dynamic communicative tools.

The interviewees said that several of their organisation's policies had been intermittently reviewed and modified; the extent being dependent on budget allocation and other factors. In case of implementation failure, all of the interviewees articulated the same answer that there was no penalty. Executives from the academic sector thought that it was not an academic culture to impose a penalty on staff or anybody concerned unless failure was severe. As executives,

they would rather find another action to deal with failures caused by people. As one executive said,

> *"We just assume that they lack understanding or cannot adapt to new working styles. It's our responsibility to make staff understand more clearly and change their attitudes. I focus on trying to make a learning organisation, so if personnel don't have a learning mind, how can the organisation be a learning centre?"*

Some executives recognised that, in some cases, it was not the fault of staff; rather the failure was caused by other factors such as lack of facilities, money or time. Therefore, they tried to be flexible when implementing policies, as one of them commented, *"It's like we are on the same boat so each of us must help row it. There's no use blaming anyone."* A few of them said they never encountered any failure because they tried to set goals *"which could be achieved more or less under the limitations."*

Another executive proposed there should be both reward and punishment systems. However, he thought that using money as a means to give a reward to staff could bring about both good and bad effects. *"It might be a good incentive, but it can cause disunity among staff at the same time too."*

It appeared that executives and library managers applied diverse measures to overcome failure. Some of executives tried to analyse and find out the root causes of failure when problems unexpectedly occurred whilst some had a follow-up plan to investigate and monitor the process at critical steps.

g) Unclear information policy

Some interviewees thought both the nation's and their institution's policies were unclear. One executive said their institution's information policy still did not cover the laws in terms of data access and disclosure. In various government institutions, authority for disclosing or disseminating institutional data has not

been distinctly identified. It was thought by one interviewee that, the lack of clear authority had the effect of strengthening cooperation at junior staff level because they had to be aware of their rights and roles in the disclosure of information or data, which were not clearly pinpointed.

Another unclear information policy which had been raised by a large numbers of interviewees concerned information resource sharing. This group of interviewees expressed a belief that so long as the policy was not determined and enforced by the government, the future of information resource sharing was still in turbulence. It was noted that the statements on resource sharing were still unclear or missing in the information policies of most libraries. Meanwhile, most large libraries were still reluctant to announce such policy due to the fear of unbalanced sharing. As most interviewees thought, *"The well-resourced libraries are not willing to share because they fear that they rather lost than gain."* The interviewees believed that a clearly stated policy from the government, therefore, could help increase awareness among the parties concerned and enforce the successful implementation.

One more missing issue of resource sharing policy involved the collection development of resources. There was no standardisation in collecting and managing information resources, leading to low possibility in sharing between research and academic institutions.

The interviewees also mentioned the lack of definition of library roles which should have been stated explicitly in the government's information policy. Another issue which should be added was about copyright in relation to dissemination of information. Most libraries encountered a problem of copyright infringement when librarians attempted to provide full-text services of domestic research works on the web. This was considered as an impediment to development of digital collections of the country.

Some academic librarians commented that the universities' information policies were unclear in the sense of how libraries would play a part in promoting

academic research. They remarked that the roles of libraries in supporting R&D should be enhanced in parallel with budgets and the promotion of the use of ICT in providing services.

6.3 Strategic management

6.3.1 Formulation of strategic plan

The majority of interviewees affirmed that strategic plans regarding managing information services were in existence and well written in most libraries. Normally, they were presented in the form of annual plans, or so-called action plans. These were considered indispensable when managing libraries because they resulted from policy making and were used for budget allocation each year. Strategic plans defined in detail how policies could be implemented and goals accomplished. The development of strategic plans was, therefore, performed differently in each workplace depending on organisational culture. In general, it originated from two sources: meetings and the top management.

a) Meetings: a forum for staff's participatory roles

Many meetings used brainstorming techniques to define the goals to be achieved and the problems to be tackled. In some cases, staff were encouraged to attend workshops and training courses or to make library visits to encourage creative thinking. As one executive said:

> *"I think it's important for our staff to learn from others, for example, from other academic libraries both inside and outside our country. Then when they come back, we use a brainstorm technique to see what they've learned, to decide what we want to have in the future."*

Organisational strengths and weaknesses in providing information services were also investigated in the meetings. For instance, a management technique, Result-

based Management (RBM), was practised by some libraries in order to guarantee the successful outcome of activities or services where best results would be identified, performance regularly measured, and effectiveness continually improved based on the information obtained from the performance measurement. Using this tool, *"helps us know in which direction we are heading to"*. One manager said Quality Control was another system widely used to assure the quality of services. Similarly, a meeting was said to be a favourable forum for exchanging ideas and discussing all issues of service improvement. It was also viewed as a means to encourage participation between all parties engaged in strategic planning.

b) Top executives' initiation

Interviewees from a few numbers of libraries said that it was a tradition for the top executives to originate both policies and strategies, which were later configured as strategic plans for implementation. An advocate of the top-down policy and planning commented that defining strategies involved the process of decision making; hence executives' pivotal role in making decision. Some said that most staff in their libraries were newly recruited and still lacked experience and working skills so they were not in the position to participate. In some libraries, a group of executives consisting of a top executive and managers of each division worked in a team as a committee to write strategies. Final strategic plans were made known to staff by distributing written copies or by making an announcement in a staff meeting. In some places, communication of the strategic plan was performed through coordinators or committee members, who usually were managers from each division. However, staff were encouraged to participate during the communication stage in discussing feasibility of projects or activities which would fulfil the goals.

6.3.2 Factors to consider in formulating strategic plans

From diverse points of views, interviewees considered the following factors essential in creating strategic plans: institution's policy, organisational change, an intermediary to inform staff, and a balance between timeframe and budget.

Even though the formulation of strategic plans originated in different ways, both executives and managers agreed that the library strategic plan could not be individually formulated, but had to conform to the goals and missions of the institution. The plan must cover the needs of stakeholder groups and serve the information needs of the institutions. Serving as a support unit of an institution, a library needed to analyse its strategic plan and implement it effectively.

One interviewee mentioned another point which should be kept in mind when formulating strategic plans, particularly for academic libraries, that they needed to be aware of educational trends which currently led to an enormous change of organisational structures. Some departments or schools were merging together into one academic institution with a purpose of pooling and sharing resources. She also gave an example to give a clear picture:

> *"For example, our university might be a centre for Chemistry and another university for Energy. Under this concept, I think the process to provide learning and teaching should be better because budgets allocated in a lump sum can help us develop a well-equipped laboratory for pool use for a larger group of students, not only in one university but for all which enrol new students in the same subject areas. This is supposed to be an integrated project in providing education in the near future."*

Despite the fact that a strategic plan should identify strategies for all levels of staff, informing them of the organisational goals whilst encouraging them to participate where they were eligible, some executives and managers did not agree strongly that the strategic plan they had met the need. They said there was still a

wide gap in broadcasting the plan to staff, especially the strategic ICT plan. In some cases, even though the plan was known, staff ignored it. Concerning this problem, interviewees thought junior managers should attempt to play a coordinating role in increasing awareness and motivating staff to contribute more effort in making it work. It was also noted that the missions and activities should be identified more specifically and hierarchically, from the all-inclusive institutional level down to workgroup in each sector and division. The interviewees believed that this would be more effective in accelerating staff realisation of their roles and responsibilities.

Most institutions had both short term and long term plans. In general, the short term plan was written for one year while the long term plan for five years. In each annual plan, the goals and targets were set based on the budgets allocated. Therefore, most interviewees thought that available resources, particularly money, needed to be in proportion to timeframe. This was considered an influential factor on successful implementation. However, most executives gave it as their view that their strategic plans were flexible enough to be able to accommodate changes if required.

It seemed that most interviewees were not satisfied with the limited budget granted by the government. Only a few of them had no complaints about the budget as they thought they strategically *"provided the scale of services at the size which money allowed"*. The interviewees recommended libraries should set policies and goals based on their potential and in the scope that they could achieve. However, most library managers agreed that better services could be provided if they had more money. Some of them commented that how much budget libraries obtained depended substantially on the vision of the top executives. If they promoted information services, they were liable to obtain more money. In other words, small budgets were likely if executives were unaware of the information services provided.

The problem of budget constraints had been addressed by interviewees in different ways. One tactic applied was to design an integrated programme of an

electronic library, which included procurement of both electronic resources and ICT infrastructure at one time. One manager said this *"two in one"* project could help the library obtain more money as the project could show the whole perspective or a full-scale picture of information service development, thus making it more attractive to executives. Another interviewee suggested that library executives or managers should keep themselves posted on institutional policies and update strategic plans according to those changes. This could help libraries to obtain more budget as their activities could meet the needs of the institutions.

6.3.3 Important issues in strategic planning document

Interviewees were encouraged to scrutinise the strategic plans of their own institutions in order to review what issues were included in most plans. It was shown that the themes of the strategic plans were interrelated to one another and also reflected the general trends of S&T information service provision in Thailand. The issues found in the strategic plans of most institutions included ICT management, acquisition of resources, service efficiency, user aspects and future plans and transition to an e-library.

1. ICT management

The ICT infrastructure in each library was explored. Most interviewees claimed that   a shortage of ICT facilities was a problem. Some also said the quality of ICT, particularly slow, outdated computers, was a hindrance in improving service provision. The interviewees commented that the problem of a shortage or poor quality ICT facilities was mainly due to lack of money. Another reason was the growing numbers of users, whose information seeking behaviour and needs had shifted from printed to electronic forms, thus outnumbering the ICT facilities provided. A lack of ICT staff was also reported as a problem which needed to be solved.

At this point, most executives and managers confirmed that there had been an attempt to tackle the problems by having an ICT strategic plan. The interviewees saw ICT as a great benefit to their organisations and the procurement of ICT facilities as a priority. Accordingly, the ICT support unit was considered important in the development of the ICT infrastructure of the organisations. In some libraries, the ICT unit was separate from the library with its own ICT strategic plan, but in most cases, the ICT unit was integrated with the library. One interviewee thought that when ICT units were integrated, libraries had more flexibility with respect to budget management. More money was often granted in order to undertake activities in the integrated projects. Regarding this, some large academic libraries set the paramount goal *"to be a leader in information service by using ICT in providing information accessibility to users irrespective of time and places."* In other words, those libraries were gearing themselves towards electronic provision of services.

Apart from ICT infrastructure, the strategic plans also often included a manifesto to enhance the ICT skills of staff both in services and system development. Cooperation with private ICT companies was also mentioned. Some libraries cooperated with private ICT companies in allowing them to demonstrate new library automation software and to provide a trial service to users. As one library manager said,

> *"This is like a mutual benefit. Our staff can learn to use new software and technology while the company can demonstrate it. In doing this, the company can draw attention from other libraries which may want the same thing the company is showing in the trial run. We can provide new services while the company is doing the marketing. It's a win-win situation."*

In the current situation, the roles of ICT were commonly stated in the strategic plans   as an indispensable factor for developing information service provision and helping stakeholders visualise the entire picture of the electronic library programme of the institutions. However, the key strategy of using ICT could be

fragmented into smaller elements such as managing digital information, constructing electronic S&T research databases, providing web-based services, providing scholarly electronic databases and journals, improving counter services, promoting resource sharing, improving high-speed Internet connections, and giving online training to users.

2. Acquisition of resources

Both executives and library managers in the research gave the same response that academic libraries and S&T information centres in Thailand tended to be heading towards providing an electronic library. They thought it was the beginning of an era in Thai libraries, where they were placing more emphasis on electronic resources in order to keep pace with global information trends. According to interviewees, new resources were selected and acquired from various sources depending on budgets and the type of libraries they were running. For instance, academic libraries were well-equipped with commercial online databases. Apart from the online databases funded by the Ministry of Education for university countrywide pool use, some universities had higher status by having more databases and e-journals which were paid out of their own budgets. Furthermore, there was an attempt to build up more cooperation among both the government and private universities in order to provide more sources of information through resource sharing. Meanwhile, special libraries were striving to compile their own in-house resources and transform them into an electronic format of either abstracts or full-text research databases. Limited collaboration among special libraries was also found in electronic library projects.

In most libraries, executives and library managers worked collaboratively as a committee of selection and acquisition of materials. Normally, library managers, who were also committee members, were in charge of forwarding a list of materials or resources to the committee meeting for final decision. Resources in the list were collected from different sources, for instance, user surveys, peer review, publishers' or book dealers' offerings, book fairs, ICT exhibitions, and bibliographies of current research papers in science disciplines. When

undertaking user surveys or peer review in S&T research institutes, a list of new books or journals were prepared beforehand and offered to users or researchers. This was also a channel for users to give feedback or make further requests for materials they wanted. Purchase or subscription of resources would be decided when there was sufficient interest in the items based on users' responses. It was noteworthy that one academic library manager said some of the resources in her library were obtained free of charge since they had been discarded from other libraries.

> *"Of course they are the print copies. Some libraries don't want to collect the print form any more. They want to throw it away. I think probably the executives of those libraries don't have the background in information science. They said they don't want to be a warehouse for keeping these old things. But in my opinion, electronic resources don't make me feel secure. As long as you have money, they are library friendly. But if you run out of money one day, you wouldn't have anything in your hands."*

On the path towards electronic library services, however, an interesting controversy arose in the domain of electronic resources. While most libraries of both sectors were looking forwarding to providing online services and electronic resources were on the rise, some library managers showed their concern over users' information literacy:

> *"Electronic resources are more advanced and look modern, but we need to invest a lot of money. Our users still lack information skills and can't make cost-effective use of them."*

3. Service efficiency

The majority of interviewees shared the opinion that the efficiency of their libraries was still not satisfactory, especially in services, collection and resource management. However, the remaining interviewees, noticeably from well-

resourced institutions, said they were fairly satisfied. Physically, these libraries were large and had higher potential than some other libraries of the same type in the academic sector. One interviewee from a large academic library confirmed that the services given were satisfactory, which could be proved by positive responses from user surveys. However, there were some particular points which users requested for improvement, for instance, more convenient access to some particular books and materials on shelves. Another point demanded to be improved was staff attitudes. This was remarked by some library managers who saw that staff still lacked positive attitudes towards providing a service. Eagerness and creative thinking were needed to be strengthened in order to improve the image of library professionals.

Reasons were also given by the interviewees for the causes of low service efficiency. Apart from the staff's lack of initiative, managers raised issues of insufficient numbers of qualified staff who had educational backgrounds in science disciplines. According to one manager, this was a general problem found in 80 percent of libraries. Another problem concerned with personnel was lack of permanent staff to continuously undertake the job. Most staff working in academic and special libraries were temporarily employed. Thus, the tendency for these staff to resign was high when they found permanent jobs. As the interviewees explained:

> *"These newly recruited staff are unskilled and need time to learn about the job. Of course, the training takes time. And when the training process is over, they coincidently find a new job with better prospects so they leave. This has weakened our library because we have had only new staff on training all the time. We can't have the experienced ones."*

It was commented that diverse groups of users also affected the quality of services of libraries. This affected academic libraries, in particular, which served both internal and external users. Librarians found it difficult to satisfy non-member or external users as their demands were excessively varied. This was

another difficulty in service provision that librarians had to bear in mind and put in more effort to overcome. Other factors which had been mentioned in relation to service efficiency consisted of interlibrary lending service, waiting times, response to questions, and personnel development. One executive from a scientific special library said her library had a strategy to improve the service of interlibrary loans by making it web-based, thus making it more convenient to users. As for the academic sector, which was largely influenced by quality management control, most libraries proclaimed strategies to shorten waiting times for library services and response to questions. Personnel development of both professional and non-professional staff was also considered a priority. An obvious strategy used was sponsoring staff to further their study at higher levels and providing them with English courses.

4. User aspects

User aspects concerned strategies which each type of libraries had implemented to provide the best of services to users.

Communication with users. From the interviews, it was found that libraries applied several approaches to communicate with their users. A library web page was the most widely used for distributing library announcements or news, for instance, advertisements of new services, new books and journals, or new databases. A few libraries sent e-mails directly to each user in their mailing list to notify them of new materials provided. The communication tools used to contact library users reflected how advanced in ICT each library was. While some rich libraries were using e-newsletters and Intranet announcements to communicate to users, in some small libraries, web pages had not been yet constructed and some were without adequate Internet connections. Library news in these cases was passed to users by a simple print circular or a memorandum.

User surveys. User surveys were conducted through various means including paper-based questionnaires, e-mail, message board, and web surveys. The frequency of surveys varied from every academic term, every six months to once

a year. It was also to be noticed that most libraries had conducted user surveys because it was a compulsory part of their quality control system. Survey items mainly concerned user satisfaction about services, user needs, recommendations of new resources, and suggestions for improvement.

The most widely used survey method was paper-based. The next methods used were e-mail and web forum surveys. With no limit of time duration, users could send their feedback any time they logged in. Interviewees said these two methods were comparatively informal and that some users were more comfortable sending their responses via emails and web forums than responding to traditional paper-based questionnaires. For example, one executive noted:

> *"Regularly we get responses from users by e-mails because we usually send e-mails to our users, informing them about the new collection or new services. We also ask them to give us feedback at the same time."*

On the whole, libraries thought that they received good feedback about electronic methods. One manager said users liked the convenience of being able to send their inquiries or comments anytime they needed. Librarians could respond to those comments and made them publicly known on a message board. But if those comments or inquiries were serious and needed an urgent reply, librarians would send e-mails to those inquirers directly. It was notable that only a few of the surveyed libraries had used a web survey. This was probably due to the fact that this tool had only just been recently introduced to the library community in Thailand. Moreover, it required more advanced ICT skills and would work best only where there were sufficient Internet connections.

However, no user surveys have been conducted in some libraries. Those interviewees explained that their libraries were at the preliminary stages of arranging user surveys. Currently, they provided only suggestion boxes for getting user feedback. It was also stated that some libraries obtained feedback from both a suggestion box and a questionnaire survey.

It was notable that most managers were very interested in research on user aspects. One manager said that she was well aware of user needs and had attempted to conduct research in this area. However, librarians found it difficult to balance their time between routine work and research, as can be shown by the following comment:

> *"The problem is, we as librarians, don't have much time to do it. It's like an extra work which you have to devote your time for. Personally, I'm interested in doing research about users so I always think about the hot topics and encourage staff to run the research projects on those topics under my supervision."*

The fact emerging from the interviews was that diverse groups of users had different demands and expectations of library services. In this situation, it was difficult for libraries to design services which could satisfy every group of users. Thus, the first priority was given to internal users. For example, one manager from an academic library gave the view that it was easier to handle students and staff users than a variety of external users who had a wide range of service demands.

It was also remarked that a key action of the library was to match library services with user needs, particularly in the full flow of electronic information resources. According to one manager from a Faculty of Science library, online databases and journals had become more favourable among science students and staff than the printed form, excluding books of which print copies were still preferred. Other managers said academic users in general were satisfied with the services currently provided. Yet, a large number of complaints were related to delays or unstable networks, and also they received complaints about difficult access to some particular databases subscribed to by the library. Furthermore, users wanted libraries to procure more online databases or electronic journals. This was widely found in most special libraries where investment of electronic resources was still low.

User education. User education was widely provided   in most academic libraries but less so in special libraries. This was due to the fact that, when compared to special libraries, most academic libraries were better equipped with ICT infrastructure and electronic resources. Therefore, it was necessary to train users and create familiarity with ICT systems used in accessing resources or retrieving information. Another reason was that interviewees thought that students, who were the predominant group of users of academic libraries, required greater information literacy. Thus, in most academic libraries, an introductory course on the basic searching process, for example, catalogue searching, was provided to new students at least once at the beginning of an academic year. Additional training was also organised during term time if there were new resources or databases. Central libraries were generally in charge of training. However, special training was also given by faculty libraries too in some cases. It was interesting to note that many attempts had been made to support users through a training module. For instance, mobile training, held on site upon request, was offered by one university as a strategy to educate users in retrieving library resources. Some universities provided online tutorials whilst others promoted training for a small group specifically at a lecturer's request. Moreover, some libraries gave special advisory services to study groups, helping students locate the resources in required subject areas.

Notwithstanding these efforts, managers felt that a number of student users still disregarded library training courses. As one manager said, *"it would be better to provide library training courses as a compulsory subject in the curriculum."* This seemed to be a common problem of many universities according to one academic library executive. She thought that, libraries needed to play a more active part in creating a learning atmosphere and developing good information seeking behaviour.

Users and the cost effective use of resources. In relation to cost effectiveness, interviewees placed emphasis on how to balance investment on costly resources and the effective use of them. There was no general agreement as to what criteria or methodology should be used to evaluate the effectiveness of electronic

resources. For example, many executives and managers said they did not agree with the idea of procuring electronic resources without considering user needs. As one executive said,

> *"There are many kinds of resources in the market for library users but we still lack an evaluation method for surveying what users really need. I think we have to start thinking about this."*

Most interviewees thought that conducting a survey would be the best approach to identify information seeking behaviours. From their experience, most managers found that a large number of users, both students and research staff, still did not seek information from the variety of electronic resources which had been obtained by libraries at considerable cost. Thus, low usage was the cause of a great loss of library resource investment. One manager said,

> *"It's not right to think that you have money so you can buy whatever you want. In managing library resources, we have to evaluate the use of those resources too. Resource acquisition is quite a hard work. Buying alone is not difficult, but it's difficult to know if the resources are used in a cost effective way. It's a librarian's responsibility to justify every bit of money we've spent. That's a hard job."*

Interviewees agreed that even though there was a trend for increasing numbers of users to use electronic resources, those users were still a minority. One manager said,

> *"Let me give an example of the university here. We have 10% research staff, 10% academic staff, the rest are student users of which the majority are undergraduate. This group is not keen on electronic databases. But as a matter of fact, the Ministry of Education has to pay about 70 million baht for running the online database consortium."*

A problem of low quality hardware and a poor network also worsened services and hindered users in accessing electronic resources. Moreover, some interviewees expressed the feeling that they still did not see the value of electronic products. The reasons were inexorably increasing prices, limited licensing, and last but not least, an attribute of "intangible property" resulting from a subscription: interviewees felt they had nothing in their hands.

One executive gave a somewhat different point of view that, in fact, there were various factors in considering the effective use of resources. The most important concerns lay in the purposes and the outcome which users had achieved from using the resources. According to his view, *"even though there is only one user using our resources in doing his or her research to create something new, I think it's worthwhile."* He also added, *"As an information provider, we have to be ready at all time to provide the service users want. Today they might not want something, but tomorrow they will do. It's our responsibility to be available."*

Meanwhile, some academic libraries had made an attempt to evaluate the cost effective use of electronic resources. For example, they kept records of users' access to electronic resources or of new online databases and attempted to address the associated cost benefits. In some universities, indicators were set to evaluate the balance between library resource procurement and the amount of research output produced by academic staff as well as its impact factor.

5. Future plans - transition to e-libraries

Questions pertaining to the future activities of the surveyed libraries were asked to investigate development trends of service provision and their preparedness for change. Responses from interviewees showed that they saw their future as e-libraries. Relevant issues of transition to e-libraries which were most discussed included the areas of data digitisation and procurement of ICT, followed by ICT skill enhancement programmes for staff. It was notable that budget allocation was also considered the most important factor that would make the e-library transition possible. Most interviewees saw a positive side to the development, as

one manager said, *"In a transitional period, we heavily depend on the budgets allocated from the parent institution. Anyway, we have to set our own goals and try to work them out, gradually, until we can achieve them."*

Future plans for S&T information service provision were thought to be dependent on ICT management, collection development, service improvement, user training, and organisational change and management. Details of each item are discussed below.

Improvement of ICT. All the answers from special libraries showed the same trend, a desire to shift to the provision of a wider range of electronic library services. As most research-oriented special libraries were of hybrid or traditional types, the direction in which they were steering was towards constructing ICT infrastructure which could accommodate advanced services. Executives and library managers thought they still needed more computers and more effective networks that could enable libraries to share resources.

Academic librarians also mentioned the need for ICT improvement. It was interesting to find that there was an initiative to establish a provincial ICT centre, a so-called software park. The intention was for the centre to be run collaboratively by provincial universities and MIC and operate as an ICT support hub for universities in each region.

Collection. Interviewees from both academic and special libraries shared the same interest in developing digital collections of in-house research and institutional information resources. They had plans to digitise print resources, for example, theses and research papers for open access as web-based full-text databases. A web-based service for patent searching was also mentioned in the future plan of one special library.

In addition to the need to improve services, digitisation was also desired by some because they had a storage problem. Several libraries, especially special libraries, were running out of space to maintain their collections. As one manager said,

"We are going to reduce or cut some collections which have been rarely used by users." Some academic libraries also encountered the same difficulty. One suggested solution in their future plan was to set up a system for weeding and replacement of collections. In this regard, an inventory book was to be developed as a tool for organising library resources. Criteria for storing or discarding resources were also needed for checking frequent use of each kind of resources.

One special library was launching its forthcoming project of repackaging information to serve the needs of industrialists and entrepreneurs from small and medium enterprises (SMEs). The executive of the library explained that information on multi-disciplinary subject areas from different sources would be combined, organised into a thematic file, and provided to users who were interested in that topic area.

Some academic libraries were also using their own financial resources to subscribe to more electronic databases, in addition to the Ministry of Education. Some universities had a plan to locate more new sources of information, particularly free databases provided via Internet and search engines.

Service improvement. The responses of all interviewees from the academic sector were to develop services which met user needs proactively. As most of them operated under the quality assurance system, they were coerced to improving user satisfaction by controlling the quality of services provided.

It was interesting to note that some provincial universities had plans to provide 24 hour electronic library services while some of them were seeking to acquire more resources for all subject areas, especially in S&T. Furthermore, some provincial academic libraries expressed their eagerness to support resource sharing schemes. As shown by interviewees' responses, academic library members under PULINET had a plan to work collaboratively in various areas to improve their services in compliance with the concept of resource sharing. A list of their future plans is as follows:

1. Using a smart card- one card for all libraries

PULINET member libraries were initiating a smart card system to provide easy access for users to any library in the provincial network. That is to say, the user will hold only one card but they can go and use services at any location of the PULINET libraries. Using this system, resources could also be shared among PULINET member users in a more convenient manner.

2. Provincial consortium and library network

Executives from academic libraries of provincial universities said that PULINET had a plan to establish a provincial consortium and library network. Even though all provincial academic libraries are members of THAILIS- the central network under MOE, the executives said that maintaining a PULINET network would still greatly benefit their institutions. One reason was that PULINET had long supported collaboration in resource sharing. Thus, they considered it advantageous to continue their activities in concerted efforts. The establishment of a library consortium and expansion of a library network at provincial level were planned. In developing a provincial library network, special attention would be paid to the issues of services, ICT, personnel, and review of achievements and evaluation. Another tentative project reported by executives was providing a consultancy service in library professional development through advising and training other libraries of educational institutions located nearby. It was remarked by one executive that the attitude for large libraries to help smaller libraries should be promoted.

> *"We aim to transfer knowledge in library management and advanced library technology to other libraries. I think this is a good idea and it also serves the concept of resource sharing. As we are bigger, we can act as a centre for other higher education colleges nearby. It's the service for the community."*

The future plans of special libraries were primarily concerned with applying an automated approach to service improvement. As most special libraries in Thailand provided information resources to users on the basis of fee-based

257

charges, they were looking forward to expanding their market to larger groups other than their internal users. The specific target group in the plan was those in business and the industrial sector, consisting of industrialists and entrepreneurs from the SMEs. In this regard, most special libraries had a plan to develop business processes in order to provide more convenience to users. Examples were a plan to expedite the process of document delivery services and an application of e-commerce so as to employ an easier method of payment. These activities were seen as good strategies to promote the wider use of costly resources, as one manager said, *"We want to encourage users in using this service because some resources have been imported at a high cost or exchanged from abroad."* Another manager commented that her library was *"looking forward to using E-commerce by allowing users to pay by credit cards. However, we need to revise the financial regulations to accommodate this change."*

User training. Some academic libraries had plans to extend training for smaller groups of users at faculty level. In some special libraries, outreach to users in industrial and business sectors was to be undertaken in the near future. The aim was to develop searching skills for entrepreneurs, industrialists, and interested members of the public, who were new to electronic resource services. This was believed to help motivate users to use information in smarter ways which responded to real business and industry needs. Furthermore, the training would include scientific researchers who were still not accustomed to searching and needed help in improving their information literacy and skills.

Organisational change and management. Organisational change was acknowledged as one of the critical factors accelerating the development of service efficiency. Executives and managers were well aware of continuous improvement of their organisations, when they set the targets to improve in the following areas:

1. Sharing of knowledge from training courses
This project was viewed as a first step in an attempt to capture and manage knowledge within the organisation. Staff who attended any training courses

would be required to transfer their knowledge or skills to their colleagues either by writing a report or giving a presentation.

2. Regional incorporated strategic plans

Academic libraries in each part of Thailand established a collaborative programme to organise forums and executive meetings in order to discuss and create an integrated strategic plan for the region. The participants would include managers from library sections concerned, namely, Services, Serials, Acquisitions, etc. Their strategic plan initially would include responsibilities of each library as well as their cooperative future activities. This represented an increasing trend towards collaborative management in formulating incorporated strategic plans for the regions.

3. Cooperation with the private sector

Some special library managers said that they had plans to boost cooperation with the private sector by sharing some specific types of resources which were required by users. These included trade and industrial organisations, for example, Thailand Industrial Fund and commercial banks, which possessed a variety of sources of statistics and industrial databases. The collaboration at first would be interlibrary lending and photocopying services.

4. Personnel development

In order to prepare for change, more training was planned for staff at all levels in an attempt to encourage them to work at their full potential in a changing environment.

5. Outsourcing technical services

It was said by one academic library executive that his library had a plan to outsource technical services. He gave as the reason that those services such as acquisitions and cataloguing consumed much time and hindered librarians in developing other professional skills. By outsourcing this kind of work, librarians would have more time to focus on other aspects of development of both themselves and the library.

6. Strategic positioning

One academic library executive mentioned a plan to reconsider the roles of the library and position itself as a competitive intelligence library and a knowledge co-producer. She thought it was essential for a repositioning as the recent roles of a library were globally diversified whilst a university itself was heading towards creating a learning society. In her opinion,

> *"It is our goal to become a competitive intelligence library. I've made this concept known to staff and let them think how we can reach that point. For example, how your section can work to meet demands of researchers? How your section can provide services which can be measurable in proportion to the research works produced by our academic researchers? How we can acclimatise ourselves to the changing conditions? We have to play roles of a knowledge-co-producer by helping researchers achieve their research goals. So now, we are starting to deal with knowledge management."*

6.4 The Development of S&T Information Services in Thailand

6.4.1 The current state of S&T information service provision in Thailand

The majority of interviewees thought that S&T information provision in Thailand in general was experiencing a sluggish growth when compared to developed countries. The interviewees believed that S&T information provision in Thailand should have been developed faster on account of the potential of the country and interest shown by institutions. However, some interviewees perceived the development as satisfactory. Accordingly, the interviewees were further asked about the current state of S&T information service provision in Thailand in order

to probe into the factors which were involved and considered as barriers to the development.

The following details the interviewees' diverse points of view about the current state of S&T information service provision in Thailand.

a) Lack of collaboration at a national level

Even though there had been huge development in information service provision, as clearly found in most libraries which were starting to provide electronic services, it was postulated that S&T information services still lacked national synchronisation on aspects of policy formulation and strategic management. Interviewees thought that there was an enormous development gap between each type of library, particularly between academic and special libraries. It was said that, at a macro scale of development, the S&T information services in Thailand were satisfactory with the rise of advanced library technologies for service provision as well as increasing electronic resources. Yet, library automation technologies were only found in some large libraries which had large budgets. Obviously, most of them were in the academic sector. Meanwhile, the S&T special libraries were rather slow and could not keep up with those technologies due to poor funding. It was believed that poor funding and a lack of an institutional policy were crucial factors obstructing the development of S&T information service provision in Thailand, as can be seen from an opinion of one executive in the special library sector.

> *"I think development of S&T information services in Thailand has not made much progress. It depends on each institution's policy. An organisational structure of each institution is also different as well as funding. For small organisations, they do not get enough money to develop the information system."*

The issue of lack of commitment and action of the parties concerned was also mentioned. Interviewees said that there should be *"a national master*

plan" for S&T information which included definition of cooperation at different levels, trends in ICT, and personnel development. It was noted that the lack of strong action at the national level had an adverse effect on executives' and librarians' attitudes and willingness to cooperate.

b) Weak point in resource sharing

Resource sharing was one of the issues the interviewees considered to be a weak point of S&T information service development in Thailand. According to their view, they thought that a lack of collaboration among libraries had impeded the development of service provision. Some interviewees, particularly those from small libraries, experienced problems when they were a member of the S&T information network because they had inadequate budgets to procure a variety of resources whilst many large libraries were rich enough to have diverse resources. This imbalance of resources resulted in an unwillingness to share.

Moreover, a library consortium in Thailand still faced difficulties in sharing as a result of limited and inflexible conditions set by dealers or publishers. The manager of one small library said, *"Dealers and publishers also have their own pricing strategy, not allowing us to share at cutting costs as we want. It's business so what the consortium can do for us is only to act as a negotiator. That's all. Anyway, we are not successful in bargaining much. It rather depends on dealers or publishers."*

c) Limited S&T information resources

One executive shared the view that the S&T information service of Thailand was far behind when compared to many western countries due to inadequacy of information resources of in both English and in Thai.

It appeared that most scientific research and the theses of Thai researchers or students were published in Thai rather than English, leading to limited dissemination opportunities for non-Thai readers. Meanwhile, publication

avenues at an international level were limited due to insufficient English skills. This resulted in a small amount of publication worldwide and also a low impact of Thai research in the international community. Moreover, compilation of Thai research databases, especially in electronic formats, did not adequately reflect research output, as said by one executive, *"there are just only few Thai research databases."* This resulted in Thailand having both limited Thai and English S&T information resources. Consequently, there is also a lack of opportunity to share S&T information in international arena. Instead, most information resources had to be purchased or subscribed to from abroad.

d) Inadequacy of ICT infrastructure

Some interviewees said that the cause of the slow development of S&T information services partly lay in the lack of ICT infrastructure. They thought that progress had been made; however, more ICT facilities were still needed together with increased user training in order to keep up with ICT developments.

e) Opportunities to R&D prosperity

Some interviewees saw that a clear institutional policy on the promotion of R&D was important and accelerated the development of S&T information service provision because more R&D led to an increase in the numbers of S&T information resources. It was commented that the slow development of S&T information services in Thailand was partly caused by a previous lack of R&D promotion policies. The situation has changed; the government now has a vision concerning the national S&T sector which has resulted in a huge increase in R&D projects. The growing number of research studies has resulted in the proliferation of research papers which were considered by libraries as valuable resources which needed to be collected, managed, and disseminated to interested users. Meanwhile, the libraries concerned were also motivated to meet the challenge of supporting the R&D sector of the countries via information service provision, as confirmed by one manager from an academic library,

> *"Our country is heading towards the development of S&T.*
> *Therefore, universities have to promote the learning of S&T and*
> *scientific research. Thus libraries have to play supportive roles in*
> *this environment. We have to set our own policies and strategies to*
> *correspond with the development trend of the country."*

f) Promising development of electronic resources

The interviewees believed that there had been an upward trend in S&T information service provision, based on an increasing number of electronic resources currently provided in the country. The following comment of one academic library manager confirmed the favourable future of S&T information service of the country:

> *"I think recently the provision of S&T information has been much*
> *developed. We can see from the government policy in funding and*
> *procurement of electronic databases in order to serve the S&T*
> *learning and research."*

This group of interviewees thought that the information system and service provision had improved quickly. One executive showed her positive attitude to the situation, *"We can provide electronic services like other countries do. Our users can search and access information from a variety of sources. We are on the way to developing more and more."*

6.4.2 Barriers to the development of the S&T information services in Thailand

As shown previously, the interviewees viewed the current state of development of S&T information services in Thailand in both positive and negative ways. Both groups were also asked to express their views about potential barriers to the

development of S&T information services in Thailand. A range of opinions were given and included:

a) **Lack of clear national information policy**

The interviewees believed that the development of S&T information services in Thailand was struggling with policy formulation at a national level. Existing policies were considered unclear and unfocussed. Furthermore, existing policies lacked awareness of an increase in national collections, especially of S&T information resources.

b) Lack of awareness from executives or policy makers

The interviewees, particularly from the library manager group, expressed their concern about the executives' attitudes towards information service provision. According to them, some executives had little understanding of library roles and information services, resulting in the lack of a clear institutional information policy and lack of funding. One manager shared her experience stating that most of the top executives at her institution, who were from different backgrounds other than information science, lacked vision in development and rated information services as insignificant. However, some interviewees said the existence of the institutional information policy did not always guarantee appropriate funding being given to the library sector. There was also contradiction between ambitious goals stated in institutional information policies and low budgets allocated for implementation, thus making the missions unachievable. It was stated by one manager, *"Executives' awareness, policies and budgets were something that did not match each other. For example, the government always put the policies as the top priority, but in practice, they don't allocate money for implementing those policies. The information service sector was always the last."* Most managers said this problem led to difficulties in implementing the policy, often resulting in a reduction of activities or project scale in order to fit the budget.

Another scenario reflecting executives' unawareness was in the area of hierarchical management. In some institutions, the interviewees had experienced management consisting of too many layers of hierarchy leading to extremely time-consuming processes in decision making. For instance, there were many levels of decision makers obstructing the work flow. One manager said this generated adverse effects on budget allocation and project implementation since approval of the project took too long and usually budgets were cut again and again during each step of decision making.

> *"Since we have too many levels of decision making, every time we submit a project proposal and ask for resources, we have to be careful to design our projects so that they are achievable. If you ask for too much money and then they are rejected, it is time wasting."*

Lack of awareness was also raised as a problem in the government agencies which deal with finance and budgeting. It was said that executives who were in charge of budget management did not see information service development as important; therefore the amount of financial subsidy remained at zero growth each year. The interviewees thought this was due to a rigid pattern or mechanism in allocating budgets. One interviewee said, *"It's sort of a freezing pattern. The budget allocated each year was frozen. You can't get more than what you have got in previous years. They think we are doing routine work so we shouldn't spend more money than we've done in the year before."*

c) Costly investment in software and e-resources

Interviewees thought that limited budgets constrained the procurement of resources, particularly when the information service trend had shifted from traditional to electronic provision. In practice, most interviewees said there was a huge deficiency in budgetary provision for the running of libraries. The economic turndown in Asia, including Thailand, since 1996 had had a tremendous impact on library budgets. The impact can still be observed now. Predominantly, the government financial subsidy was not enough to meet the

cost of electronic resources which have to be imported mainly from the UK or the USA. As one executive said, concerning buying or subscribing to the electronic databases or journals, it was important to analyse the cost effective use of those resources before spending money.

> *"Budget cuts are always a big problem. It always blocks our way in doing our activities. We can neither achieve our goals nor implement the national information policy. We have to create strategies to deal with a small amount of money we have. My background is in Economics so I always consider the cost effective use of library resources, how to save money. My concept is the more we can save, the more we can provide."*

Electronic databases were currently provided in all academic libraries and in some special libraries. However, it was thought that the service could be much improved with better funding.

In addition to the procurement of electronic products, some interviewees thought another factor hindering the development was the high investment needed for automated library technologies. So far, most libraries in Thailand had imported software for automated library systems from abroad. Only some libraries used home technologies. Thus, some interviewees viewed this as an obstacle and the investment cost of technologies was exorbitant at a period of transition to e-library functionality. One executive commented,

> *"The imported software of automated library system is very expensive. The government should have a policy to promote the use of software which is locally designed because it's much cheaper. There should be a policy to promote Thai technology and unify the national system."*

It was also noted that this problem was partly due to the attitude of the parties concerned. The same executive said,

> *"In spite of reliable library technologies at an affordable price developed by Thai technologists, most of us still depend on the costly, imported ones because of their higher speed, greater functionality and convenience. In fact, Thailand technologies are developing fast, but most of us are not patient enough; preferring instant technology instead."*

d) Lack of domestic electronic resources

A number of interviewees commented on the need to improve the content of domestic electronic resources for more cooperation between ICT staff and librarians. It was remarked that other than imported electronic resources, Thailand needed to develop its own local content databases either of full text or bibliographical resources, for example from scientific research and theses. The interviewees considered this activity as beneficial to the national collection and resource sharing scheme in the future. However, it was also noted that more cooperation between ICT staff and librarians needed to be encouraged in order to undertake projects in domestic resource development, particularly in some libraries where inadequate ICT staff still remained an unsolved problem.

Concerning this project, intellectual property was noted as a major concern. From librarians' experience, reproduction of materials and information resources to be provided for public users had caused copyright infringement. This was viewed as a big obstacle and some libraries even decided to stop provision of full-text databases. As one library manager stated:

> *"At the moment, we are going to provide web-based abstracts, not the full texts. I think this service should go smoother. Hopefully, the authors wouldn't make any complaint or try to stop us any more because we provide only abstracts of research papers."*

e) Information providers' attitudes toward collaboration

Collaboration among S&T information providers in Thailand was noticeably weak and insecure, shown by negative attitudes towards collaboration by executives, library managers, and staff. As observed by the interviewees, some of the aforementioned parties still lacked willingness to cooperate, leading to failure in terms of consortia or networks. Regarding this, the interviewees had diverse opinions about the unsuccessful operation of library consortia or networks in Thailand. One executive said the failure was caused by competitiveness of some libraries:

> *"Some libraries think that they should be leaders in the service provision so they see others as a competitor and they don't want to share the resources or cooperate with them. They just said they agreed to cooperate and promote the sharing but in practice, 'no action'. For example, they didn't try to find any system to facilitate the sharing or when they got a lump sum of money for the networks, they didn't share it with other members. Instead, they spent the entire budget within their libraries only. This also blocked the way of other libraries to request resources for the same categories or activities."*

When discussing organisational management of the network, feedback showed that it lacked the culture of team working. The interviewees stated that a brainstorming technique should have been used among members. But, instead, decision making came from only the coordinating body. Therefore, there was a gap and limited information in the process since members had no chance to share their views.

As far as collaboration was concerned, the interviewees said that the unwillingness to collaborate could be seen from the resource sharing projects undertaken. As mentioned earlier, large libraries had a strong sense of belonging and saw no benefits in sharing. Moreover, an attitude towards workload was

mentioned as a barrier in resource sharing due to the fact that those large libraries feared an increase in workload when more external users requested interlibrary services.

The interviewees believed that these attitudes strongly influenced the lack of collaboration among libraries involved with S&T information service provision since no serious attempt had been made to promote collaboration among them.

f) Lack of powerful coordinating centre

The lack of organisation which could be a focal point for S&T and academic libraries was also considered to be another factor hampering the development of S&T information service in Thailand. Most interviewees thought that there should be an organisation which could act as a coordinator to manage the S&T information sources of the country. From the interviewees' experiences, there had been an attempt by the government to establish such centres but the operation turned to failure for various reasons. One was that the coordinating centre was not a powerful enough negotiator, especially on the matters of budget and financial support, thus, finally, leading the groups to a period of inactivity because of inadequate funding. Another reason was concerned with political circumstances; government changes had resulted in suspension of all activities and the abandonment of the national information policy. It was interesting to note that the interviewees considered the performance of the National Library of Thailand as stagnant and its roles as inconspicuous. Despite being a national information centre, its collections seemed incomplete and missing, especially in the realm of S&T information resources. As commented by one library manager:

> *"I think the holdings of the National Library are not complete, for example, journals. When I'm doing my project about journals, I can't find anything I can use for my research project from the national library. In my opinion, the organisation of the national library needs a completely restructuring. As long as it's still under the Department of Fine Arts, development will be difficult because*

> *of the lack of resources. That Department is too big so the structure*
> *is unwieldy."*

However, the interviewees still saw the potential for development of NLT and mostly disagreed with the government policy to establish a new centre to manage the national information and knowledge resources of the country. The expected role of such a centre in coordinating the S&T information providers nationwide was also discussed. The interviewees thought that its main task should create portals or gateways to S&T information resources both inside and outside the country.

In relation to the academic sector, the interviewees saw that, notwithstanding an endeavour to establish a consortium of online database licensing, the current level of collaboration among academic libraries was still low since it was more a buying club than a deep resource sharing agency. It was recommended that more activities should be extensively promoted in order to create more extensive collaboration.

As for the current status of S&T information networks in Thailand, library members commented that the collaboration so far had not been successful. The main barrier to success was lack of interoperability which allowed each library to connect and share resources. Another problem was the lack of local content to be shared, as mentioned earlier. The interviewees also called for the restructuring of the network and tangible activities which clearly defined service models.

g) Personnel problems

The most obvious problem concerning personnel issues, as mentioned by various libraries, was a shortage of staff. This problem emerged from the Thai government's economic policy which stated the fixed growth of government officers with the aims of restructuring the state sector and exploiting the full potential of the workforce. The policy of zero growth of staff also had an adverse effect on the library sector, particularly when the ICT staff were highly

demanded. The management group tried to solve the problem by providing ICT training to librarians and library staff instead. However, it appeared that some librarians and staff still lacked enthusiasm to learn new ICT skills. The management group, therefore, tried to motivate them by providing more incentives, for example, giving staff grants for further studies, allocating more budget for staff training, seeking attractive ICT training courses from outside including neighbouring countries. The interviewees said that this aimed to prepare staff for the move towards an e-library. They thought that a shortage of skilled personnel obstructed the development of service provision; therefore it was considered urgent to provide library staff with ICT training. It was interesting to note that some executives and managers said that they would rather provide ICT training courses to librarians or library staff than recruit new ICT staff because they believed that librarians and staff were keener on content development and service provision than ICT staff were.

In addition to ICT skills, the interviewees thought that staff also needed to be trained in professional skills especially those associated with service provision. As the managers said, some staff lacked eagerness in providing services and did not actively involve in service improvement. One manager gave the view: *"It's hard to say. I think this problem depends on the character and personality of each person whether they want to learn new things. If they do, they can improve themselves more and more and that will be very useful to the organisation."* In her opinion, she considered the learning as a lifelong process for people to get involved with. One manager viewed the problem of insufficient skilled staff as related to users' information illiteracy. As she said, the information literacy of users was partly built on staffs' ability in educating users. She also gave an interesting comment on the library profession:

> *"In general, the library profession hasn't been well recognised in Thailand. People think of it as old-fashioned, or you don't have to acquire any knowledge to become a librarian. Most people look down on librarians. But the root cause of the problem is, we, librarians, don't have much chance to improve ourselves because of*

a heavy workload. We also lack support from executives in developing our professional skills, especially research skills. We have neither time nor financial support. One thing to solve this problem is we should promote librarians' career path. How can we provide effective services when we, ourselves, still lack necessary professional skills?"

Moreover, the lack of research skills of library staff was noted as a cause of inadequate user surveys of Thai libraries. In other words, the interviewees thought that libraries provided services based on the management's speculation regardless of user needs, which was, therefore, a failure in service provision.

One executive said that staffs' insufficient language skills were one of the barriers to the development of the S&T information service provision in Thailand. As she explained, languages of S&T information resources were diversified, thus there was a difficulty to access or retrieve those kinds of information when staff were not proficient to understand the context of the subject areas. An example was given about the resources in the areas of international standards which had been produced in various official languages, e.g. English, German, and Chinese. The interviewee said staff encountered language difficulty in understanding foreign technical terms. This was viewed as having a strong impact on services provided to users since librarians or staff failed to locate or retrieve the information which met user needs.

Regarding this, most libraries had strategic plans for personnel development, which had partly originated from the quality assurance policy. Training needs surveys have been conducted, in some cases to provide or find courses based on staff interest. All executive and managers believed that this strategy could help motivate staff and encourage them to improve themselves in a changing situation. They also thought training was an effective tool in narrowing the ICT efficiency gap between the management group and staff.

Negative reaction to organisational changes was another problem found among librarians and library staff. According to the executives, this problem was common among senior librarians or staff who tended to resist change. One executive said that each senior staff usually stuck with his or her own ideas and refused to accept others'. He said,

"Sometimes, each of them wants to move in different directions, and have different goals, so I have to compromise their ideas. We have such kind of conflicts and I believe every library has it too. I think, for library development, we still face the problem of seniority, a group of people who cling to their traditional practices, experiences, and knowledge. Therefore, it is an executive's responsibility to fill in this gap."

Heavy workload combined with a small workforce was also viewed as a critical barrier to information service provision. As mentioned earlier, the policy on zero economic growth of the Thai government had widely inhibited staff recruitment in the public sector. Most libraries could employ only temporary staff to help minimise the increasing workload of permanent officers. However, these temporary staff had low wages with no annual increments. Therefore, they were always ready to resign once they could find a better job with satisfactory payment. This caused turbulence in managerial areas since there was a high turnover of staff. The interviewees considered this as time wasting since these temporary staff consumed a long period of training time, but *"they quitted the job after having been trained for three months, so we have to start training the newly recruited staff again and again."*, one manager said. Another executive thought this caused organisational weakness in terms of policy making. She said that these staff members generally lacked a chance to participate in the formulation of institutional policies due to their inadequate work experience, thus there was a huge gap between temporary staff and the management. The interviewees agreed that these conditions had created heavy workloads for permanent staff in the long run as they had to bear increasing responsibilities while training new temporary staff at the same time.

One manager expressed her desire to have an effective system to evaluate staff performance after they had been trained. She observed that, strategic plans for personnel development could be found in most libraries, but, in practice, there were not pre- and post-training assessment criteria to measure training success as well as staff performance. She commented: *"Most staff, therefore, still don't have good performance even though they have been trained with various skills for many times."*

Another interesting point of view given by both executives and managers concerns the idea that not only librarians or staff needed to be trained, but the management group too. The interviewees thought that the development of the management could bring about the successful organisational development. One manager expressed her expectation: *"We need executives of great vision. They should be a developer too."*

h) Users' information illiteracy

The user dimension was also viewed as a barrier to the S&T information service provision. The interviewees from the academic sector agreed that the majority of student users lacked researching information skills. The interviewees thought that this was caused by the educational system or the learning and teaching cultures which failed to develop research skills and critical thinking in students. From the interviewees' view, it was observed that *"undergraduate and post graduate student users lack information seeking skills. They prefer easy and instant information. This depends on the education system which never motivates students to develop the researching information behaviour. Most lecturers still feed students too much."*

Most students were unaware of the variety of information resources provided by the libraries and showed no interest in library training courses. The library managers commented that a large numbers of users were still *"loyal to"* print copies and paid no attention to electronic resources. This situation caused

difficulty to libraries in terms of budgets and procurement because they had to subscribe to both print and electronic forms, as one manager said,

> *"For example, SciDirect, at the moment, more than 500 print copies are repeatedly subscribed by seven to nine academic libraries. When we tried to survey if any of them wanted to cancel the print form, all of them said 'no', claiming that their users still prefer the print copies. They don't even care that they can do the online searching."*

The manager from one academic institution noted that some academic staff also lacked ICT proficiency and few of them were interested in online searching. As she said, it depended on staffs' background knowledge or subject areas. She added that the *"pay-as-you-print policy"* in her institution also stopped most academic staff using the online and electronic services as they were unwilling to bear the cost. Another manager agreed. He thought that users' lack of awareness and low information literacy was also a factor in causing the slow development of the S&T information service provision in Thailand. As he said,

> *"Users still think that they don't want to pay money for information. They try to avoid spending money on information as much as they can. They like only free information. Therefore, the information service sectors in Thailand can't develop themselves much. How we can develop when we can earn nothing from information services. Not like other countries, users don't mind to pay to get reliable information from as many sources as possible."*

He noted that it was necessary to change the behaviour of users seeking information from various sources. He also desired to build up users' attitude towards the value of information, creating a culture that users are willing to pay for receiving more creditable information.

i) Restrictions of rules and regulations

The problem of restricted rules and regulations was also raised. The interviewees viewed that the rules and regulations, particularly those associated with finance, purchasing and bidding, were sometimes too rigid, thus limiting cross-institutional collaboration. As one library executive mentioned, she found it difficult to motivate collaboration between academic libraries and special libraries since those libraries were supervised by different Ministries. She also thought this was a key barrier to information resource sharing scheme of the country. For example, current official rules and regulations did not allow them to pool their money to buy resources for sharing. Another manager viewed the financial and bidding regulations as a blockage to procurement of resources and ICT. She commented,

> *"It was regulated that, in the bidding, we have to buy from the supplier who offers the cheapest prices. But as we know, what quality can we expect from cheap things?"*

6.5 Resource sharing

The research placed an emphasis on library consortia and networks predominantly those providing information in the science and technology areas. The main focus was on:

- University Networks consisting of academic libraries in the government sector.
- S&T Information Networks which included both academic libraries of the government universities and special libraries either from the government or private sectors.

6.5.1 The University Networks

In 1998, academic libraries in Thailand established an organisation called THAILIS - Thai Library Integrated System, as a national focal point for providing information services to academic users. THAILIS originated in the unification of PULINET or Provincial University Library Network, established in 1986 and THAILINET-M (Thai Academic Libraries Network-Metropolitan), established in 1992, having the UNINET (an inter-university network) as a hub and a key supporter in the domain of ICT infrastructure under the Ministry of Education (MOE). Currently, the electronic information services among academic libraries in Thailand are provided to library subscribers under the administration of THAILIS which has as one of its responsibilities the management of a licensing consortium of reference databases for universities. PULINET continues its activities among academic libraries in the provinces, however THAILINET-M has been terminated and all activities transferred to THAILIS.

All interviewees from the academic sector were asked to share their experiences and views of the university networks. The purpose of these questions was to investigate the current state of the university networks, particularly their activities in relation to resource sharing as well as the interviewees' opinions on the network operation.

UNINET is the Thailand Education and Research Network and has three main activities:
- Union cataloguing of the academic library collection throughout the country;
- Digital collection of academic research; and
- Onsite databases.

Member libraries thought that joining the THAILIS consortium was satisfactory in terms of collaborative activities, cost-saving and more convenient communications. Most interviewees said that the project on sharing licences of

electronic reference databases was a valuable achievement, as it would promote collaboration among academic libraries, cut the procurement cost of each library, and improve services provided to users. According to one executive, the consortium project was a great leap forward for S&T information development as the electronic databases provided were in scientific subject areas. As regards this, each university could save the cost of procuring these S&T databases and spend the saved money on seeking other information resources such as databases in social sciences.

In addition to the sharing of resources, the interviewees thought they gained benefits from the network in terms of knowledge enhancement by attending seminars, meetings or conferences. One manager said she was satisfied with the organisational structure of the network as there were several groups of sub-committees to manage each project, namely, acquisition, analysis, and services. These sub-committees were supervised by the Main Committee for Academic Library Development, MOE, which had representation from the management of each university.

Although satisfied with the national electronic database sharing programme countrywide, member libraries under PULINET complained about the effectiveness of the network service when compared to the stand-alone systems each university had operated before. In the view of PULINET member libraries, the UNINET network was technically poor, for example, slow and unstable. They thought this problem was caused by the inadequate ICT infrastructure. Moreover, it was said that the management of the consortium was ineffective since the service of online databases had temporarily stopped during the subscription renewal at the end of financial year. Another problem was an attempt from the central network to dissolve the organisation of PULINET. This had created controversy, as one executive said,

> *"But the main point is that we are not happy with the central*
> *network. I don't understand why they want to put an end to*
> *PULINET. I'm not a librarian but I have often heard executives of*

> *the universities in the central region talking like this. I don't understand why we can't have more than one network. The concept of a consortium or a network doesn't mean that we can have only one of them. In my opinion, many small networks are fine. That means we can help each other more effectively and it's easy to manage and to strengthen each of our regions. Then this will make the central network stronger at the end of the day."*

This executive justified his idea from the fact that PULINET had been established long before THAILIS and UNINET had been created. He confirmed that PULINET members collaborated well and could provide satisfactory services to users, especially in the area of interlibrary lending which could be done within 48 hours. He commented that this service did not get good cooperation from academic libraries in the central region as *"I think people in the libraries at the central region still have a strong sense of ownership. They don't want to share because they think it's not fair for the large libraries to give but rarely get anything back. But for us, the provincial libraries, we look at it differently. Because we have been weak before, so we prefer to help each other grow up. We prefer the way we can grow together and serve the community."*

Another executive also disagreed with the termination of PULINET. She thought that it was necessary for PULINET to maintain the service provision relating to local information which was demanded by users in each region. PULINET member interviewees agreed that all members were satisfied with the levels of collaboration among them whilst the operation was active and successful. They also said that they preferred having the network hubs for each region, and that each region could initiate its activities and services specifically designed for diverse user needs.

6.5.2 Science and Technology Information Network

The Science and Technology Information network centre (STIN) has been established since January 28, 1988 after the inauguration of the Thai National

Information System (THAINATIS) on December 2, 1986 under the UNISIST programme or so called UNESCO's World Science Information System. The responsibilities of the National Information System were to increase the efficiency of library and information facilities, to avoid duplication of work, and to coordinate information resource centres in order to develop the service provision meeting the information needs of the country. THAINATIS's mandate was to manage six information network centres consisting of:

- Agriculture Information network centre;
- Medical Science Information network centre;
- Humanities Information network centre;
- Science and Technology Information network centre;
- Economic Information network centre; and
- Social Sciences Information network centre.

THAINATIS had the National Library of Thailand (NLT) as a national node to coordinate the six networks which were comprised of academic and special libraries. In each network there was a library acting as a focal point to coordinate among its member libraries. For instance, the Ministry of Science and Technology (MOST) was a coordinator among the libraries under STIN. It was noteworthy that the information network centres under the THAINATIS were an early attempt to create cooperation among the information providers and promoting the resource sharing concept at a national level. Notwithstanding its long establishment, the interviewees thought that STIN had not been a success for two main reasons. Firstly, the beginning of the network almost twenty years ago was in the period when ICT infrastructure had not been widely introduced to Thai information providers. Most libraries were of a traditional type and their collections were of print format, which allowed the sharing only for interlibrary lending and document delivery services via photocopying. Therefore, all libraries under STIN had been struggling with development of both their resources and ICT infrastructure. Secondly, the long development period of the libraries had taken place through many policy changes of various governments, thus resulting in interrupted activities and fluctuating budgets.

When compared to the satisfaction of the university network members, the members of STIN expressed their disappointment with its low profile. The interviewees said that during the past twenty years, cooperation had been active only at the beginning and then it had gradually declined. In the interviewees' opinions, no very great benefits were obtained from STIN. So far, the organisational changes of the government restructuring programme since 2002 has caused a long temporary halt to the network's collaborative activities. Most interviewees were not even sure whether STIN still existed. Some said it had been dissolved while others said its activities were temporarily suspended until the government announced a clarification of policy. The only collaborative project which was said to be active was digitisation of Indexes of Thai S&T journals.

Another indicator that STIN was inactive was that some interviewees said that they did not have any idea about it since they were new in their managerial positions. They had heard of it but had never been involved at all. They thought that the period of prolonged inactivity could possibly make newly promoted library executives or managers unfamiliar with its existence. Meanwhile, the government seemed to mention only new information policies relevant to promoting a library environment without paying attention to existing projects which had been initiated by previous governments, particularly in the S&T information domain. The following comment from one manager who had just come to take executive responsibilities reflected a member's experience with the operation of STIN:

> *"Our library is also a member of STIN but since I've become a library manager, there's never been a meeting between its members yet. Not like another network, for example, the Medical Science Information network centre, there was a meeting recently. But for the STIN, it's very silent. Anyway, I had a chance to attend the STIN meeting once before I become a manager. One member gave her comment that this was not the kind of collaboration she had expected. We could see from the meeting that there were not many*

> *collaborative activities; each member just reported what they had*
> *done so far. That's all."*

Another executive who also had experience with the network in the past said that the concept of the network was perfectly good and the executives' intention also showed satisfactory collaboration every time they met, but, in practice, there was *"no action"*. This interviewee believed that this inactivity was due to the executives of most libraries who failed to transfer the concept and stimulate their staff to undertake collaborative activities. She observed that information flow among network members was a serious problem, *"Information was always stuck and members didn't know much about its movements."* This idea was confirmed by another executive who held a seat in the network member meetings. She said that the amount of politics in the network management was extremely high. She felt that the organisational management of the network had created an authoritative atmosphere when *"the network coordinator never listened to members' points of view."* This eventually caused the network to be inactive since most members did not have a chance to participate in a decision making process or did not receive what they really needed, finally leading to a negative attitude that they saw no benefit from the network.

Concerning resource sharing, one manager said that, in her opinion, she had never experienced an atmosphere of sharing among the STIN members. As she came from a small library, she felt that most large libraries, in general, were unwilling to share even though they had better status. She commented,

> *"For some big libraries, they have high budgets to subscribe to*
> *online databases on their own, so there's no need for them to share*
> *through a consortium. I think this makes the concept of resource*
> *sharing difficult to happen."*

However, the interviewees who had been coordinators of STIN in the past considered that, as coordinators, they also had limited roles to play. From their experience, they thought that they lacked power in coordinating and promoting

collaboration among network members. One executive said, *"We lacked the nature of team working or a brainstorming process. On the contrary, most of us were likely to work individually and develop our own collections."* Even though she was a coordinator of STIN, she had no information about its future. As she said, the organisation still existed but had no activities. The response from the THAINATIS committee or NLT which supervised all the networks for the UNISIST programme also did not give any clear direction for STIN. The answer was that the network had nothing to do but was just waiting until the bureaucratic restructuring reform was settled and then it was expected that the government would announce a policy concerning resource sharing and future roles for the network.

Another executive who also played a major role in network management commented that the network's operation was seen to be rather unsuccessful because of the lack of budgets to undertake activities such as developing ICT infrastructure and information resources. He said that the coordinator could not strengthen resource sharing unless other members fully cooperated so as to make the network operation more powerful:

> *"The problem is like a chain reaction. You have no money because the government didn't have the policy on network promotion. No money, so no activities, and of course, also no cooperation because we don't know what we should cooperate for or in which direction we should walk in. Actually, resource sharing and network operation needs team work. It's impossible for only one organisation to work alone."*

When asked whether STIN should be maintained and continue its activities, all interviewees agreed that they were still content with the concept of being united as a consortium or networked libraries. However, as mentioned earlier, most of the network members faced the ICT and information resource constraints at the early stage of their collaboration. Therefore, they could not create diverse activities in the past. Seeing that now the condition of ICT infrastructure in most

libraries had been much developed, the interviewees thought that the concept of resource sharing should be re-promoted. One manager expressed her desire that the network should have been revitalised with new resource sharing projects. The first tangible activity should be an initiation of licensing agreements of commercial online databases among special libraries of STIN. However, in doing this, members had to start discussing how costs should be shared. She said,

> *"If we could collaborate in that way, it would be very useful, like what they have done in developed countries. However, we have to talk about the costs. As far as we have joined as a networked group, we have never talked about the investment cost before. We've talked only what we can collaborate and share, but unfortunately, we didn't have much to share in the past."*

Other members also expressed their expectations with regard to STIN in the near future. Activities suggested as important which the network centre should undertake included:

- Developing information resources to be shared among the network members, for instance, electronic bibliographies or full-text research databases;
- Finding collaborative strategies for member libraries in providing rapid and convenient services;
- Providing document delivery services via the web;
- Improving services and finding more users through an e-library project;
- Extending the resource sharing scheme internationally e.g. creating a sharing project with other ASEAN countries; and
- Providing training and seminars to network members.

Most interviewees said that they were satisfied with the network's current structure which had one organisation as a coordinating node. It was expected that the coordinating organisation would play a key role as a manager of the network

operation. However, the interviewees agreed that the decision making should be decentralised. In doing this, it was suggested that surveys of member needs should be frequently conducted in order to investigate what kinds of collaboration or activities most members demanded. And last but not least, this organisation should act as a national S&T information depository, both for domestic and international resources, as one executive observed,

> *"I do agree with the decentralised management, but, at least, there must be one party being in charge with running the network and its responsibilities must be clearly defined as well as the tasks each member will be assigned to undertake."*

Under the heading of being a networked group, one STIN member suggested that it was not necessary for the network manager to be a newly established organisation. Instead, it might be selected from any of members having strong leadership qualities and which was keen on creating collaborative activities and had been empowered to coordinate among members.

It was noteworthy that one manager considered that the organisational structure of STIN needed to be readjusted to the real situation where there were various types of libraries, namely academic and special ones, in the network. Therefore, she proposed the creation of different kinds of collaboration models which suited the conditions of member libraries.

6.5.3 Network promotion

The interviewees had interesting points of views about ways to promote the operation of the information network. From their opinions, important factors which might accelerate a healthy network included:

- Clear policies from the government and at a ministerial level which corresponded to the national policy;
- Making the policies well known and understood;

- An active coordinator to motivate collaboration among members with continuous and tangible activities;

- A national network centre providing a single point of access to S&T information collection;

- Reciprocal agreements and recognition of resource sharing between members;

- Clear processes in acquisition of resources and service models;

- Support for digital collection of full-text or bibliographical databases;

- Health indicators for network growth e.g. more partnership or members, extensive cooperation to an international level;

- Strategies in enhancing potential of members;

- Development of local, regional, and national networks;

- Collaborative planning for both resources and ICT infrastructure, including collaborative missions, strategic planning, and service plans;

- Positive attitudes towards sharing among network members;

- Balancing of workload between routine work and resource sharing activities;

- Skilled personnel for the resource sharing projects; and

- Staff participation in sharing ideas or suggestions.

The interviewees agreed that the policies at all levels were the most important factor as they would help create an environment of resource sharing especially in budget allocation which would make sharing activities possible.

6.5.4 *Journal Link:* the latest approach to resource sharing

Apart from the University networks (THAILIS and PULINET) and S&T library network (STIN), there has also been an attempt among academic and special libraries to develop a collaborative project called *Journal Link*, a web-based union catalogue of S&T serials in Thai libraries. The *Journal Link* project, originally supervised by the Committee of the Deans of Science Faculties, was

started in 1998 by the Faculty of Science, Chulalongkorn University. Its purpose is to save money by reducing duplicate subscriptions. *Journal Link* developed a union list of international S&T journals held by academic and special libraries as a reference tool for journal location and provided an electronic document delivery service to library members and users. The project was initially financially supported by the Thailand Research Fund. Currently, *Journal Link* has 204 member libraries (as of June 2006) and the Technical Information Access Centre (TIAC) is the hosting provider. In addition, a current awareness service is provided, allowing users to search through electronic tables of content using both authors' names and keywords. Users can request full-text articles from TIAC or directly from provider libraries.

6.5.5 Advantages and disadvantages of resource sharing

The interviewees thought that the current situation of collaboration in information resource sharing had improved, as many networks had been progressively established in the country, for instance, for schools, universities, and private and government sectors. It was notable that the interviewees had a positive attitude towards the resource sharing situation even though many weak points were noted. They thought that Thailand was at an early stage in creating an environment of resource sharing, as one manager said, *"it's just beginning. Now, we are working under the concept of helping each other."* This was agreed by another manager who mentioned a strategic plan by her library to find more partners managing information resource projects. Regionally collaborative planning was also being used as a tool in strengthening the resource sharing projects. Regarding the private sector, collaboration was also increasing with special libraries of economics and industry cooperating in sharing information. Meanwhile, the academic sector was putting more effort into extending collaboration with other educational institutions in resource sharing, library professional training, and consultancy services in librarianship, information science and advance in library management. Another type of collaboration was at faculty level between universities and between faculty and central libraries. This was intended to promote an effective use of resources among them. It was

expected that, in the near future, there would be a centre for each subject area, chosen from any faculty library which was well equipped and active in that particular field.

From their experience, the interviewees considered that resource sharing yielded benefits to both libraries and users in the following areas:

- As a minimum, an interlibrary lending service could help users access new sources of information as demanded.
- Libraries could obtain resources and so save money. For example, the reference databases supported by the MOE could help save each university's expense in procuring information resources.
- Service provision could be improved under budgetary constraint. According to one manager, *"it was somehow useful. Otherwise, we wouldn't have tried to find ways to promote more collaboration. We expect our library services to be well known and useful to users as much as possible."* The interviewees also agreed that resource sharing was indispensable in the current economic situation where no libraries could maintain a complete collection or subscribe to all international journals as demanded by users.
- Librarians had good opportunities to keep themselves up-to-date with new resources and information technologies. As one manager said, apart from the resources shared, *"we see that it's good to cooperate, especially in organising training in searching and data retrieving"*.
- Resource sharing was good for users since it allowed them to access a variety of resources regardless of time and place. It enhanced the environment for teaching and learning.

The interviewees were also asked to comment on disadvantages arising from resource sharing. However, when compared to its benefits, only a few weak points were raised as follows:

- Resource sharing activities increased workload on librarians. The interviewees agreed that large and well resourced libraries had to provide services to an increasing number of external users.

- Excessive waiting times for interlibrary lending services needed to be improved. Ineffective management made the service unpopular because users wanted borrowed materials to be in their hands as quickly as possible.

- Although resource sharing had its benefits in cost saving of resource acquisition, a huge amount of money had to be paid for procurement of ICT infrastructure and system maintenance.

- It regularly happened that consortium members could not come to agreement in the decision making process. One manager commented,

> *"The strong point of resource sharing is that we work in a collaborative way, by decentralised decision making, but it has a weak point that it's quite complicated because sometimes, we can't agree when discussing details, for example, subscription to electronic and print journals. We can't agree on the list of journals that each library needed to subscribe in order to reduce repeated holdings".*

This often arose from executives and managers refusing to cancel subscriptions, even where they could find those journals in other libraries.

6.5.6 Barriers to resource sharing

Although saying that the situation of resource sharing was apparently improving, all interviewees agreed that the level of collaboration was still low. In other words, they were not satisfied with loose relationships among members in the consortium or network. They considered that there were a number of barriers to resource sharing that can be categorised under five main headings: policies, strategic management, resources, values and attitudes towards information services and work culture, and user attitudes.

a) Policies

Policies were often mentioned by the interviewees as one of the main barriers to resource sharing. As regards this, the interviewees thought that the scope of resource sharing had not yet been defined, thus causing difficulties in defining the scope of collaboration. Considering either a national information policy or an institutional policy, one executive commented, *"the principles are really good, but in practice it is not effective."* All interviewees thought that the country, so far, had only broad policies and implementation was often discontinuous due to political change. An institutional policy was also seen as a hindrance when executives lacked the mental agility to apply it to information service provision. Another comment was focused on the policy for the agencies concerned in resource sharing activities. One interviewee had experienced the problem that the sharing project had been started and then gradually abandoned. She said, *"It's just good at the beginning. But in practice, how far we can go is still a question as long as we don't have clear policies for implementing among the institutions concerned."*

Special libraries encountered their own particular problem if the institutions' executives seemed to give insufficient importance to information services. It was noted that libraries were considered a peripheral function in most institutions, thus resulting in a lack of improvement in terms of both resources and services. One manager gave an example,

> *"The situation here is quite difficult because information service provision is not considered as a main responsibility of the institution. Therefore, the executives have announced a policy to prioritise work in other areas, for example, registration of patents and trademarks"*

The interviewees agreed that a lack of awareness of information service provision among executives had a significant impact on budgets for developing the information service sector, and this exacerbated problems in resource sharing.

One executive commented that an unclear institutional policy was a critical hindrance to collaboration among staff or junior managers due to limited rights according to the information and data protection act. She said,

> *"I think the policy is still not clear, especially the institutional policy. For example, the information and data protection act, it's not clearly defined yet who can reveal, distribute or access data and information. Now, it covers   only the top management or senior management who can do that. Therefore, it's difficult for junior managers or staff to access data or information. When we ask for collaboration, they are unwilling to collaborate owing to fear of legal violations."*

b) Strategic Management

The interviewees commented on strategic management in the areas of collaboration level, leadership of the hosting provider, duplication of services, service improvement, and organisational management.

1. Collaboration level

The interviewees from THAILIS and STIN shared the opinion that the collaboration level of the consortium or networks represented a loose relationship among members. Academic interviewees expressed their desire that collaborative activities should be more extensively promoted beyond the licensing agreements of onsite databases. So far, THAILIS has had three main activities, union cataloguing of academic library collections, digitisation of academic research, and licensing agreements of onsite databases. From the interviews, members wanted THAILIS to proceed to deep resource sharing, for instance:

- giving up of ownership of material and rationalising holdings so that one library could provide services to all;
- enhancing cross-library borrowing rights and access to collections;
- reducing fear of unbalanced sharing;

- revising the rules and laws of purchasing and budgeting;

- sharing staff and expertise, e.g. training, consultancy.

The interviewees believed that the problem of a strong sense of ownership seemed to be common in large libraries where resources and ICT facilities good. As mentioned earlier, this problem had a strong impact on the THAILIS consortium since most universities refused to stop subscription to journals that they could find from other member libraries. One manager considered that this had obstructed the growth of the consortium and made decision making time consuming.

As for STIN members, deep resource sharing had also been discussed. However, organisational re-structuring and action from the top policy makers of the network were stronger imperatives. Therefore, what library members could do was to develop their own resources and ICT infrastructure, and plan for collaboration in the near future.

2. Leadership of the hosting provider

The network members thought that a severe problem for STIN was a lack of a powerful hosting provider to coordinate members. In their experience, the existing hosting provider was weak in managing and negotiating, leading to failures of activities and poor budget to maintain the network status. The interviewees added that having a good hosting provider, or coordinator, was a key success factor, thus its role and performance had to be agreed by members. However, some interviewees thought that it was very difficult to make members appreciate their coordinator. One executive noted that culture was a main cause influencing people's mindset and made them always think unfavourably of the coordinator. He commented,

> *"For Thai culture, I think it's quite difficult to claim yourself as a centre or a coordinator at the beginning. Most of us don't accept this. I might be wrong. But I think we have to be careful about this. We can only tell other members that we are willing to start*

> *everything for them and support them in every way. But we can't tell*
>
> *them that we are a centre."*

One executive considered that most members were not satisfied with the hosting provider or the coordinator because of its poor performance. It would seem from her evidence that such inactivity was typical not only of STIN, but was a general problem across all government agencies. From her experiences, most coordinators lacked alertness in managing change; therefore they usually failed to coordinate and communicate quickly. She confirmed that it was difficult to ask for collaboration as long as a coordinator was ineffective in helping members out of the problems when they needed support.

3. Duplication of services

One executive said that duplication of services was also a barrier to resource sharing. He thought that the situation where many information providers were offering the same kinds of resources and services, for example special libraries under MOST which all provided S&T information, had caused difficulties in developing service provision. The development of each library was unbalanced depending on its potential and negotiating power of its executive.

4. Service improvement

Apart from THAILIS onsite databases and *Journal Link*, the resource sharing schemes undertaken were only interlibrary lending and document delivery services. Yet, the interviewees considered that those services were not effective enough to attract users' interests. Librarians' inability to locate resources requested by users and the long waiting times for interlibrary loans needed to be improved in order to meet user demand.

5. Organisational management

Executives from provincial universities commented that the organisation of the THAILIS consortium should be restructured, and closer relationships among members needed to be built up. In their opinion, THAILIS was a national consortium consisting of government universities throughout the country so the

organisational structure was apparently large; therefore member relationships were loose and it occurred that they did not understand each other. One executive commented,

> *"I think THAILIS is too big, and members don't understand each other. I think for the organisation management, if it's too big, it will be difficult to manage."*

This executive agreed with a service model of having many smaller networks linked together and operated under the concept of resource sharing. He confirmed*: "for example, university networks can link with those of other educational institutions or colleges. That is the way we can expand our network."* Another manager criticised the management of THAILIS as rather full of difficulties which remained unsolved. Beside the technically poor system, there was a severe problem of diverging opinions among the members, causing low collaboration and a lack of team working culture.

Problems of information breakdown and ineffective communication were also mentioned. An example was given of a situation of poor communication between central libraries and other campus libraries. It was noted that representatives in the THAILIS consortium, normally from central libraries, sometimes failed to update staff in branch libraries about consortium activities, thus resulting in ineffective services and collaboration since participatory roles and trust were eroded. One manager from a branch library complained,

> *"Only the central library has the representation in the THAILIS consortium. Each university has only one representative but there are many collaborative groups to conduct activities, for example, acquisition, user needs analysis, services. Until now, we still haven't been informed much about the consortium activities."*

The same manager noted that poor organisation between central and branch libraries also had an adverse effect on interlibrary lending and document delivery

services. As she said, the central library failed to send examples of signatures and names of managers of branch libraries to other member libraries, resulting in inconvenience and a time consuming process of interlibrary lending. Moreover, librarians in the central library seemed unaware of collections in the branch libraries. This was evident by a case of document delivery request from *Journal Link* members. She described: *"when a request to the branch library to print out an article for users was sent to the central library, librarians there just replied that they didn't have that journal. Then, the request was put on hold for a while and, finally, the Journal Link coordinator had to contact us directly."*

c) Resources

The issue of insufficient resources related to two main areas: ICT infrastructure and information resources, and were considered as interrelated problems.

1. Inadequacy of ICT and poor technical performance

As regards ICT infrastructure, the interviewees considered that even though the situation of ICT had become better; it was still inadequate when compared to the increasing demands of users. For instance, UNINET's poor performance was commonly mentioned by academic librarians. The problem regularly found was its slow operation and that the system was often down, as one interviewee stated,

> *"The network system needs to be maintained properly. When the system is down, it costs problems to service provision, which is almost totally stopped."*

This opinion was shared by most interviewees who thought that the ICT facilities had not yet reached a level to support onsite databases. Thus, libraries often received complaints from users about quality of services. It was suggested that more ICT facilities needed to be acquired in order to serve increasing numbers of users. One manager said,

"The ICT facilities are not enough. They also have their working life and needed to be maintained or upgraded. At the beginning of the onsite service, it was OK but later the service has been popular among users so we have a problem of lack of facilities. We must procure more."

Meanwhile, special libraries had been suffering with the unbalanced ICT infrastructure between large and small libraries, leading to system incompatibility and difficulties in integrating systems. One manager from a S&T library commented that ICT facilities and support were necessary for her library because it was located far from the city centre. However, she thought that ICT support was still a problem the library had to tackle in order to move towards better resource sharing.

2. Lack of technologies to locate resources in different libraries

Weak ICT support also caused difficulties in the locating of library resources. As one executive said, resource location was almost impossible in the current situation since ICT facilities were inadequate and systems used for accessing were outdated. Therefore, each institution had no idea what material other libraries had in their collections.

3. Unclear aims

It was noted that an unclear national information policy exacerbated the situation as collaboration of government special libraries had declined and became aimless. The fact that each library worked independently also engendered difficulties in cross-institution resource accessibility.

4. Lack of information management systems

Lack of information management systems was commonly found in both academic and special libraries. All interviewees agreed that libraries had an urgent need to develop electronic resources from their own collections in parallel with compatible software or systems that allowed for effective sharing. It was noted that S&T research papers in Thailand were not well-compiled and

properly-managed. Therefore, users had to go to several places until they found what they needed, or sometimes, they failed to find it, or obtained only obsolete information. To solve this problem, a standardised information system was suggested in order to create a system of a single point of access to S&T information resources. However, the question of budgeting for such a system was an acute issue that the interviewees could not say how it could be solved.

5. Limited print copies and copyright problem

The problem of limited copies of print resources, for example, theses and industry standard references, were said to be a barrier to sharing since those kinds of material were considered reference copies which were not permitted to be used for interlibrary lending. One manager said: "*we have only one copy of each thesis or research report so we can't provide even the lending service, otherwise it will not be shown on a shelf and not fair to the walk-in users.*" She added that the library tried to solve this problem by providing full-text theses databases but "*finally we had to give up because of the copyright problem. We even thought to provide e-databases or provide web-based services of these research works, but some authors didn't agree with us.*" Another executive thought that academic authors would be more concerned with effective use of theses or research reports than copyright infringement.

> "*If we consider the impact factor, we won't have to worry much about the copyright. If we can provide the service online, anyone can access and make use of those theses. Otherwise, they are only on shelves and less valuable.*"

However, one executive from a special library commented that compiling research reports from non-academic researchers was considerably more difficult since those research documents were found dispersed across various institutions. Similarly, less collaboration was also found among those researchers because of the copyright problem. She also agreed with provision of Thai research databases in electronic form. As she said, just an interlibrary lending service was not enough for sharing.

*"Personally, I think that the concept of resource sharing should
have something more than interlibrary loan. For example, we'd
rather have shared electronic databases of each institution under
the same standardised software and technology."*

6. Unwillingness to stop duplicate subscriptions

Another facet of the resource problem was criteria for reducing duplicate
subscriptions. The interviewees thought that cancellation of serials subscription
could help cut procurement costs and could accelerate an effective use from the
shared resources. However, unwillingness to share made most large libraries
reluctant to stop collecting serials themselves. It was noted that a change in this
could be achieved only at intra-institutional level, for instance, collaborative
sharing between faculty and central libraries of the same campus. One manager
said that her university was successful in reducing duplicate subscriptions even
though the policy could not cover the two medical schools since *"they were
located at a separate area so librarians and users need some heavily used
journals to be ready for use at both campuses."* She said that under the MOE
consortium, duplicate subscriptions of serials had been reduced to just ten
percent, compared to 40 percent previously. Another manager commented that
she still saw benefits of interlibrary loan. If this service could be improved by
reducing waiting times, it would be one of the effective tools for sharing and
increase willingness of librarians to give up collecting everything themselves.

7. Costly site licences and limited use

Even though the interviewees from the academic sector were satisfied with the
THAILIS onsite databases funded by MOE, they were not sure that the licence
consortium was a good alternative to saving money. The interviewees who were
involved with the consortium operation confirmed that MOE had paid an
extremely large amount of money for the national site licence fees. Meanwhile, a
large sum of money was additionally invested for procurement of ICT
infrastructure so as to accommodate the system. Therefore, when asked if she
thought the consortium could help reduce costs, one manager said,

> *"It's true and not true at the same time. It's true that we can save our money somehow, a little bit. Each library might pay less. That's all. But it doesn't mean that in general we can save a large amount of money. We still have to invest for facilities to support the operation of the consortium network. Nobody has ever said how much they have to pay on this."*

Moreover, the pricing models and conditions of publishers and dealers did not provide lower prices as much as librarians had expected. It was generally known that subscription fees were more determined by dealers than by subscribers, who could do nothing much more than try to negotiate discount for bulk deals, as one manager said,

> *"Some institutions which have a large sum of budget can subscribe to online databases on their own so it's not necessary for the large libraries to share. I think it's quite difficult for us in sharing. It's not us who can decide everything, but it rather depends on dealers or publishers. They also have their own strategies, not allowing us to share resources at the most economic price. It's a business, you know! So, our consortium gives benefit to us only that we can do the collective bargaining. That's all."*

Another example of dealers' strategies was shown in the pricing model of electronic journals where the academic library consortium had tried to negotiate to stop subscriptions to print format. One manager explained,

> *"We've tried to negotiate that we could use the online databases and we wanted to stop the duplicate subscription. Dealers said that they had to consider first. If most members didn't want to subscribe to print form, they might increase the online fees.   That's dealers' point of view. Apparently,   they don't want to lose commercial benefits."*

According to this interviewee, dealers initially had a marketing promotion strategy allowing the consortium members to access as many resources as provided. Then the rights to access were gradually decreased and the consortium was scaled down into several groups having different types of resources. Another manager said that the Medical Science Information network centre had encountered the same problem. She said that a site licence of medical science was extremely expensive so libraries of thirteen medical schools had to collaborate as a consortium to negotiate with a dealer. Even though they could subscribe to electronic resources at lower cost, the use that could be made by small schools was hindered by financial constraints. The manager explained,

> *"Even though we are in the same consortium, only big medical schools can afford expensive and well recognised databases so we have different contracts and agreements with the dealer"*

Apart from highly-priced subscription fees, the interviewees also found that site licences limited use, e.g. only authenticated members could log on for searching under specific Internet Protocol (IP) addresses. Therefore, it happened that users still had to come and use the onsite services at the institution's library. Only a few academic libraries provided off-campus services through which users could log on to their own university network systems. However, one manager said that, according to users' complaints, off campus services were not effective because of technical problems that made the searching process slow and unstable.

d) Values and attitudes towards information services and work culture

The interviewees thought that the negative attitudes of people working in the library (executives, librarians, and staff) were also presented an obstacle to resource sharing and some improvement. Comments on attitudes raised the following issues:

- Most parties concerned with information services considered that information was not to be charged for. Users usually sought free information, while providers hardly thought about investment in information service provision because of lack of income or budgets.

- People thought about collaborative projects for resource sharing as a voluntary or charitable activity. One manager said that large libraries lacked incentives to share because they could not earn any benefit such as income from collaboration despite high procurement costs.

- A number of executives and staff had a negative attitude towards resource sharing because they thought it would increase workloads, result in less power or freedom, and would have the risk of being inequitable.

1. Increasing workload. The interviewees all agreed that, as a matter of fact, most resource sharing projects they had experienced loaded extra tasks on them. However, it was suggested that this perception needed to be reinterpreted in a positive way. One executive said that she was trying to convince her staff to change their attitudes towards working.

> *"Absolutely, we have to work hard at the beginning because of more workload. But you will suffer only at the beginning, and then work will be easier when everything has settled down later on."*

One manager proposed the interesting idea that increasing workload was not a problem as long as *"collaboration is sustainable"*. She said,

> *"However, from my experience, collaboration never lasts long. It often terminates after a short time. If we are sure about its bright future in the long run, we will devote ourselves in doing it. But it never happens. I don't believe it will go for long."*

It was also remarked by another manager that the attitude of fearing an increasing workload should have been changed because it was completely impossible for any library to hold a complete collection due to limitations of funding, staff, space, and facilities.

Agreeing that a fear of increasing workloads was a problem, another executive noted that excessive competitiveness among libraries was also a significant barrier. He commented that most executives in large libraries struggled to be a leader in information service provision, thus they perceived others as competitors. This created bad relationships among members, ones that were often characterised by disputes and an inability to work together.

The interviewees suggested that clear institutional policies on information resource sharing would be the best solution for changing the negative attitudes towards the heavy workload. Many libraries, therefore, had a particular section to deal with resource sharing. They viewed this as a global trend in the development for research libraries. As one manager said, *"We never think about it as increasing the workload. It's just a good chance for us to improve our services. It's not a problem."* Another manager agreed and thought that the high capability of ICT currently could assist information providers in collaborating more while decreasing workloads.

Another way to eliminate the fear of increasing workload was to charge service fees. Many interviewees thought that if libraries could earn income from their services, they would more easily recognise the benefits of sharing and be willing to expand services to a larger number of users.

2. Power or freedom lost. Most executives considered sharing activities as limiting their freedom or power. One executive saw that many executives favoured authoritarian decision making over collective ones. Therefore when they were in a sharing situation, they felt that they lost power.

One executive from PULINET believed that lack of a sharing culture was a root cause of the fear of unbalanced sharing. In his opinion, he viewed the current situation as a case where members only talked about ICT issues but had no intention to share. He said,

> *"It is very sad. I've heard somebody comment that our focusing on resource sharing at the moment is just a technology trend, but not a way of life. That means, we don't have a sharing culture. We rather think about what we will gain from the sharing, or what we will get from others than what we will give."*

3. Fear of unbalanced sharing. It was also stated that some executives or managers thought about "unbalanced sharing" in a different way. In addition to fearing to share, they were afraid of having less than what others had. For example, in THAILIS, one manager said that a dispute over equal access to onsite databases happened when library members of the consortium claimed rights without considering that their users did not need these particular resources, or that site use agreements were limited by dealers or publishers. The interviewee said, "*I think in the future it must be better. However, I'm still worried about the executives' attitude on 'what they have, we must have'…*"

• Senior executives were failing to deal with change. It was noted that most seniors were conservative and did not approve of any new ideas recommended by the younger generation. One executive said that it was difficult to achieve long term and successful collaboration while those executives dominated the thinking and tried to pass their attitudes on to junior managers or staff. As she said, *"Their attitudes become typical. They are in the same team, so they think the same."* One manger from an academic library in the provinces thought that most senior executives were not open-minded about sharing when compared to the junior ones who were more willing to cooperate. However, they could not collaborate much when there was no support from top management. She also commented on the low collaboration obtained from large academic libraries in the central region.

> *"I think probably they rarely talk to each other so they are not aware of sharing and collaboration. Sometimes, they don't even allow their staff to join in our meetings. I don't know what the reasons are, actually."*

One executive from the central region thought that resistance to change was evident because many executives, managers and staff were reluctant to adjust their traditional working styles or processes. Another thought that most executives considered themselves to be self important and refused to work with others, particularly in the sharing situation.

> *"They didn't even try to find or want to change to the technological system which accommodates sharing,"* one executive said. *"They didn't either take sharing or collaboration seriously,"* she added. Another stated: *"I think the problem is about a paradigm shift. We have to change our way of thinking and create a service mentality."*

• Some executives had wrong perceptions of information sources and service processes. In many institutions, executives defined electronic resources only as information obtained from search engines via the Internet. One manager commented that many executives tried to save library budgets by stopping librarians procuring commercial electronic resources. One manager said,

> *"Sometimes, they just think that searching through the search engines is enough and they don't consider if the information they get is reliable. This is the problem of information overload. Most people think that we have plenty of free information sources, why then should we have to pay a lot of money for commercial one. This also leads to the attitude that they don't need libraries anymore."*

According to the manager, many executives tried to follow a trend by providing electronic resources, but *"they just think that libraries don't have to hold a large collection because they can search everything on the web, but, that's not true.*

They don't know that it's hard to procure electronic resources. How difficult we have gone through. I think this misunderstanding has a very bad effect on libraries."

• Many executives and managers relied rather heavily on imported library technologies rather than Thai-developed technological systems. One executive said that the Thai library community unreasonably preferred to pay for these, no matter how expensive such imported software or hardware was. Another interviewee commented,

> *"It is fashionable for libraries to have modern technologies imported from abroad, for example, the USA. Whatever products they want to sell you, you are willing to buy them without any question. But for home-grown products, you always have questions on this and that and never trust our own technologies even though you realise that they are much cheaper."*

When compared to imported technologies from the USA or the UK, the interviewees thought that it was true that Thai technologies were less advanced. However, they thought that fair trade should be given to home companies as Thai-made technologies could meet librarians' demands to some extent. More importantly, they were cheaper. Meanwhile, if promoted, home technologies would have more chance to be improved so that they would reach international standards.

One manager commented that libraries which could afford costly systems or ICT also had a strong sense of ownership and were reluctant to share with others as they thought that they might have to spend money from their own budgets. At the same time, the systems each library procured were of diverse technologies and incompatible, leading to a difficulty in sharing.

- Some librarians or staff lacked ability in creative and analytical thinking, and so had less potential to participate in strategic planning. As one executive said, librarians and staff tended to work too passively.

> *"I wish they would change their attitudes. Only waiting for commands is not enough. They have to work with their heart, being dedicated to their work. They have to think from users' points of view, not from their own."*

This executive thought that it was a priority for librarians to be aware of professional development and improve service provision. *"Otherwise, our roles will be less important and finally, nobody will think about us,"* she said.

A manager from an academic library also agreed. She thought that staff's service mentality needed to be improved. From her experience, staff were not helpful and not aware of service provision even though they realised that they had to follow the procedures of quality control.

e) User attitudes

It was noted that users were less inclined to use interlibrary lending services as they were not impressed by the uncertainty of the waiting time. The interviewees thought that whatever types of users they were, they tended to have immediate needs for material so they viewed interlibrary lending as inconvenient. However, all interviewees agreed that, to date, the service had not been effective because of the long processing and waiting time caused by low cooperation among member libraries. This was also considered to be a hindrance to the elimination of the problem of duplicate subscriptions of printed resources.

The interviewees said that the issue of users' information literacy, even though not serious, was another problem that librarians had to bear in mind. It was noted that users' preference for printed material needed to be changed urgently as it resulted in a failure to make cost-effective use of electronic resources. Libraries

had to spend their budgets on both printed and electronic copies in order to meet diverse needs. One committee member in THAILIS gave an example of the consortium's subscription to a particular commercial database:

> *"We've subscribed to 500 print journals of SciDirect, of which duplicate subscription were found in 7-9 universities. When we asked if any university wanted to cancel the printed version, all of them said 'no'. They claimed that users still wanted the print form. They don't even care that they can do the online searching, so we can't save as much money as expected."*

She stated that libraries, however, could not stop acquiring print resources to be ready for users. *"I hope that users will be literate enough and happy with electronic resources soon."* she said, *"and then we can solve the problem of duplicate subscription."*

The interviewees from special libraries said that researchers were interested in seeking information provided by libraries. Unfortunately, low budgets had inhibited the growth of electronic services to meet user demand. However, it was noted that external users, for example, those from the business and industrial sectors, still lacked information literacy and they were not enthusiastic about using electronic resources. This was considered a significant problem to some special libraries of which key users included industrialists and entrepreneurs.

6.6 Suggested solutions

Interviewees expressed their ideas about solving problems of resource sharing and S&T information service provision, and which will be discussed under the following three headings: strategies and processes, attitudes and cultural aspects, and revision of policies and laws.

6.6.1 Strategies and Processes

Solutions in the areas of strategies and processes encompassed the topics of business models, service processes, interoperability of systems, resources, content development, organisational management, professional development and user support:

• It was recommended that business models for resource sharing should be developed. The interviewees thought that commercial provision of information services would be a good incentive and could accelerate collaborative sharing. Meanwhile, users would have more chance to access diverse sources of resources of good quality.

• Service processes should be improved to be more commercial. The example of library services in developed countries, such as the UK and the USA, was given. Money deposit or account opening with S&T information centres was suggested as a convenient method for users as they can use money in these accounts to pay for services.

• It was suggested that librarians should play a major role in managing knowledge of their institution.

• Standardised systems which supported interoperability were also considered as a tentative solution. There should be a single point of access to S&T information for the community. Library members should collaborate to establish a centre for service provision.

• Content development was viewed by interviewees as a weak point of resource sharing situation in Thailand. Many executives and managers said that local content for S&T research was still missing and incomplete. Most resources provided at the moment, therefore, had been imported. The following comment from one executive showed that the problem of limited information resources was related to user education and information literacy:

> *"The concept of the digital library is not only having computers for users to use. But we must provide them with quality content which is useful and valuable for the process of learning, teaching and*

research. We have to put the right concept in users' heads: that
information access is not a search through search engines only.
That's why we have to develop our own electronic databases. And the
most important is we have to do it collaboratively, to provide a web-
based service linked to each other for user convenience."

Another manager from one academic library viewed that content development was not an easy task because, in order to attract users, *"each library has to find its special collection or distinction."* Another manager, who was participating in the development of the *Thailand Knowledge Centre*, a national portal of technical information for education and research, also agreed. She commented that in developing content, more collaboration was needed from parties in diverse disciplines, for example, academics and information professionals. She said, *"A problem occurred that we have ICT personnel and technologists, but we don't have staff in building the content, the ones who are knowledgeable in terminology and taxonomy."*

• The interviewees thought that organisational management of libraries needed to be improved simultaneously with service provision. There should be a section in libraries to deal specifically with resource sharing. Effective organisational communication should be focussed on eliminating communication breakdowns.

• Professional development was another area which needed to be concentrated on. The interviewees thought that, for the library profession, having only a background in scientific subject areas or ICT was not enough to create a clear direction in providing information services, but it was necessary for them to update themselves with skills and knowledge of technological changes in the realm of librarianship and the information profession as well. Suggestions concerning professional development included these following topics:

   a. There should be a clear policy and process to enhance the library profession, for example, to play a part in teaching and research.

   b. There should be databases of librarian specialists.

   c. Research activities should be promoted increasingly. There should be more channels for librarians to publicise their research works.

d. Cooperation should be boosted between the private and academic sectors, especially in training activities.

e. There should be a policy to recruit more skilful staff to be responsible for resource sharing.

f. Librarians and staff needed to adopt concepts of analytical thinking and active working as well as be aware of user needs.

g. Other than librarianship training, other necessary skills for the library profession comprised ICT and English language. It was suggested that librarians and staff should be enhanced with research skills and have more chance to attend professional conferences.

• User support was also mentioned as a priority. As suggested, activities included surveys of user needs and provision of regular training courses.

6.6.2 Attitude and cultural aspects

Issues arising from attitudes and culture aspects were suggested in the following areas:

Resource sharing

• As the interviewees thought that most executives and librarians had a problem with the concept of resource sharing, it was noted that change management should be focused on this in each institution. They thought that it was necessary for management and staff to change their attitudes and work culture. Strong commitment was needed to create a line of activities in the sharing process. One executive commented,

> *"I think we have to apply more of Buddhist principles into our daily life, reducing our self-centredness and not having too high opinion of ourselves. We are Buddhists, but hardly apply the Buddhist teaching with our daily life. We have to build up trust in others; we have to trust others' ability. In team working concept, you can't work alone, we should accept each other."*

Technology

• Library executives and managers should consider the use of home-grown technologies as a substitute for imported ones. The attitude of preferring imported technologies needed to be changed.

Information seeking and literacy

• Libraries should be aware of the need to build up user understanding of information seeking and information literacy.

6.6.3 Revision of policies and laws

Suggestions in relation to policy and law included the following:

• National information policies should be revised or re-written to be in line with the current situation. An emphasis should be placed on:

    a. A master plan including vision and mission of the S&T information service and national resource sharing;

    b. Collaboration among the sectors concerned, especially of the government research sector and academic sector;

    c. Acquisition policy of S&T international resources, focusing on user needs;

    d. Funding models from the government agencies e.g., MOE, MOST and other agencies concerned ;

    e. Copyright of Thai research electronic databases;

    f. Development of union catalogues and databases of Thai research and theses. As a first step, it might link the research databases of the public, private and academic sectors together.

    g. Promotion of Thai research work to be published in international publications;

    h. Promotion of the use of electronic resources

• The government should have a clear policy about review and amendment of out-of-date laws and regulations which was considered as inhibiting the development of information service provision. One manager commented:

> *"The government should regularly review and change any out-of-date laws and regulations, to make them more responsive to the changing world. Some laws and regulations don't support flexibility in working."*

6.7 A committee member's view on THAILIS Consortium

An interview was conducted with a THAILIS committee member from the Electronic Reference Databases Executive Committee with the aim of investigating the operation of the consortium from the point of view of the working committee.

The interviewee stated that the THAILIS consortium had been funded by MOE and had representation from 24 university libraries from all regions of Thailand (by the time this interview was undertaken). The main service currently provided was provision of online databases to members, which was undertaken by the Electronic Reference Databases Executive Committee.

As the consortium had been founded by the former Ministry of University Affairs, which was later restructured and converted to the Office of the Higher Education Commission (OHEC), under MOE, a question was asked about whether the restructuring had had any impact on the consortium. The interviewee replied that there had been no adverse impact. At first she had been worried about the changing policy, but one year on from the restructuring, the consortium was still running smoothly as planned. So far, there had not been an impact on budget allocation either, *"But I still don't know about what will happen in the future because I've heard that there will be recruitment of new staff and*

executives who are going to be in new coordinating roles." Another reason for the consortium's activities continuing unchanged was that there was no term of office for working committees. That is to say – the committee members could continue until their projects finished. It was also noted that all working committees were appointed from qualified staff with extensive background knowledge relating to their projects.

THAILIS had established the Electronic Reference Databases Executive Committee to deal with the selection and procurement of databases. In the procurement process, a list of electronic databases had been recommended by each library member for the committee to review and finalise. According to the interviewee, THAILIS's five year plan had set a target of subscribing to thirteen out of the 45 databases which had been suggested through this process. Only four or five databases could be subscribed to each year because budgets were allocated annually. A subscription criterion was based on coverage of subject areas or courses offered by the member universities. There were four main subject areas: Human Science, Social Sciences, Health Science, and Science and Technology.

Problems of the THAILIS consortium

Experience suggested, there were three factors which caused difficulties to the consortium operation. These were related to purchasing processes, cooperation from members, and technical support.

a) Restricted purchasing rules and regulations

The interviews with some consortium members had suggested that in procuring resources for sharing, dealers' monopolistic positions had become a problematic issue. Dealers had used their monopoly powers to charge exorbitant prices. This question was therefore raised with the interviewee for further clarification.

She explained that electronic resources had to be subscribed to from international publishers, for example, from the UK and the USA. In subscribing to those online databases, the THAILIS committee had to follow the purchasing rules of the Thai government, one of which stated that a purchase from an overseas company was restricted so that it could only be through the company's authorised dealer or agent in Thailand. The exception was if a company had no dealer, or a purchase was a national procurement for governmental projects, in which case a business contact could be made directly. Moreover, in dealing with publishing companies, it was also a regulation that all documents and agreements had to be written or translated into Thai. In the interviewee's opinion, this complicated the process and the red tape caused difficulties to the procurement. As she said,

> *"We are very much limited by the rules and regulations. As a matter of fact, THAILIS is not a national consortium, it's for academic libraries only, so we have to deal with dealers in Thailand. We can't contact the companies directly due to the government's regulations. There were cases where we contacted the publisher directly, for example, the SciDirect database of Elsevier. But the process of dealing with the publisher is quite complicated. We also had to help the publisher translate the agreements into Thai and have it checked by our legal officer. In fact, there are many companies wanting to deal with us directly but, as I've said, they are limited by the regulation that all documents must be written in Thai, so I just told them that they should contact a solicitor in Thailand to do it for them."*

The interviewee also thought that the procurement of electronic resources was made complicated since each company had its own contract and agreement which was different. Subscription fees for each type of resource were also varied as there were many choices, for example, print only, print plus online, and online only. The fee rates for personal and institutional subscription were different while the business processes of each dealer or agent varied. The interviewee said

that most publishers also preferred to have a dealer doing business for them due to the document and translation process mentioned earlier. *"Even though we tried to contact the publishing companies directly, they told us that they had their authorised dealers in Thailand and they would ask their representatives to contact us to enable legal processes to be carried out efficiently."* The interviewee commented that the library resource business in Thailand was still a narrow market, therefore, *"only a few big agent companies have power to deal with international publishers and only these few big companies were authorised to be dealers for the publishers. That's why most people think that it's monopolised. I've heard about such thing too. I also feel unhappy about this rumour. I don't know about the situation in the UK or the USA. But it should be different from ours, shouldn't it?"*

The interviewee said that, as far as she knew, electronic resource procurement in neighbouring countries such as Vietnam, the Philippines and China was the same, with there only being one *"monopolistic"* dealer. She confirmed: *"I'm not sure about Malaysia, but for China, Vietnam and the Philippines, they deal with the same representative company as we have done. It is because this company has been the first one to run such kind of business in Asia so it has a wide marketing and a large group of customers. They also have long experience and a good reputation."*

Another example given concerning restricted purchasing rules was a problem occurring at the time of renewing the subscription. The interviewee said that the red tape in the purchasing processes, for instance, with the time-consuming translation of contracts and agreements, had resulted in a failure to renew the contract within the timetable set. The result had been had a short break in access while the consortium had to wait for the new budgets to arrive at the end of financial year. She thought that the purchasing rules were too strict and not supportive of the changing situation in dealing with international businesses.

When asked about the solution to the problems, the interviewee said, *"I can't tell you. The problem is very complicated. Each university also has its own different*

purchasing rules. This makes the management more difficult. Electronic resources are also sort of something new to our country so we still don't have proper laws or rules to deal with this matter. We still have to apply the current rules or laws with our activities, which is not a good way to work because it depends on interpretation and management policies. The ones who are responsible for implementing the rules or laws are very important. It depends on their interpretations. Sometimes, we also have a problem in different practices even though we read from the same purchasing rules of the Office of the Prime Minister."

b) Cooperation from library members

Even though the THAILIS Consortium was mainly funded by MOE, some members had to pay individually extra money for supplementary subscription to very expensive but necessary databases such as IEEE. This means that only the members who pay extra can access these kinds of databases. However, some members did not realise this condition; therefore, some of them were reluctant to pay while some of them did not want to pay but wanted an equal right to access. The interviewee said that this had caused a conflict amongst members and the questions such as *"Why do you pay less and I pay more?" or "Why can you access but I can't?"* were also raised. The interviewee thought that this situation had indicated weak cooperation among members and it was a critical problem to the consortium management. The interviewee stated that the consortium still lacked unity since members thought only about the benefits for themselves, but not the consortium as a whole.

Another instance of lack of cooperation among THAILIS members was an attempt to cancel print copies from some libraries without consulting the Executive Committee or considering limited agreements. As THAILIS agreed to subscribe to databases under the *"print plus online"* fees, it was decided that the consortium could not stop subscribing to the printed copies. However, many consortium members as well as the budget allocating unit failed to understand this condition. As the interviewee said,

> *"This problem has been regularly raised by the people who allocate the budgets. They think it is a duplication of subscription. No matter how hard we tried to explain to them they didn't listen. They don't understand it is the publishers' condition. They even said that we were a weak negotiator. A lot of negative comments."*

According to the interviewee, the cancellation of print formats was allowed only if the consortium agreed to pay for content fees. Basically, there were two types of fees: access fees and content fees. Thus, an attempt by some members to stop subscribing to print format without informing THAILIS had caused THAILIS to pay extra money for the content fees.

When asked if the Executive Committee had taken any measures to make the agreements known among library members, the interviewee said that the Committee often announced in member meetings, but *"I think that if they are not in our situation, no matter how often we talk, they don't understand us; they don't understand what we are doing. They don't understand the processes in details so when these kinds of questions are raised, they can't give answers or can't explain what the real situation is."*

However, she accepted that the Executive Committee had to put more effort in creating understanding among members on the matter of contracts and agreements.

c) Technical support

Some interviewees among THAILIS members had said that the UNINET server regularly had caused a delay or was unstable. The interviewee thought that, at the beginning, the server had often had problems as it was a local host, but since then the service had been improved by transferring to an international host.

6.8 The role of libraries and librarians

The interviewees from the academic sector and special libraries had different points of view about the promotion of the role of libraries and librarians.

The interviewees from academic libraries thought that the current government had a clear policy to develop the role and status of libraries and librarians in general. They thought that the government's policy was beneficial to the library sector, offering chances for information service improvement. As one manager said, *"The fact that the government is trying to promote public libraries throughout the country is a good sign. The public will be encouraged to seek knowledge from the libraries."*

Meanwhile, the interviewees from special libraries thought that neither the government nor the top management of relevant institutions had sufficient awareness of information service provision. This was evident in the low annual budget allocations and the lack of clear policies for those special libraries.

6.8.1 Current status of libraries

While the interviewees from the academic library sector expressed their satisfaction with the current role and status of their libraries, those from the special library sector were less inclined to agree.

The interviewees from academic libraries expressed the opinion that libraries at the moment could play more significant roles such as:

a) A support unit for curriculum planning, teaching, learning and research

As one manager from a faculty library said, departmental executives had long recognised the library as a centre supporting teaching, learning and research. Recently, the Faculty had also offered a chance for the library to play a part in curriculum planning. The library manager held a seat at the faculty board

meetings, while librarians were asked to provide information on global research trends, which was considered useful in curriculum and research planning of the Faculty. The manager said,

> *"The Faculty Board wants us to cooperate more closely, especially when there are changes in the curriculum. They want the library to be alert and to keep pace with changes in the Faculty."*

Moreover, the manager was satisfied with the more flexible working environment in which the library could work more actively and had more chances to participate in organisational planning. She stated,

> *"Being a member of the Faculty Board gives us a chance to present ourselves and convince other members to give more importance to library service development. We can also make some recommendations concerning curriculum and research to each department in the Faculty."*

New activities assigned to the library included developing educational media and assessing the impact of in-house research articles. The libraries also provided information for Faculty executive's decision making and kept them up-to-date with effective methods, trends and research developments.

b) A knowledge management centre

Various academic and S&T libraries had started knowledge management in their institutions, on a trial basis. One executive from an academic library said that it had taken the initiative to develop databases and capture knowledge from forums which were regularly held for academic staff to participate in and share their ideas. It was noteworthy that knowledge management projects were at an early stage in the country and most library people were just beginning to learn about it.

c) A centre for enhancing user information literacy

The interviewees agreed that libraries were the most appropriate unit to develop information literacy in users. One of the main new tasks of libraries was to provide user education in ICT training and electronic searching. However, the interviewees thought that user education in many libraries had been undertaken in too passive a manner. As a consequence, it appeared that users paid little attention to library training courses, leading to low information literacy. One executive suggested that a more active role would be possible for libraries if *"librarians cooperate with lecturers to encourage students and develop their learning culture and information seeking behaviour. Even though our parent institution has a policy on this matter, we have to try more seriously to implement it."*

6.8.2 A view on librarians' role and status

Even though the library profession was recognised as a valuable human resource which could be very beneficial to the strengthening of users' knowledge, it was interesting to note that the role and status of librarians was not considered satisfactory. When compared to academic staff, such as lecturers, librarians did not believe they received good support and promotion. One manager said,

> *"We have ability but we don't have much chance to get support and encouragement, for example, in doing research. Some executives even said that it was not necessary for librarians to do research because it was not our responsibility. This has an effect on research funding too. The university has a policy to encourage only academic staff to do research."*

It was stated that institutional policy was the most important factor in promoting librarians' careers. Only a few interviewees from the academic sector said that their universities had clear policies of promoting research in the library field. Doing research was considered as an extra task and, in

contrast to the treatment of academic staff, was not recognised in career progression.

With regard to research funding, one manager commented that funding criteria often created disagreement as money had been granted to senior rather than new researchers. The manager thought that it would be better if the grant were distributed on an equitable basis. *"I know the long reputation of senior researchers can be guaranteed, but what can we do to distribute the fund more widely? It's hard for new researchers to get the funding"*, she said. *"In another way, this had an effect on librarians' lack of research skills, especially in applied statistics,"* she added.

The interviewees thought that librarians also had poor promotion prospects. One executive from an academic library expressed his understanding of the difficulties librarians were facing:

> *"I think we, especially university executives, have to change our attitude towards librarians. Most of us still have an image of librarians as office clerks who don't do anything much except collecting and lending books. Instead, we have to encourage them to play more important roles."*

Another manager said that the lowly image of the library profession was due to the fact that, in general, people perceived librarianship as an old-fashioned career. She stated: *"the library profession is not well thought of in Thailand. People just think, 'You don't have to learn much to be a librarian.' They look down on the library profession."* She added that the library or information science courses taught in Thai schools and universities were also out-of-date, leading to its failure to attract students. The same manager said: *"Both parents and students felt shame for the library profession. We have less and less students in library science each year."*

According to the interviewees, the lowly image of the library profession together with inadequate incentives and support from the parent institutions had an adverse effect on librarians' effectiveness in the long run. Some executives thought that as a consequence of these factors, their librarians and staff were inactive and opposed all kinds of change. *"Librarians' attitudes in providing services need to be changed. We should encourage them more in implementing the policies,"* one executive said. Similarly, another executive thought that librarians should play more active roles in supporting teaching and research using user-oriented approaches.

This was contradicted by comments from managers, as one manager said: *"I think sometimes it's quite difficult for librarians to implement the policy because they still lack incentives in their career."*

When discussing a possible solution, interviewees agreed that librarians' career prospects needed to be improved. One incentive proposed was that librarians should have a chance to be promoted as experts in their subject specialism. However, it was noteworthy that one manager thought that librarian career path needed to be well-balanced between heavy workloads and professional development. One interviewee suggested that an improvement of the position of the library profession would be best achieved   through a clear statement of government policy.

However, the interviewees commented that through the process of career path development, librarians themselves still had to improve themselves with ICT and English language skills in order to meet the challenge of dynamic change in technologies. One manager thought that librarians had better opportunities to be exposed to proliferating ICT when compared to most lecturers in the library and information field. One strong point in favour of librarians was that they *"can adjust more rapidly, more actively. They also have more experiences in information management."*   Another manager said that, librarians in general reacted to changes positively *while "some lecturers are seniors and can't keep pace with advanced ICT."*

One manager expected that the government's policy on the establishment of a Thailand Knowledge Centre (TKC) would probably help to upgrade librarians' roles generally, to some extent. As the TKC would be a national institution promoting activities in writing and reading among Thai people, librarians might have a key place in organising those activities. "*If this organisation could be really established, that would be good for librarians,*" one manager said.

6.9 The role of funding agencies in Thailand in the development of the S&T information sector

The interviews were conducted with two participants at an executive level from two funding agencies in Thailand, which are well-known for providing funds to R&D within the country. The aim was to investigate their role in supporting the development of the S&T information sector. During the interviews, the executives of both funding agencies stated that their institutions had clear policies and criteria. The first funding agency had as its mission the support of R&D, by providing research infrastructure and all resources needed such as budgets and research information. It is interesting to note that this agency also had as its policy the promotion of a research culture and the research careers of young researchers by encouraging them to conduct research continuously and to participate in the international R&D arena. From the interview, it was clear that the interviewee said that funding criteria were based on the research proposals from researchers. Priorities were given first to the projects where results could be used directly or new innovation would be achieved, and also to basic research where new knowledge or theories would be developed. According to the interviewee, the R&D projects associated with patent registration were also promoted.

Regarding issues around the national information policy, the interviewee stressed that she was not familiar with it. However, her institution provided funding to the information resource sharing project in the area of library consortia among

academic and research libraries in Thailand. She expressed the view that the S&T information sector in Thailand lacked strong cooperation among the parties concerned. She thought that, first of all, it needed the funder to act as a coordinator and a hosting provider. She said that Thailand still lacked a clear national policy. She thought that the policy needed to address the issue of resource acquisition or purchasing of both hardware and software, and also electronic resources. As she stated, clear policies could help "*save a huge amount of the national budget each year*". The interviewee also added that the development of the S&T information sector in Thailand was not progressing well as collaboration was poor and the coordinator lacked authority in managing the affiliated organisation. Each Ministry planned and worked individually and repeatedly on the same projects. Many new institutions were planned to be established without investigating the potential of the existing ones. Furthermore, new plans and projects on information services were going to be undertaken without having any survey of users' attitudes, culture, and information seeking behaviours. She thought that both librarians and library users in Thailand still had low information skills which needed to be improved.

The interviewee from the second funding agency said that her agency did not involve itself as much with funding allocation as it had before. Instead, the agency, currently, dealt with the national research policy, giving directives and guidelines to R&D agencies in order to make cost effective use of research resources. Moreover, the agency also analysed the potential of projects which had been submitted for financial funding. Recent funding criteria encouraged the integrated research projects which had a high impact on national economic development. The interviewee agreed that she was not familiar with the national information policy. However, with respect to information system development projects, the interviewee said that her agency provided funding to the development of research information databases, which covered details of research projects in Thailand. Furthermore, the agency provided services through the library which acted as an information centre for Thai research. This aimed to strengthen the Thai research community by providing researchers with the necessary information for initiating and managing projects. Thai research

databases were also constructed in order to provide online services and links to other R&D agencies. The interviewee thought that these activities could be of great benefit to Thai researchers.

CHAPTER SEVEN

DATA ANALYSIS: FOCUS GROUPS

7.1 Introduction

This chapter presents the results from an analysis of the focus groups, one of the qualitative data collection methods used in addition to a questionnaire survey in this research. Three focus groups were held to explore the current situation of science and technology (S&T) information service provision in Thailand, the barriers to development of S&T information service provision, and opportunities for resource sharing as a suggested solution. A focus group or group interview method was selected for its ability to provide abundant qualitative data about the opinions of people in a more specific and focused approach (Higa-Moore *et al.* 2002; Krueger and Casey 2000, pp.7-9). Higa-Moore *et al.* (2002) also recommended this method as an effective technique for library strategic planning by virtue of the collaborative process which facilitates the incorporation of expertise, ideas, and feedback from the brainstorming technique. Thus, it was expected that the results obtained from the focus groups would create visionary strategies on aspects of policies, management, and resolution of the current barriers for the S&T information service provision in Thailand.

7.2 Findings from the focus groups

As stated previously, three focus groups were undertaken under these following topics:

Group 1: Roles, policies and strategic management of S&T information

service   in   Thailand.

Group 2: Barriers of S&T information service provision in Thailand.

Group 3: Opportunities for resource sharing or consortia development in

Thailand.

The findings of each group can be shown as follows:

7.3 Group 1: Roles, policies and strategic manage-ment of S&T information services in Thailand

<div style="border:1px solid">

1. Does Thailand have a national information policy which is clear enough to implement?

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Participants in Group 1 stated their opinions about the Thailand national information policy which are presented below:

• No clear policies for information providers

Participants considered that Thailand still lacked a clear national information policy   for information providers to implement. One participant commented:

> *"Actually, we, as information providers, have our own clear information policies, but at a higher level, the national information policy, which is the most important one, is still not clear to implement. This causes a loss of investment because we still don't have a clear sense of direction, especially in the investment of ICT. We have invested a lot but don't get the cost effective use of it."*

- **Current policies are too broad and lack of policies for a library sector**

One participant found the 9th National Economic and Social Development Plan of Thailand (2000-2006) too broad as it concentrated policies to increase the number of ICT graduates, the use of ICT for industrial development, the development of national databases, and utilisation of science and technology for economic development. She thought that those policies did not mention the roles of S&T information providers and libraries or the development trend of S&T information networks.

- **No clear policies for S&T information service sector during transition period of bureaucratic restructuring**

Participants thought that the bureaucratic restructuring programme in October 2002 brought about a vital change to many government agencies. Some of them were dissolved, some merged together. During the transition period, there was a vacuum for most agencies. The participant gave an example of the structure of the National Information Networks in Thailand. There were six subject areas under these Networks, or so-called Thai National Information System (THAINATIS), which comprised agriculture, medicine, humanities, sociology, economics, and science and technology. Each network had its own coordinating centre. Recently, under the bureaucratic restructuring programme, some government agencies which subscribed to the networks had been restructured but none of the policies related to the networks had been updated yet. This phenomenon caused difficulties in implementation since the future roles and status of most government agencies under the networks were still not officially ensured. One participant suggested that:

> *"A written policy or documented guidelines should be provided for us to follow."*

> **2. If you had a chance to formulate Thailand national information policy, what are the issues which should be included?**

Participants suggested the issues which should be written into the Thailand national information policy as follows:

- ### Infrastructure

Concerning the infrastructure, participants suggested that it should cover the issues of hardware, software and human resource. One participant remarked that the current policies gave more importance to public Internet access but only in public libraries and school libraries. Yet, there were neither infrastructure nor information resource management policies for academic libraries or special S&T libraries.

- ### Budget

Participants noted that the budget allocation for academic libraries seemed to be better when compared to other types of libraries. They thought that more funding should be allocated to school libraries and public libraries in the provinces and remote areas in order to establish community learning centres, thus alleviating the problem of information illiteracy and bridging the digital divide.

- ### Establishment of a National Science Library

Discussing community learning centres, participants proposed that a national science library should be established as a depository library and a service centre for the research community. One participant stated:

> *"Comparing with other countries, we still don't have a national science library. We have only the National Library which generally provided resources in every subject area. But they don't do much with the S&T information resources. This makes me think*

that we should have a national science library individually to handle with S&T information resources in particular."

However, another participant, who was a researcher and also a user of an S&T library, gave a different point of view. He argued that the trend to invest in library space was rather out-of-date due to the ubiquity of ICT. As a user, he preferred to search through the online services from his office computer. He needed services which provided online remote access, full text resources, and print-out services. He described the present difficulties encountered by users:

> *"I understand we have a problem with storage of resources. But from a user's view, going to a library consumes much more time. If you can provide online services, that would be more favourable. Particularly nowadays, Thai researchers have a serious problem with online searching. Every time we search, we get only abstracts, not the full paper. When we really need the full paper, we have to pay, we have to ask a librarian to do it for us, and we have to wait. We can't search on our own. This results in Thai researchers' information illiteracy because we are not skilled enough in electronic searching and can't find the paper we want on our own, or can't get it at the exact time we want."*

The librarian participants responded to this by explaining that most academic and S&T libraries were attempting to provide services electronically. However, they were also struggling with the budget cuts, which limited subscriptions of international electronic databases and journals, and created access restrictions and copyright issues. Here is a debate from one librarian:

> *"I insist we need space for storage. Our library has been established for more than 70 years and we have a huge collection of S&T information printed resources. Anyway, we understand users' requirements in the ICT age so we are trying to transform those printed documents into electronic format such as PDF files. But we*

*have to be aware of copyrights too. We don't have a right to
transform every journal or book into PDF files, especially the
international materials. Every library must be careful not to infringe
the copyright. What we can do so far are, firstly, transforming the
research papers in our own institution or those allowed by other Thai
researchers into electronic full-text; secondly, producing
bibliographical databases or digital union lists of abstracts from
international resources. Then after browsing through those digitised
products, users can request the full-text paper they need from the
printed holdings in our library. That's why we still need space; that's
why we still can't provide the complete services electronically."*

- **Resource sharing to achieve the goal of one-stop service electronic library**

It seemed that a one-stop service electronic library was the most preferred option, both by librarians and users in the research community. Consequently, the potential of current services in S&T information sector in Thailand was widely discussed amongst librarians and users in the focus group.

The librarian proposed a national science library, as mentioned earlier, to be the best solution for the one-stop service. However, because no such library exists, most   S&T information centres are striving to improve their own information resource management to meet the *'electronic'* demands of users. Current strategies employed by those libraries included:

Academic libraries
- Digitisation of research papers from academic and research staff, and theses or dissertations from students. In some universities, students were required to submit their thesis or dissertations in formats of floppy discs or CD discs other than the hard copies.
- Interlibrary lending amongst academic libraries.
- Provision of books and journals (Thai version) in PDF file. This project was carried out by kind permission of publishers in Thailand

on condition that it was for scholarly use of registered users only. Service fees were charged in the case of non-member users.

- Union cataloguing amongst 24 universities throughout the country.

- Smart card for users. Students could use the smart card to borrow materials from libraries at different faculties or campuses.

Special S&T libraries

- Development of electronic databases and union lists of Thai research in each subject area. The special S&T libraries conducted this project either individually or collaboratively with other institutions.

- Development of electronic indexes of Thai S&T journals published by organisations under the Ministry of Science and Technology.

- Development of databases of Thai scientific researchers' expertise.

- Interlibrary lending and document delivery amongst the THAINATIS network subscribers.

- Provision of a web-based documentary service via Journal Link, which is an online union list locating journal holdings in Thailand.

Considering their potential, participants agreed that a strategy of resource sharing should be promoted and stated in the national information policy. Collaboration as strategic partnerships or a decentralised model of networked resource sharing was considered the way forward. In other words, they preferred a library portal or gateway which facilitated a single point of access to a wide range of information resources provided by each network subscriber.   One participant explained:

> *"From my experience, the centralised network was not suitable for our conditions due to unbalanced allocation of budget. Now, the advanced ICT allows us to connect to each other more easily, so we should boost our cooperation as strategic partners. Each shares what each has on a web-based system in order to achieve the one-stop service electronic library. For example, when users want the information about medicinal plants, they can click from the web*

page of any library under the network, and then navigate through
the web links related to the needed topic."

In an attempt to create a resource sharing environment, participants reiterated that they needed a national science library to be established as a focal point in providing S&T information, as one participant remarked:

"The national science library will act as an information manager, a
gateway to S&T information resources. This will surely help us solve
the problem of inadequate budget because, as all of us know, S&T
information resources are costly. Moreover, we will have a more
variety of databases from different institutions. Although we are not
able to access the full-text papers, an interlibrary lending service
can sort this inconvenience out. We have to improve this service, to
make it faster and more effective. Our services must be proactive.
We need more active participation and commitment from our staff. "

• Knowledge management

The values of both explicit and tacit knowledge were discussed amongst the group participants and it was agreed that the issue of knowledge management should also be emphasised in the national information policy. Moreover, participants, especially from the library community, needed the policy to cover the management of tacit knowledge, referring to the stock of expertise or the embodied, hidden knowledge from individuals which had never been written down before. Participants also suggested the capture of local knowledge and how-to tips from web boards or discussion forums. Responsible agencies to deal with knowledge management should be defined in the national information policy together with evaluation criteria of knowledge reliability.

• Special collections

Participants proposed that special collections should be covered in the national information policy. They agreed that special collections should be developed in

each library providing subject speciality, state-of the-art issues, the most requested issues, and speciality databases.

• Acquisition strategies

A problem of budget allocation was discussed in the group in parallel with effective resource collection. Participants suggested the national information policy should state acquisition strategies in order to avoid inadvertent and unnecessary duplication of expensive electronic and printed resources and to achieve cooperative collection development. They remarked:

> *"The acquisition policy can help us solve a problem of inadequate budget. Then development of union lists or bibliographic materials must be promoted to avoid wasteful duplication."*

• Copyright for republication

Another concern of the national information policy was about the issue of copyright for publication. Participants thought that academic or special libraries should pay copyright fees to republish materials which were in high demand or were expensive. They believed this method would reduce the acquisition cost and alleviate a problem of budget shortage. They also recommended that there should be a particular working committee or group to deal with the processes.

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3. **Amongst various groups S&T information providers, who would be the best representative to influencing the development of the national information policy?**

Participants unanimously agreed that the most preferred representatives should be from the library sector, either academic or special libraries. This group might include executives, library managers, or librarians of the S&T information sector. The suggestion was based on the notion that library personnel had expertise in different areas of information management, and that, as they had worked together for such a long time, they were aware of most of the problems. They had similar concerns about the current situation, and thought they needed an effective policy

that matched their particular organisations' needs. In this regard, an ad hoc committee was recommended to work on the policy matters.

4. What do you think about the current roles of academic libraries or special S&T libraries?

Concerning the roles of S&T information providers, the level of collaboration was favourably focused amongst participants. All agreed that the collaboration amongst academic libraries and special libraries needed to be strengthened. Participants considered that there was more collaboration between academic libraries than special libraries. They observed that most special S&T libraries were providing services individually and even collaboration among special libraries was very loose.

However, participants from academic libraries were still not satisfied with the collaborative roles amongst them. They said they needed the results to be more focused. It was suggested that:

> *"Nowadays, collaboration amongst academic libraries is still broad. We need more specific roles in collaboration, for example, the collaboration between the faculty libraries, in the same disciplines, the same subject area such as engineering."*

5. What is the key policy of your institution in S&T information management and services?

The key policy, as presented by academic library representatives, was focused on resource sharing. For special libraries, participants thought that there was no such policy. As one commented:

"… but for special libraries, for example, those under the Ministry of Science and Technology, the policy in resource sharing hasn't been written yet."

However, participants from academic libraries argued that the resource sharing policy in the academic sector was still ambiguous. Other than the interlibrary lending, no resource sharing policy has been officially stated or written.

> **6. Has your library ever evaluated its success in providing S&T information service? If so, please give examples of strengths and weaknesses of your library.**

It was revealed that most academic libraries and some special libraries had applied the Quality Management System: ISO 9000, or the system equivalent, for controlling the quality of library services. Consequently, those libraries regularly evaluated strengths and weaknesses in order to be in compliance with the latest requirements. They agreed that the strength of their libraries was in collection development while the weakness were in lack of funding and the inadequacy of user communication as well as user education, especially virtual training.

> **7. Do you think your library has any strategic plan for information management and services?**

According to the Quality Management System, most libraries, either academic or special, had their own strategic plans, so-called the Quality Plans, as guidelines for their management and services. Some special libraries also implemented the policy of Key Performance Indicators (KPI) for human resource management. In their view, the plan clearly identified missions, visions, and strategies in resource management, knowledge and information access, and quality services. It was also noted that library staff had opportunities to participate in formulating these

strategic plans. However, some special libraries criticised the vague strategies of their institutions. One participant from a special library remarked:

> *"The strategic plan is quite broad. For example, it is stated that we are heading towards the e-library. That's all, no other details."*

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8. In your opinion, is there any funding agency supporting or sponsoring research activities in management and development of information resources and services?

The responses to this question differed according to the type of library where participants worked. Participants from special S&T libraries complained about the lack of funding sources for research in information services and resource development. They commented that the funding agencies in Thailand had limited research activities to certain types of libraries. Research funding for academic libraries was considered more promising. The representatives accepted that research funds were available both for academic and library staff but the opportunity to conduct research was often lost because of immense staff workloads. The research regularly and widely undertaken by most libraries were users' satisfaction surveys. All participants unanimously agreed that librarians in an advanced ICT age should actively seek more funds, harness their research skills, and dedicate themselves more to research achievements which would lead to improved information services.

7.4 Group 2: Barriers of S&T information service provision in Thailand

> **1. Regarding the situation of S&T information management and information access in Thailand, have you ever experienced any difficulty in managing or collecting Thai scientific research papers?**

The focus group participants thought that their collections of research reports from in-house researchers or academic staff was incomplete and outdated. Participants, such as librarians, said this was caused by researchers' failure to submit copies of their papers to libraries. The views on the root causes of gaps in collection were exchanged amongst participants, which can be summarised as follows:

- No clear policy of parent institutions mentioning the management and dissemination of in-house research reports.

- No obligation to hand in research papers to libraries was imposed on researchers.

- Open access to Thai research reports was sometimes refused due to the confidentiality policy of parent institutions, terms and agreements of externally funded research, and copyright or patent laws. It was notable that some externally funded research studies or the research papers under the copyright remained unopened and unavailable for dissemination to the public even though the contracts or the copyright had expired.

- In some particular cases, researchers had their research reports printed outside the parent institutions, for instance in scholarly journals, without informing librarians to collect copies of those journals.

- Preprints or grey literature were unlikely to be systematically managed by librarians as they were privately owned by researchers or exclusively disseminated to a minority group of the research community.

The following are comments from participants attempting to explain the reasons for incomplete collections.

- *"Each year, there are quite a huge number of research studies conducted by our academic staff. But sometimes, we find those research papers published outside the university. We just know this from library users who come to ask us about them. It appears that researchers have their works printed outside but they have no idea to give their works to us."*
- *"This is also a problem in resource management. Probably their research works are under copyright so they can't disseminate them to any other agents, even the library collection."*
- *"At present, libraries have no authority to ask researchers to give us their works. We had even raised this problem with the executives. We tried to make an agreement that researchers should give their published work to the library, but we got no response."*
- *"Lacking good cooperation from researchers and departments concerned has a great effect on our resource development and service provision. The fact that each library should have a complete electronic database, or at least a list of abstracts of the research studies or theses of their own institutions has accelerated us to develop the e-searching databases of in-house research and theses. The problem is if they don't give us, we'll never know or get them at all because there is not any regulation or agreement for both sides to follow. It's beyond our control."*

In order to obtain more cooperation from researchers, it was suggested amongst participants that a clear policy and agreement on the management of in-house research or theses were needed.

> **2. What do you think about users' information literacy currently?**
>
> **Do you think users are information literate?**

Since the members in Group 2 were recruited from different types of libraries, for example, academic libraries and special S&T libraries, a diversity of experiences was found amongst them on the issue of users' current information literacy in Higher education and in the research community. Various opinions included these themes:

- Users in small libraries such as faculty and special libraries are likely to come for enquiries or asked librarians for help in searching.

- In general, student users were not familiar with advanced searching technology so they were incapable of searching on their own.

- When compared to student users, scientific researchers and academic staff had more experience and skills in searching and locating information.

- Undergraduate students were more inclined to search through a library catalogue or OPAC than electronic databases.

- Postgraduate and research students preferred to search from electronic databases. However, only a small number of them were proficient in electronic searching.

- When compared to students in other fields, science and medical students were more skilful in electronic searching.

- Academic libraries provided both regular and on-request training courses on ICT and electronic searching to student users.

Librarians also remarked that levels of users' information literacy were mainly influenced by library training and skills obtained from past experience. As observed by academic librarians, most students had adequate skills in using computers, but electronic searching was different, as it also required understanding of the subject areas. The following are the comments:

- *"Users who have never been on a training course before can't do electronic searching on their own; even though we provide them a manual on site. But after training, they are better, having more skills in electronic searching. This shows that only having a manual doesn't help much. Users still need to be enhanced with some searching techniques or some guidance to phrase their search in order to help them get the information as demanded. Besides, it depends on their background knowledge in those subject areas."*

- *"Medical students are quite good in electronic searching skills so they can search on their own without librarians' help. We also provide them training at the beginning, though. They will come for our help only when they can't retrieve the full-text papers or when they need a document delivery or interlibrary loan services."*

- *Most scientific researchers in academic or research institutions are excellent at information searching, especially electronic searching. They know about databases related to their works as well as the keywords used in searching."*

In the discussion, one participant from the academic sector also raised another problem, which she believed was a barrier in providing S&T information services. Librarians in a central library had only surface knowledge in scientific subject areas due to the fact that information provided in the central library was mostly based on social sciences whilst S&T information was available more at faculty libraries. Therefore, librarians in a central library likely failed to serve the demands of users in more specialised scientific areas. The suggested solution was that central libraries should recruit staff that are from science-based background.

> **3. What is your opinion about information accessibility in Thailand? Do you think access to electronic resources is convenient?**

The focus group response described how users access library resources currently. Librarian participants in the group accepted that remote access to commercial electronic databases was impossible due to licence restrictions. Student users could access commercial online resources only via computers in the library, and while academic staff had more choice in using those resources via computers from their offices, they still could not do it from their homes. It was notable that accessing electronic databases was free of charge to students and academic staff, but not to walk-in or non-authenticable users. However, users had to pay for the printing charges. In some academic libraries, access to Internet searching or electronic resources was open only for students and staff. Queuing was used due to limited access terminals. Academic librarians commented that the provision of electronic resources had been recently improved by the government's effort in boosting resource sharing amongst academic libraries countrywide. A wide range of heavily used electronic S&T databases was subscribed to under licence agreements by UNINET, a higher education network centre in Thailand, thus providing availability of electronic resources and cost savings to the academic community in Thailand. Regarding the service of sharing databases, librarians commented that many complaints were raised about system failure and instability of servers which regularly occurred and caused connection delays. From the librarians' point of view, users' demand was unlimited and they required boundless services that were beyond the capacity of present-day libraries in Thailand. One librarian stated,

> *"This is one of the resource sharing projects we are trying to provide to users. We can do it only at our capacity allowed, but it's still not good enough. Users don't understand our financial constraints and the fact of restricted access to electronic resources."*

Participants from special libraries considered themselves far behind academic libraries. Comments were made that information accessibility amongst under the Ministry of Science and Technology seemed limited and needed more development. In the discussion, participants also thought that there was an issue that the national policy was a barrier to S&T information service in Thailand. It was remarked that changing of governments also resulted in reshaping policies, which, in participants' view, resulted in fragmentary implementation or even interruption. One librarian gave an example:

> *"Recently, it has been announced by the present government that the Thailand Knowledge Centre would be established to represent an image of a knowledge-based society. But surprisingly, none of S&T information was included in the scope of the Centre, so we had to propose it ourselves. We have to keep nagging. Now, the Ministry of Science and Technology is acting as a coordinator amongst the libraries concerned in order to facilitate information accessibility."*

> **4. What way do you think the institution's information policy has shaped the provision of S&T information service at your institution?**

Participants confirmed that institutions had understood the need for information policies and they were found in most academic libraries and special libraries. In their opinion, having a policy was advantageous because it acts as a guideline in working and was influential in increasing the effectiveness of information service provision. However, some weaknesses in the institution's information policy had been observed by the group participants so they also discussed how the policy could be a hindrance to the provision of S&T information service. Participants were generally unhappy with the organisational structure which derived from the institution's information policy. The key problem was about a separate entity between the library and ICT service, which was considered unfavourable amongst librarians. Most participants preferred these two units to be merged into

one and support each other. They additionally criticised that a library could not *"stand alone"* when its mandate was to provide services electronically in a networked environment. It was viewed that the operations of the library and ICT service should be closely connected:

> *"We have a problem with our information policy. The ICT service has been split off from the library. At the beginning, we worked cooperatively. The library sector provided the content collection and supervised the ICT staff in developing databases. Now we are separated and the concept of working is changing. The library sector has no authority to supervise the development of databases. It's more difficult to be in close cooperation as before because the ICT unit has to serve the whole organisation so the staff have much more work to do. ... The databases are still with the ICT unit but users come to ask for support from us, so library staff have to try harder to connect with them. We think the workflow would be smoother if the two units could be merged together."*

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5. What do you think about collaboration or the network amongst academic libraries or special S&T libraries in Thailand? From your experience, discuss the strengths or weaknesses of the collaboration or the network?

The group response revealed poor collaboration amongst academic libraries and special libraries in Thailand. It was noted that despite an effort in collaboration, the output seemed to be largely unsuccessful. As stated by participants, the obvious barrier to the development of library consortia or networks in Thailand was mainly from a lack of directive from the national information policy. This created problems with providing resources to develop networks. There was also a problem of incompatibility of the systems. Even though the concept of resource sharing was excellent, the participants admitted they did not collaborate frequently. Lack of concrete policies was blamed for this.

"The criteria for resource sharing are not clear enough to implement. We just know that we can share resources with other libraries. But what we can share is very limited, only a library catalogue of each institution. For other types of databases, it was almost impossible to share because we have different systems."

Another librarian commented:

"Sometimes, it seems that we can share resources or ask for collaboration only when we know each other....Official collaboration is still something out of reach."

Given that interlibrary lending was also included in the library consortium scheme, each library in the group discussed its practice. Some participants claimed that the interlibrary lending service was satisfactory and had no delay despite the enormous numbers of users. One academic library explained,

"The waiting time of each user's requirement is not more than one week. Users have to pay an extra cost for the delivery of a service as regulated by the Ministry of Education. The interlibrary lending service is provided only to members of the campuses. For outside users, we provide only a searching service and suggest to them to go straight to the location where there is the material they require. But these cases are rare now because most users know how to locate their information sources."

However, the librarian accepted that the service was delayed sometimes because there was no prompt response from the lending libraries. As reported by participants, another problem arising from interlibrary lending service was the loss of borrowed materials due to loose control procedures. Consequently, stricter lending rules and checking of authorised signatures was needed to be put in place.

It was also noted that the interlibrary loan service was currently provided only by academic libraries even though the rules permitted special libraries to use this type of service:

Regarding this, the participants agreed that interlibrary lending rules or agreements should be reviewed in order to accommodate special libraries and strengthen the S&T information service provision.

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6. Do you have to abide by any rules and regulations when purchasing or acquiring resources?

   Do you think they are barriers to S&T information service? How?

Procurement rules were considered to be an obstacle to developing services. As one librarian stated, the ICT division in her institution strictly controlled the procurement of computer hardware and software. Despite having its own budget, the library was unable to purchase computer devices without permission. In this librarian's view, permission procedures were time-consuming since a purchasing plan had to be proposed two or three years in advance before permission was given, thus causing inconvenience and problems in keeping pace with technology in ICT. From the participant's observation, it was a barrier to development of their services in the long run.

Compared to the special library sectors, academic libraries were in a different situation. So far as resource procurement was concerned, academic libraries were freer in managing their own budgets. However, they encountered a problem of lack of space during peak times.

Participants from special libraries also shared their ideas about solving the space problem. Some of the participants said that they had provided a call centre for users, so that they could receive services via a fax machine or could collect information later. However, service charges were applied in some special libraries.

Another problem related to resource procurement was availability of electronic resources such as electronic databases and journals. Participants found it was difficult to deal with the issues of electronic holdings and archives, particularly when users required the issues of journal dated back years ago. Regarding this, librarian participants preferred subscribing to the print copies rather than to electronic ones. They also mentioned difficulties in accessing electronic resources which were limited because of licence terms, and sometimes needed a variety of different hardware and software to be installed. Concerning information seeking behaviour, some participants observed that senior researchers and academic staff still came to libraries on their own to search for the print copies instead of electronic ones.

> **7. In what extent do you think library personnel are ready for change management, for instance, implementation of Quality Management System (QMS), performance evaluation, and the use of advanced ICT in providing services?**

A major problem mentioned by many participants was the rejection of change from senior librarians and staff. As reported by the participants, many senior members of staff were not keen to undertake ICT courses (see the comments below).

- *"This is a big problem for the personnel development in our institution. For example, when we ask them to go for training in computer courses, they will say no and try to make an excuse that they are too old to learn these modern things and can't catch up with it. Now, we try to solve this problem by giving them financial incentives."*
- *"Only the young generation of staff is happy with changes and willing to learn new things."*

The need for more training was recognised by the participants. The most needed training courses for S&T librarians were electronic search skills for S&T information, and English language. It was justified that, in the situation where most information sources were provided in English, it was of great importance for S&T librarians to develop themselves in this area. Participants also agreed that it was necessary to evaluate the effectiveness and productivity of the training in order to assure that staff who had been trained could apply the new skills to the tasks under their responsibilities.

7.5 Group 3: Opportunities for resource sharing or consortia development in Thailand

> 1. **Could you describe the situation of library consortia in Thailand today?**
>   **What are the strengths and weaknesses of the library consortia in Thailand?**

Participants in Group Three, who comprised librarians from government and private universities and from special libraries, shared their experiences about library consortia in Thailand.

Academic libraries

The academic librarians in the focus group mentioned the inauguration of THAILIS, a library consortium among academic institutions in Thailand. Funded by the Ministry of Education, THAILIS cooperates with the UNINET network and has been designed to allow universities from all regions of the country to share S&T international online databases. Interlibrary lending was another collaborative activity traditionally practised. It was notable that the consortium members mostly comprised academic libraries from government universities and only a few private universities. Other than the THAILIS consortium, one participant mentioned the forthcoming database sharing project between private

and government universities in the same geographical area. Another activity included a subscription to *Journal Link*, the online union list of S&T journals operated by one of the key S&T information centres in Thailand. In considering financial freedom, private universities seemed more flexible in budget management than government universities. As described by the participants, a private university can subscribe and retrieve full-text documents from both databases and electronic journals to meet users' demands but, nevertheless, joining the consortium was a preferable alternative owing to the advantage of cost saving.

In regard to the strengths and weaknesses of library consortia, participants from the academic sector firstly mentioned the management of the consortium. Established by the Ministry of Education, the THAILIS consortium was administrated by a committee represented by each academic library. However, the group participants from the academic sector lacked willingness to share their experiences about consortium management. Participants who were junior executives or staff shared the same view that they did not have the chance to work as a coordinator or a committee member, neither had they been informed about how the consortium was managed. In practice, they only acted as service providers or intermediaries between the consortium committee and end-users. Accordingly, they could give no comprehensive understanding about the consortium. The following comments demonstrate participants' points of view.

- *"We are only users of the consortium. We don't know about how they subscribe to those databases, actually. We've never been in the decision-making process, never been in the meeting with representatives from the Ministry of Education, or with the committee."*
- *"Yes, I do agree. We are just at the end of the subscription process, just a service provider to users. Does this consortium have any benefits? I believe it does. But how it has been managed, we don't know, actually."*

- *"We see the benefit in sharing databases. But management of the consortium is the most important thing to think about it. I think it's still not clear….The concept of library consortium is absolutely good, especially in collective negotiations. But how can we make the consortium going on continuously? That's the question…   I can't say much why the management is not clear because I'm not involved with any coordination. But what I've seen, the persons who run the consortium have been frequently changed."*

The participants also mentioned problems that emerged from the consortium which they had experienced and stressed as weak points. Weaknesses of consortium management as debated by participants include:

• Unstable servers

Discussing the users' feedback on the use of the shared online databases, participants reported that users most frequently complained about recurrent server failure. Another problem was delayed response from the network manager. This is evident from participants' remarks:

- *"The server was always down and so inconsistent that users had to give up their searching. When the system failed to work for too long, they usually made loads of complaints. We, as a mediator, had to report the problem to the coordinator, and then the coordinator informed the committee. Then the committee assigned the responsible person to solve the problem."*
- *"The server of the UNINET was usually down. We immediately emailed UNINET every time when the problem occurred, but we never had any reply from UNINET."*

It seemed that participants from the academic sector required proper maintenance of servers as well as rapidly responsive action in solving the problem.

• **Unbalanced sharing of resources**

Unbalanced sharing of resources was another significant problem raised in the focus group. As stressed by one participant, the most discussed topic in the consortium committee was an annual consortium fee in parallel with the balanced resource sharing. The fact that not all subscribed electronic databases were equally shared had aroused a controversy amongst members. It was commented that access to some expensive databases was restricted to some universities only. This inexorably provoked a conflict in the consortium as some members considered their institutions lost benefits from the unbalanced sharing of resources. The following comments illustrate the situation:

- *"From what I've known, the problem of extra money each university has to add to the consortium is raised every time in the committee meeting, especially at the end of the financial year when the consortium agreements have to be renewed. The representatives from each university always debated in a way, sort of, 'your institution's got more benefits from sharing than mine.' For example, in the case of the IEEE database. …It's for engineering subjects so it's rather useless to some universities focusing on mainly social sciences. But they said, in principle, because they are in the consortium they should have the right to access to this database too."*

- *"We don't understand how the consortium is being run. Talking about the IEEE, I also found that not every library in the consortium could access to it at the beginning. I don't understand why."*

When the consortium committee tried to solve the problem by asking members to pay equally, some members were still not satisfied with the condition. As one participant explained:

"It was proposed that each university should pay extra money for subscribing to costly databases on a basis of 'equal pay, equal

access'. Still, some universities didn't want to pay, claiming that they didn't get much benefit from that extra load of money."

Furthermore, some members were not happy when more funding was allocated to the universities which were in need of using those expensive databases. One participant said that the dispute over unbalanced sharing also led to an argument over budget allocation. She stressed:

"There is also much dispute over the budget. Sort of, 'It's not fair. Your institution's got more budget than mine, just for buying that expensive database."

The participant suggested:

- *It's the big problem that needs to be solved by the executives at a national level. When it has been recognised that Thailand is gearing towards the development of science and technology, those S&T databases should be of importance, and we have no choice but subscribe to them. Accordingly, it's not wrong to allocate more annual budgets to the institutions that provide S&T information for research purposes because they have to contribute more in subscription. "*

• Lack of communication

Another weak point of the consortium management was the breakdown of communication flow between the management of the consortium and member libraries. It appeared that ineffective communication also had an impact on the unbalanced sharing of resources, as demonstrated by this following participant:

- *"I come from the library in the remote campus. I think there is still a problem of a lack of communication between the consortium manager and the members. Since our libraries are located in two*

campuses, at the beginning, only the Central library could access those electronic databases. Librarians in another campus had never been informed about the consortium at all. Partially, this might be from our weak internal communication.... Moreover, there has never been any notification whenever servers fail to work, or when access to some databases is unavailable during the period of subscription renewal. We never know the causes and can explain nothing to end-users. "

When asked about the problem arising from subscription renewal, participants reported that access to some databases was not available because the renewal had not been made in time. One participant remarked:

"Everybody knows the financial year ends at September 30th and that we have to renew the agreements; we have to pay money to continue the subscription. But during that transition period, the service of electronic databases totally stops. In fact, we should plan to renew it in advance before the financial year end."

Regarding this, another participant tried to explain the situation. Reluctance of many libraries to participate in the financial pooling was the main cause of renewal delay, which in turn caused the decision making process to be drawn out, as noted by one participant:

"I think it is because of the expensive databases; it takes time for the committee to make a decision which will be acceptable to all members."

Special S&T libraries

When compared to the situation of academic libraries, it was remarked that there was still no immediate prospect of a library consortium amongst special S&T libraries in Thailand. Each special library singly subscribed to commercial online

databases or electronic journals and provided services independently. No attempt had been made to undertake resource sharing of electronic databases. It was thought that this was because of the lack of policy from the top executives and lack of funding. As commented by one participant from one special library under the Ministry of Science and Technology, special libraries and S&T centres provided services individually and the formation of a consortium was still far away:

> *"We are in a different situation from academic libraries. The Ministry of Education funds their consortium. But we, special libraries, haven't got any fund to support such a project so we rather work separately from each other."*

In the participant's opinion, it was astounding to observe that the researchers in her institution seemed to lack the ability to make good use of electronic services. As she commented, it was *"rather disappointing for researchers not to be keen on electronic information searching."* In order to attract attention, librarians ran a campaign for tracking down users and promoting electronic services, but there was not a good response from in-house researchers. Thus, group participants suggested that a consortium amongst special S&T library under the Ministry of Science and Technology should be initiated in order to promote the optimal use of electronic resources. One researcher remarked:

> *"We've never been informed about that even though we are also under the Ministry of Science and Technology, and we really need to search through electronic databases."*

However, it was clarified that cross-institution searching was still unavailable unless there were agreements amongst the libraries under the Ministry of Science and Technology, as justified by one librarian:

> *"We spent our own budget in subscribing to those databases in order to serve our in-house users only, to support the research*

sector in our institution. At the moment, there are no policies in sharing commercial electronic resources between us. It would be great if we could set the reciprocal agreements amongst S&T information centres under the Ministry in sharing resources in the future."

This was agreed by the researcher participant who suggested the establishment of a consortium amongst special libraries. She remarked:

"Is it possible for each library under the Ministry to hold a meeting for discussing the collaboration in details, for example, the budget and the databases which will be needed by each institution? There should be a needs survey of users too in order to assure that those databases are really in demand. This economises budget."

The librarian also reported that her library could afford only to access online abstracts of scientific research but, nevertheless, it was considered beneficial by researchers in reviewing literature, or at least exploring the trends of R&D in those fields. This was also agreed by the researcher in the group. She added that, although full-text electronic databases had not been provided so far, most researchers in her institution currently updated themselves with new research trends from browsing through the free websites devoted to scientific disciplines. Thus, having a consortium amongst special S&T libraries would be the most cost effective means of facilitating the sharing of electronic resources for research purposes.

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2. What do you think about Thailand's current situation in subscribing to online databases or electronic journals from commercial providers?

Do you see any limitations and could you describe them?

Having experiences as an information provider in academic libraries, one participant thought that academic and special libraries in Thailand were still

struggling with electronic environments. This participant firstly mentioned the exorbitant cost of commercial online databases and electronic journals as a major disadvantage in service provision. Secondly, the fact that those electronic products could be provided via Internet access only was a severe difficulty due to a lack of ICT infrastructures and the situation of the digital divide of the country. Thirdly, the participant thought that, under these circumstances, a lack of ICT or poor quality facilities exploited in Thailand had led to the ineffective use of costly electronic resources. According to the participant, those electronic resources had to be imported at high prices but users could not use them effectively as servers or networks often had problems. She stated:

> *"The networks always failed. Users couldn't access those electronic products. It's a pity to subscribe to those expensive databases when we can't make the cost effective use of them, we are just wasting money."*

Comments on the cost-effective use of information resources in relation to users' demands created a wide discussion amongst group participants. Participants from the library accepted that there was still a lack of users' surveys determining the need for electronic databases and journals. Librarians thought it was difficult to evaluate the cost effective use of electronic materials. However, as observed by one librarian, electronic resources were "*something fashionable.*" Most student users consistently came to ask for electronic resource services only "*when being assigned or recommended by lecturers. The big problem is they don't like any kind of information which is in English language.*" Another librarian agreed: "*Yes, it's the mix of problems of culture and information needs and behaviour. Users will read English only if necessary. However, academic staff are good users of electronic resources because they have to search information for their research.*"

Participants from special libraries also raised the issue of users' demands and behaviour. At the same time, they assumed that information resources in special libraries were not used cost-effectively because although some users had information needs, they lacked information seeking skills. As users of special

libraries were from diverse backgrounds, their information seeking skills and expectations were very different, which was considered by librarians to complicate service provision. For example, users from small and medium enterprises (SME) preferred having *"an instant information package"* that provided an instantaneous solution for their problems rather than searching and processing the information on their own. In other words, their motive in seeking information was only to solve technological difficulties, which, in librarians' views, sometimes needed synthesised knowledge from multi-disciplinary research. As demonstrated by one librarian:

> *"I think the problem is quite characteristic for special libraries.... We try to temp entrepreneurs with all kinds of information, but they say that we do not have what they want.... They do not want to do any information processing."*

When asked whether librarians had the potential to solve problems for entrepreneurs, providing them added value information as demanded, the same librarian answered that:

> *"I don't think we are able enough. What they want from us is out of our capability. Indeed, we have scientific knowledge background but we are not in their situations so we don't know what their real problems are. It's sort of technical problem. They don't care much about research or any information resources, either print or electronic ones. Those resources are useless to them. There have been quite a lot of such users coming to ask for our services."*

As the information service provision was free of charge, the librarian was asked whether it was possible to collect service fees and allocate them for recruiting specialists to provide consultancy services to industrial users. The answer was:

> *"It is rather difficult and needs a huge budget because the service requires experts of diverse expertises. I can say that our staff can*

provide this kind of service to those users at some levels, but only in general. We can't play the role of a specialist or technology transferor, though. "

The librarian added that the diversity of the users' backgrounds had influenced the services of special libraries to become too thinly spread in an effort to meet all user needs. Some users with limited education, for example, but with superb local knowledge, had the inspiration to develop their ideas into industrial innovations. They expected referencing services from libraries but their educational background was a great barrier to gaining access to English or electronic resources whilst scientific information resources in Thai were inadequate and obsolete. In this regard, the librarian proposed the following measures that would help alleviate these problems:

1. A special library should develop a database of experts or consultants in multi-disciplinary S&T, who can provide consultancy services as needed by heterogeneous users, particularly assisting entrepreneurs at the inception stage or supporting innovation-based activities.
2. S&T information resources should be systematically managed in order to serve diverse needs of users, specifically for those who have limited education and lack skills in information retrieval.
3. Special librarians should play the role of intermediaries between expert consultants and users, facilitating their connection and association.

The following point of view gives a clear and interesting picture:

"Ineffective use of S&T information is really a major problem. Have we ever made a good use of the procured expensive resources, either e-journals or online databases? That's still a doubt. Even the patent full-texts, users have no idea how to retrieve them, or if they do, they still don't know how to apply the information to meet their needs. Therefore, we lack people who can analyse the information to fit users' needs, especially technical needs. If we don't have these

people, resource sharing projects will mean nothing because the service loop hasn't been connected yet. We have to accept that most SME users don't have enough time and skills in information searching so if we don't support them, our resources will become investment losses because we spend a large amount of money for those resources but can't make good use of them. Each group of users has its own specific need, but for small industrialists, they also need somebody to fulfil their needs, somebody, like a consultant, who has more detailed knowledge than a librarian. As special librarians, we should promote the idea of this type of consultant to make our S&T resources more cost-effective and the sharing more successful. It's the role of librarians to create the society of information consumption."

> **3. What do you think about current collaboration between academic and special libraries?**
> **Do you know what kind of information resources we can share and in what way?**

As far as collaboration was concerned, participants agreed that there was no consolidated agreement between academic and special libraries. As a matter of fact, academic libraries provided services individually from special libraries and were well equipped with both ICT and resources owing to a larger budget gained either from tuition fees or from subsidies. In addition, collaboration between academic libraries was strongly promoted with more tangible projects of resource sharing. For instance, there was an attempt by most universities to provide more effective services by developing web-based academic research databases, which were freely accessible and could serve the needs of users both inside and outside the academic community. However, it was commented that these databases were still user unfriendly since users had to navigate through each university's homepage one by one, thereby being time consuming and inconvenient. It was suggested that webpage links or web portals should be constructed as a gateway

to S&T research in Thailand, which could provide a single access point to support users' searching. This generated an idea amongst participants to discuss the strengthening of collaboration between academic and special libraries concerning the management of S&T information resources. Participants proposed this gateway should access the national S&T research collection, combining research projects both from the academic sector and other research institutions countrywide.

> *"Talking about collaboration between academic and special libraries, we should ask how we could develop a one-stop access point, kind of portal which automatically links to other sources of information concerned. Now, we can search only through many universities' websites, one by one, and it takes much time. We need a portal for S&T information resources. If research works of R&D institutions and the private sector are included, that would be perfect."*

Moreover, it was also suggested that databases of experts and specialists in S&T should be cooperatively developed between academic and special libraries in order to optimise the use of human resources in aspects of information service provision and serve the purpose of organisational knowledge management.

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4. Currently, is there any collaboration among libraries in developing union catalogues, union lists, and bibliographic databases?
Are there any other ways to manage our resources to make them more beneficial?

According to academic librarians, the forthcoming activity in the near future was an establishment of a union catalogue amongst universities throughout Thailand. Participants from the academic sector viewed this programme as extremely valuable for all users in the research community. While discussing the benefits of this programme, some academic librarians showed their concern about a hindrance to the progress of the union catalogue activity. As reported by

academic librarians, the launch of the academic union catalogue service was still delayed due to a large numbers of missing records which needed to be resolved. Librarians indicated that checking through the records was enormously time consuming. They were under huge pressure from excessive workloads in developing the union catalogue and providing routine services simultaneously. One librarian complained:

> *"It is a backbreaking work for academic librarians undertaking this project. We are now really exhausted with checking the records. Meanwhile, users always come to ask for this service. Sometimes, users are 'our pain in the neck'. They have extremely high demands and likely don't help themselves much. They prefer to be fed in everyway. Some users don't even want to come and search by themselves in the library. They just make a call and ask librarians to search instead. It's quite hard for us to do two or three jobs at once. It doesn't mean that we don't want to serve. Of course, we want to serve our users but right now we have heaps of work to do, and the development of this union catalogue is awfully complicated. Looking at a brighter side, we just expect that the success of this programme would contribute greatly to the academic and research communities. Cataloguing would be much easier later on. We are miserable pioneers, though."*

The librarians' strenuous tasks were sympathetically understood by user participants in the group. In every participant's view, this was another effortful programme initiated from the government's policy to actualise the integration of ICT and information resources. Struggling in this challenging situation, librarians did have positive attitudes to the development of the union catalogue. They visualised the project as promising to invigorate the resource sharing scheme, lessening librarians' cataloguing tasks, and ultimately improving services. It was thought that libraries could benefit from this in the future:

> *"More web-based databases are still in a waiting list. If this union catalogue works satisfactorily, we will move forward to include other educational institutions such as Ratchabhat Universities, Ratchamongkol Technology Universities, and private universities. I think that if the project is well done, both librarians and users will find providing and using the services more convenient."*

As stated by the librarian, this project originated from the government's policy in promoting Internet access, e-learning, and a virtual library. Universities were initially designated to steer the project of co-cataloguing.

> *"It was sort of a pilot project, still under trial run. There are several projects under this programme. We are trying to share the resources in a more effective way. We have representatives from each library to run this programme. The programme originally hosted by the former Ministry of Universities, which is now dissolved and merged with the Ministry of Education. However, the representatives and staff are the same team and still doing their jobs."*

Concerning the issue of resource management, an interesting comment emerged that this task was currently a concerted effort between academic libraries only. In order to consolidate the sharing of S&T information resources, more institutions in the S&T research domain were strongly recommended to be involved, as noted by one participant:

> *"This union catalogue should embrace all research studies in other government R&D institutions, and if possible, also those of the private sector so that we can manage the national S&T information resources to be conducive to the best sharing in the research community."*

In addition to the co-cataloguing of research works, one participant from one special library gave a view that a national database of fundamental research

should also be developed in order to optimise the use of research works. According to her explanation, a massive number of fundamental scientific studies from the early age of scientific development of the country dating more than 50 years ago still remained of great value in providing the foundation of scientific knowledge and were appropriate to be used as a platform for conducting further and more advanced studies. She stated that:

> *"Those research reports were conducted since 1947, at the glorious age of fundamental scientific research in Thailand. Data in those reports were scientific facts that we still can use for further studies, or in developing some innovations. The original reports are quite old and fragile now, for example, the research works of Department of Agriculture, Department of Forestry, Department of Mineral Resources and…a plenty of special libraries. Not many people even know if these libraries exist."*

This suggestion was reiterated by another participant:

> *"Yes, I do agree. But the problem is how we can create collaboration amongst us, amongst our special libraries. These fundamental research reports are quite interesting. I think even at the Research Council's library, we don't have any copy of them because it was established later in 1975. At the beginning, Thai national Documentation Centre (TNDC) was in charge of all scientific documents of the country. Therefore, it is important to invite other special libraries to join in this preservation project, isn't it?"*

> **5. What is your opinion about the management of the information networks in Thailand?**
>
> **Do you think these networks have conducted activities consistently?**
>
> **In which direction would you recommend the networks to be developed?**
>
> **Or what kind of collaboration model would you prefer?**

The current status of the S&T information network in Thailand was reviewed by the group participants and it was summarised that failure in managing the network was almost certainly caused by a lack of consolidated agreements amongst libraries. As observed by one participant from a special library, the network *"operated in a voluntary manner, had not enough subsidies, and had no clear direction."*   This resulted in dispersed and discontinuous activities and, as a result, a low profile of the network. It was agreed by other participants that the management of the network had to be discussed in detail amongst the parties concerned.

When asked how libraries should collaborate and propel the network more vigorously, the commenting participant said that a steering committee was needed in order to formulate the national strategies for developing the network:

> *"We need a national steering committee, which will act as representatives for all network members. This committee should be responsible for creating strategies for the network. From our previous lessons, having only one department taking charge of the network is not a good idea because they do not take into account the views and needs of others. The funding for the network was also scattered and this caused the network to have a bumpy ride. But if we have the steering committee with concrete vision and missions, the network will go far better."*

The participant explained that the S&T information network was one amongst the six information network centres, each of which functioned in different knowledge disciplines and were affiliated to THAI NATIS, having the National Library as a secretariat. Each network also had its own coordinator and affiliated teams to undertake different activities depending on its missions within the scope of the subject areas. Given that the network members were loosely organised, the reciprocal agreements were not formalised, which significantly affected the overall success of the networked resource sharing. As remarked by the participant, only enthusiastic members were productive in resource sharing and achieved their goals. Loose partnerships and imprecise direction was a feature of the S&T information network, which may, in the end, lead to its downfall. In order to give a clearer picture, the first scenario was described to the group concerning the sharing of international journals. In order to be economical, it was agreed that each network member should avoid subscribing to journals having similar titles. However, according to the participant's point of view, this proposition was considered as an example of implementation failure due to its impracticality:

> *"Although it is a good idea, we've never studied or analysed the real situation, the conditions in subscribing international journals. We just made an agreement that we shouldn't subscribe to any journal which could be found in other member libraries, but that is not enough because it is not practical. In fact, we should have investigated the users' need, and, practically, subscription of journals should be based on the research trends of the institutions as well. In practice, we should analyse which titles of S&T journals are really important and widely needed in particular fields."*

It was implied that a lack of user surveys and insufficient investigation of ongoing in-house research activities generated ineffective services. Also, the lengthy waiting time of interlibrary loans gradually weakened network agreements, driving members to subscribe to all affordable journals individually and withdrawing themselves from networked services.

The second scenario was focussed on inadequate financial support from the government. So far as resource procurement was concerned, inadequate budgets were always found to be a drastic hindrance to the development of S&T information service provision. The participant commented that the government's policy in budget allocation still lacked a mechanism to support the procurement of library resources. It was remarked that:

> *"The rigorous financial regulations need to be revised to make them more flexible. Budget cuts are common problems encountered by all libraries but it's incredible, we've never discussed this problem in the network, never analysed what the real causes are and how we can solve them."*

The participants agreed that librarians should try to convince the government that the resources imported from abroad were costly and were fixed in price. Therefore, when the budget was cut; it was impossible for libraries to afford them, as noted by one participant:

> *"Actually, we libraries, should undertake collective bargaining, convincing the government that those resources were crucial to S&T development of the country. When the government requires us to provide the best services to researchers, to foster the S&T development in the long run, they should support us by reviewing their financial practices which are obstructive to purchasing."*

The librarian participants also thought that the budgetary policy needed to be improved to make it more practical. One participant who gave an example remarked:

> *"Believe it or not, in the budget allocation, books and journals are defined under the category of materials, not different from toilet paper. And it is the first category to undergo budget cut. For example, during economic crisis in Thailand, our budget for*

subscribing to journals was cut in that year. Just a few we could
afford. The problems of budget and resource management are
related. How can we convince the people up there to understand
that 80% of S&T information needs to be imported? It's not that
we want to spend money extravagantly, but it's necessary. There
are many conditions in purchasing, for example, the fixed prices
and time we have to pay. It also concerns the matter of inflation
rate. I haven't seen anybody trying to solve these problems."

Another participant from a special library agreed that, apart from the problem of
having limited funds to subscribe to journals, her library also experienced a
difficulty in obtaining computer upgrades:

"I totally agree we should empower ourselves in negotiating for
resource procurement. At my library, we also lost one-year budget
for journal subscriptions. We are also stuck in the problem of lack
of computer upgrades. The process for budget allocation is so tough
that the staff that are in charge want to give up. They have to justify
every bit of money they're asking for. It's too burdensome. I don't
understand. Using the more advanced ICT is the overall policy, but
we are not allowed to upgrade our computers. So I think, at this
point, if THAINATIS would be strengthened with powerful
negotiation, it could help us sort out the problems."

When asked whether this problem pertained to strategic management of
THAINATIS and the networks under it, one participant stated that:

"I'm not quite sure. In fact, the organisational structure of the
networks is really good because each network represents each
subject area. That's quite perfect. We also have the key institutions
to work and run the network. However, we have to accept that the
networks have been established many years ago. At the beginning,
the ICT situation was not as advanced as nowadays, so it might

somehow limit the roles of the networks and force each library
member to work individually. But now, the ICT is pretty good while
the economic situation is quite poor. It's time for us to think about
how we can get more benefits from the networks, to get our money's
worth."

The group participants agreed that the *"current network model"* was satisfactory and well established; however, most participants thought that the network needed new strategic management to keep pace with developments. From their own experiences of being network members, some participants stressed the importance of being proactive and of being supportive of all library members, particularly in negotiation matters. All the librarians thought that the network representatives should have some power in negotiating budget allocation. They also visualised the networks as an economic mechanism for budget management under the watchword of *"pay less but get more"*. Moreover, some participants remarked that although the organisational structures were well-formed, the strategies in operating the networks needed to be fine-tuned to suit the government's bureaucratic restructuring scheme. Periodic evaluation of the networks' success was also mentioned, as stated by one participant:

"For example, we could sketch a three-year mission, set the goals
to achieve, and then evaluate them. Secretariat or a coordinator of
the networks must be active in the coalition and be determined in
defending the budget. It should be a collective negotiation."

It was also added:

- *"I agree that budgetary or financial rules need to be revised and we*
  should ask for it together."
- *"There should be a revision of terms and definitions in budget*
  allocation too. For example, what are defined as materials, what is
  defined as equipment? Now, we can say is that we have almost come

to the paperless age. We should review the situation and prepare ourselves for these changes."

Participants expected that the networks should play a role of a coordinator to integrate several activities into one project. In this regard, the scope of a project needed to be defined and responsibilities allocated to each member. Participants thought that an integrated project having a synergistic approach should be more effective in achieving the goals. It was also thought to help in reflecting the whole direction of network development. Furthermore, it might be easy for budget allocation. One participant said:

> *"What I've experienced was having small projects to be integrated into a big one and asking for the lump sum of budget. It really helped. We could get what we had asked for. For example, under the project on development of databases, we had several sub-projects under it, including the procurement of ICT for carrying out the main project. Finally, we could get what we wanted and we had the databases as the final outcome. I think to have project integrated is very important. It can prove tremendously the concept of collaboration and how we share the resources. Therefore, the network will be the best coordinator amongst us, investigating what each member would like to do under the same goals and targets, what facilities and support those members need in order to complete each task, then integrating those tasks into the whole project, and negotiating for the budget totally needed."*

One participant agreed that the integrated project was a favourable idea for accelerating tangible collaboration amongst academic and special libraries. However, another participant expressed her concern about future attitudes to resource sharing. It implied that most institutions, especially academic libraries where the greatest capacity was more evident, were still unenthusiastic about sharing the resources with others due to unbalanced sharing although another

academic representative thought the problem was more to do with the lack of ICT facilities:

> *"The problem is not that we are not willing to share. Now, the concept of managing the resources has been changing. Currently, we can develop our own databases individually but under a compatible system, so there's no worry about the sharing. To be honest, there's nothing much in the databases other than bibliographical data so it's no need to be unwilling. But in fact, we still have a problem with the server for those databases. That's why we still can't provide this service. I think the real problem in resource sharing heavily depends on the ICT facilities and compatible systems. If the network could sort it out, it would be a great contribution to the resource development of the country. Therefore, this is another issue I think the network should do for members, to support us with the good and user friendly systems so that our routine works and services would be made easier"*

Another participant from the academic sector thought that there was a possible mismatch between the concept of resource sharing and quality management. The quality of library service comes under the auspices of the Quality Education Assurance System.[1] Academic libraries, for example, have to ensure that the size of collections complies with quality control requirements. Problems might occur if resource sharing schemes result in the shrinkage of collections, causing libraries not to be standardised as required by the quality management system. She gave an example that:

> *"In quality assurance, it is specifically required how many chairs we must have, how many seats we must provide, how many books per how many users we must have in our collection, and so on."*

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[1] The quality management systems for higher education in Thailand helping universities and colleges to achieve quality of instruction and an appropriate academic learning environment.

This question was answered by another participant as follows:

> *"The quality plan can be changed. Those figures are the thing we set just to measure the quality. We can review our own measurements and change them to be appropriate with our real practices. If we agree to share the resources, we can revise our quality indicators."*

However, some participants remarked that quality control of libraries was a critical issue and it needed more discussion:

> *"We need three more days to talk about the quality assurance system of libraries, actually. (laugh)"*

From the discussion, the group participants from special libraries showed considerable concern about collaboration. They recognised the need for more collaboration in the light of changing environments and bureaucratic reform. Roles of members, goals and mission statements need to be defined and collaborative projects implemented and promoted.

CHAPTER EIGHT

DISCUSSION

8.1 Introduction

This chapter discusses the findings and conclusions of each strand of research undertaken. Three research tools were used to collect the data: questionnaires, interviews and focus groups. The results are addressed in relation to the original research questions.

8.2 Key research questions

The key questions for the research were as follows:

1. What are the current status and roles of S&T information service centres in Thailand?
2. Are there any policies and goals, or achievement targets relating to information services and information technology in Thailand? If so, what are they and who are responsible for their implementation?
3. How are S&T information centres strategically managed? Which types of services are provided and what are their future plans?
4. What are the barriers to S&T information service development in Thailand? Are people aware of them and how can they be overcome?
5. In relation to users within Thai S&T research community, what is the extent of information literacy and what are the attitudes of and expectations for S&T information services?

6. What appropriate information service models or roadmaps could be developed to aid the modernisation of the S&T information service in Thailand?

8.3 Stakeholders in S&T information service sector

 The stakeholders in this research include:

- Executives /Policy makers of libraries or S&T information centres;
- Library managers;
- Librarians /Library staff;
- End-users;
- Decision makers of funding agencies.

8.4 Discussion of findings

In order to answer the above questions, data obtained from three stakeholder groups (academic libraries and S&T information centres, users, and funding agencies) are summarised below.

8.4.1 What are the current status and roles of S&T information service centres in Thailand?

The key S&T information service providers in Thailand consist of libraries in a number of parent institutions, as shown in Figure 8.1.
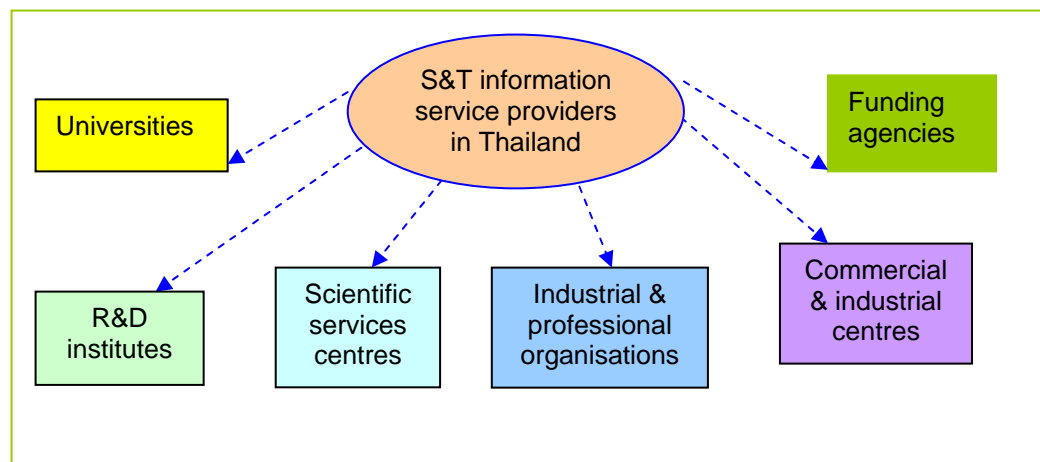
Figure 8.1. S&T information service providers in Thailand

Figure 8.1 shows the institutions where S&T information services are provided. These can be split into two categories: academic libraries and special libraries. They were the key S&T information providers investigated in this research.

Academic libraries

Academic libraries in this research include government universities throughout Thailand. Users of academic libraries consist of academic staff, students, non-academic staff, and the general public.

Universities in Thailand are supervised by the Office of Higher Education Commission in the Ministry of Education. Even though each university is independently managed in relation to learning, teaching and research, all collaborate in library resource sharing projects through committees, namely THAILIS and PULINET, as administrators (See Figure 8.2).
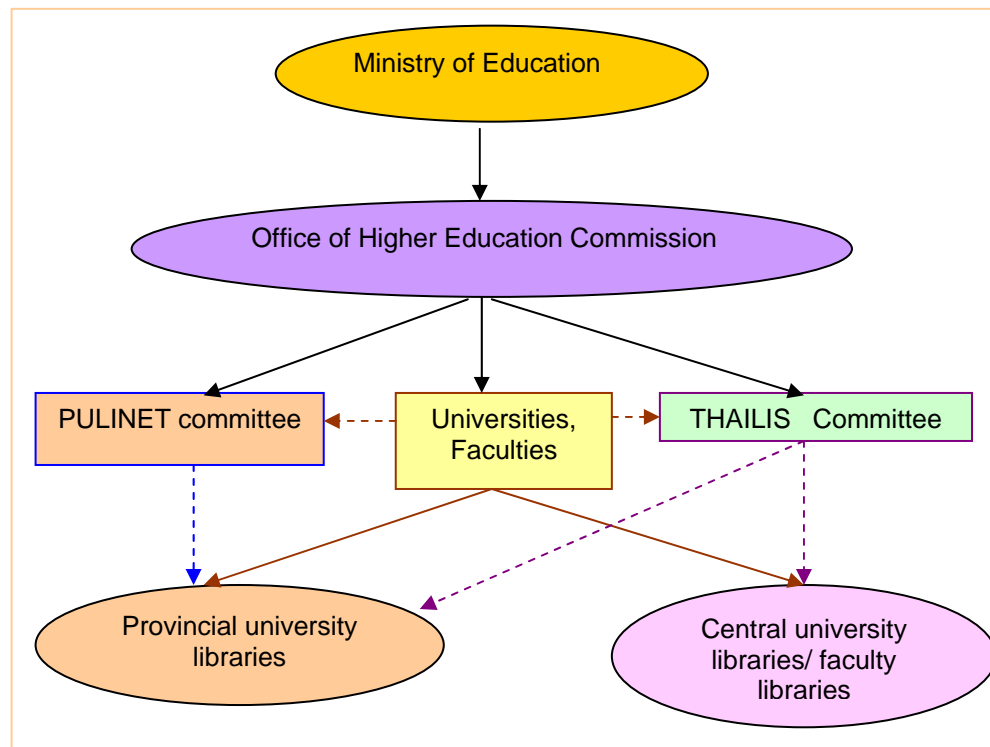
Figure 8.2 Hierarchical management of academic libraries

Special libraries

There are several different types of special libraries. This research studied special S&T libraries which are parts of:

- **R&D institutes** including government institutes promoting or conducting R&D. Users of these types of libraries are in-house researchers, industrialists and entrepreneurs, external researchers, and the general public;

- **Scientific services centres** including the institutions providing scientific, technological services other than R&D, for instance, information services and scientific testing services. Users of these libraries include in-house staff, external researchers, industrialists and entrepreneurs, and the general public;

- **Industrial & professional organisations** in the private sector. These libraries provide a variety of technical and managerial support including

information to Thai industrial and business sectors. Users of these libraries are, for example, industrialists and entrepreneurs, professionals in engineering, architecture, construction and design, businessmen, and company staff;

- **Commercial and industrial centres** including the institutions under the Minister of Commerce and Ministry of Industry which provide information to their staff, industrialists, entrepreneurs, and the general public; and

- **Funding agencies** where research information is provided to researchers and the general public in order to promote research activities.

Special libraries are controlled by different parent institutions and the services they provide vary depending on their individual missions and user groups (See Figure 8.3). An attempt had been made to share resources among special libraries along with the academic sector; however, the collaboration had diminished as a result of policy change.
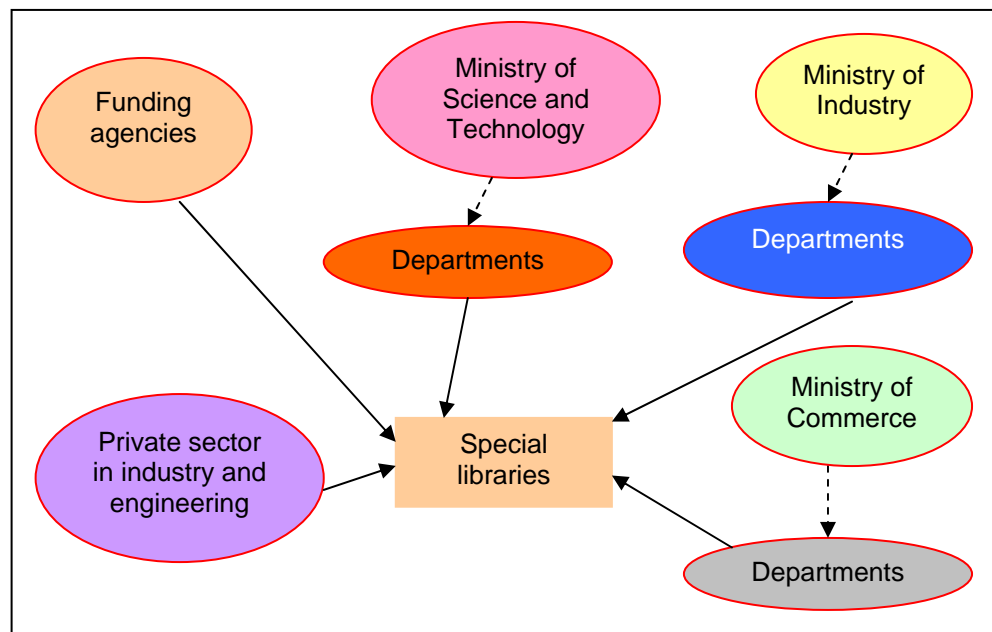
Figure 8.3 Parent institutions of special libraries

In comparison to special libraries, academic libraries have a higher recognised status and are more unified in organisation, with clearer missions, and well-identified target users. As academic libraries fall under the responsibility of the Ministry of Education (the only supervising agency), the organisational structure and management is less complicated, offering a greater chance for development and building of resources especially the budget. With identified and specific users (academic staff and students) they also had an advantage when formulating policies and defining activities.

In comparison, special libraries come under the responsibility of different government agencies as well as the private sector, where responsibilities and mandates are diverse. For example, special libraries under the Commerce and Industry Ministries provide industrial- and commercial-based information, while those in R&D institutes of the Science Ministry provide technical information required by their researchers. Moreover, research topics in the R&D sector are likely to be diversified because of each institution's R&D policies. The information service provision of special libraries, therefore chiefly depends on the information needs of internal users, again, these also vary by institution. These factors have created a wide diversity in the provision of services. At the same time, the majority of special libraries have been struggling with limited resources because parent institutions give little, if any, priority to information service development.

Most libraries are currently hybrid and are aiming to provide electronic resources as far as available budgets will allow. Both academic and special libraries view their role as support units for research as well as knowledge managers for their communities and centres for enhancing user information literacy. All academic libraries place emphasis on supporting teaching and learning and some have a new role in the participation of curriculum planning. This is considered an essential part of supporting research and increasing awareness of information services among academic staff.

In Thailand, the role of libraries as centres for knowledge management is still at an early stage. Knowledge management projects have begun in a number of academic libraries, with only a few in the S&T sector. It appears that while academic libraries are trying to capture knowledge from e-forums, most S&T special libraries are only just beginning to initiate information management projects, for example, projects to digitise research papers.

Academic and special libraries also describe their role as educators in the area of ICT, on the basis of improving user information literacy. It is apparent that electronic searching skills have been provided by academic libraries, but with much less training offered by special libraries due to a lack of ICT facilities and electronic resources. However, most academic libraries reported a problem of users' lack of attention in training. Thus, these libraries are trying to educate users in a more active manner.

There is a user demand for libraries to act as a *"gateway"* to S&T information in Thailand. So far, attempts have been made to create an e-library project in order to achieve the integration of information service provision between academic and special libraries. A recent project was criticised by the interviewees for lacking direction. The roles of the Ministry of Science and Technology and the Ministry of Information and Communication Technology are not yet well defined, thus causing further difficulties in implementation.

It appears that the executives and librarians in academic libraries feel that their role and status is satisfactory. However, those in special libraries are not satisfied; little money is provided and managers of the parent institutions do not appear to be aware of information services they provide.

8.4.2 Are there any policies and goals, or achievement targets concerning information service and information technology in Thailand? If so, what are they and who are responsible for their implement-ation?

Policies, particularly in the realm of S&T information service provision, focus on two levels: the national information policies, and the institutional information policies. The strategies used by each institution to fulfil goals or targets are also discussed.

National Information Policies

In relation to the national information policies, the information providers have two varying opinions. One group of executives stated that they are familiar or very familiar with the national information policy, while the other group stated that government policies on information do not exist, or, if they do, they are unclear.

The results from the questionnaire survey and interviews differ. The majority of respondents from the questionnaire (16 of 25 executives) said they were familiar or very familiar with national information policy, while the majority of the interviewees (18 of 28 executives[1]) stated that the national information policy did not exist, or that a number of issues necessary for S&T information service development were still missing.

Those executives, mostly from the academic sector, who believe that Thailand currently has a national information policy, stated that it is supported by the following initiatives by the government:

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[1] There were more executives participating in the interviews because three of them preferred to be interviewed rather than completing questionnaires.

- e-government policies;

- the establishment of MICT;

- the promotion of the e-learning environment by accelerating the use of ICT in information service provision, and funding the academic library consortium project;

- the launch of the National ICT Master Plan;

- enhancement of reading behaviour by initiating a living public library throughout the country and establishing the National Knowledge Development Centre.

However, the majority of executives think that these above-mentioned initiatives are related more to ICT infrastructure and its usage rather than issues related to the development of information service provision. Moreover, it focuses more on public libraries than on the academic and S&T information sector. The group of executives believed the statements regarding policy were too broad, and did not specifically cover the S&T information sector. The roles in relation to the implementation of the policies are also unclear or not stated, with current policy focusing only on the functions of MICT, the key organisation responsible for steering the mission. Librarians feel disappointed when the academic and special library sectors are omitted from the government's ICT plan. In relation to this, the roles of other stakeholders such as the National Library, S&T information providers, MOST, academic and special librarians need to be clearly defined with regard to strategic partnership.

The National Library is described as having a low profile and low impact. Instead of rectifying this, the S&T information providers pointed out that the government has a plan to establish new organisations to deal with the information sector of the country. These providers prefer the level of cooperation to be clearly stated with the institutions concerned having equal opportunities to participate because of their experience and reputation. Moreover, they think that a newly established organisation such as MICT is not ready to handle the

national information sector alone. Thus, collaboration from the parties concerned is considered necessary as an integral part of national information development.

Overall, the library executives believed that the current national information policy has an affect on shaping the institution's information policy while also increasing awareness of S&T information as well as competitiveness among the S&T information providers. However, the national information policy is still not well known by most S&T information providers, thus having no influence on the provision of S&T information. The broad statements of policy also cause implementation problems. This is evident as 11 of the 25 library executives are not familiar with the S&T information proclamation within the national information policy. However, the majority of interviewees commented that the S&T information policy was launched over 17 years ago but has not been revised in any way until now. Therefore, there seems to be a need for the national information policy to be rewritten by focusing on the S&T information sector in order to keep up to date with technological changes and global trends.

Institutional Information Policies

When comparing three groups of people working in libraries, the results from the questionnaire survey show that library executives are the most familiar with the institutional information policies (92 percent), followed by library managers (75 percent), while librarians and library staff are the least familiar with the institutional information policies (72 percent). This corresponds to library mangers' opinion that thinks that the institutional information policies are not well known by staff. However, it is interesting to note that staff think they know the institutional information policies well.

Results from the interviews show that, on the whole, all groups are aware of the institutional policies as well as the institutional information policies. It can be assumed that communication of the policies in each institution is satisfactory and effective. Therefore, only a few managers and staff are unfamiliar with the institutional and information policies. In various institutions, the policies are

communicated to staff through meetings, which is considered by both management and staff as a satisfactory communication tool. They see the benefit of a meeting as an interactive forum where staff and management can exchange ideas concerning the policies and provide feedback. Library managers are viewed as having a key role in fostering good internal communication. The quality assurance system widely used by most libraries in both sectors as a management tool in monitoring service provision is also a useful means for effective communication, helping to develop organisational commitment and disseminating the policies.

The institutional information policy is usually formulated by the executive team of libraries. It is notable that the policy formulation of all libraries both in the academic and special library sectors, excluding those in the private enterprise which have their own business mission, has been influenced by the government's information policy. For example, academic libraries recognise the e-learning environment of the e-government policy as a milestone; special libraries consider the electronic and living library as a target to fulfil. The executives of libraries also often play a participatory role in formulating the institutional policies as they are also executive administrators. The institutional policies also shape the information policy of each institution (see Figure 8.4).
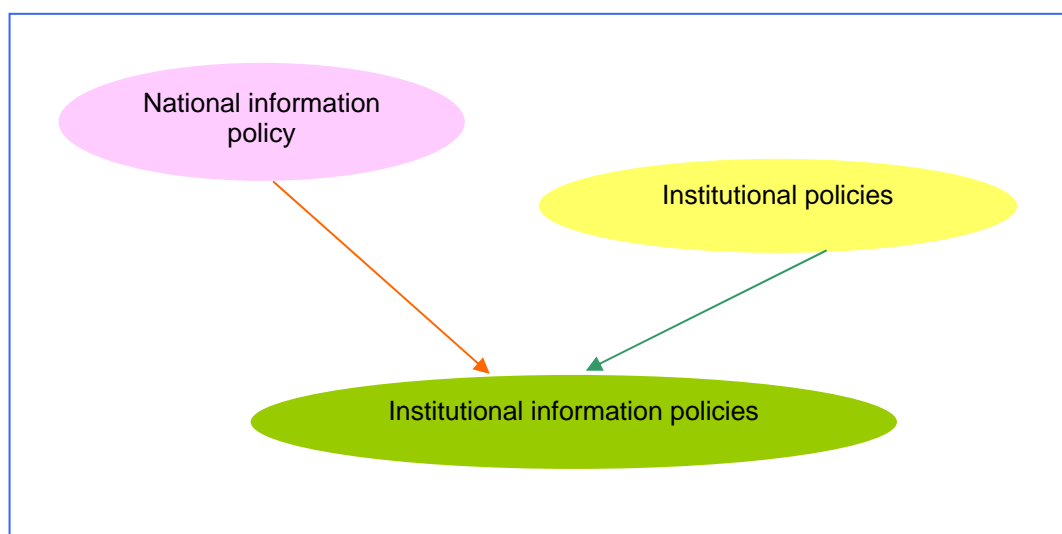
Figure 8.4 Influences to institutional information policy formulation

From the questionnaire surveys, library executives expressed satisfaction with the parent institutions' awareness of the information service sector and library system development. They also agreed that institutions actively promote the S&T information service while announcing clear policies in promoting R&D. The interviews confirm that most libraries endeavour to support the research community. Therefore, it is not surprising to find S&T information stated in the institutional information policies. Nonetheless, not all library managers and staff are aware of the S&T information policy of their institutions. As shown in the questionnaire results, 14 of 25 library managers and 45 percent of library staff are unfamiliar with it. The interviewees remarked that the institutional information policies still lack clear statements in relation to information or data access and disclosure, promotion of inter-institute collaboration, information resource sharing, and redefinition of library roles in current circumstances.

As a result, policy implementation seems to be disputed between library executives and library managers. It appears that what they expect from each other cannot be fulfilled. Since executives identified their roles as *"facilitators"* or *"problem solvers"* and expect their managers and staff to work creatively with lateral thinking, they only provide broad policies. However, managers fail to understand this approach and consider the policies as ambiguous, and not covering all levels of staff. Managers want the policies to be more focused with specific activities identified. Moreover, lack of enforcement or punishment is also a factor causing a lack of commitment in implementation. It is believed that this has caused staff to work in a passive manner. Therefore, executives should find a way to build commitment among managers and staff. Although intra-communication is viewed as effective, there are still some misunderstandings between executives and managers in aspects of statements of policy and implementation. Executives need to clarify their demands and make their approach clearer among managers and staff. Meanwhile, managers have to play a more participatory role in communicating with staff and urging them to think creatively and work actively.

The important statements in most policies include the key missions of libraries in promoting academic and/or research communities. Most libraries have launched an e-library project by extensive use of an automated system along with state-of the-art ICT to enhance user convenience. Digitisation and procurement of resources are also significant issues in the information policies. The new policy on knowledge management is still at an early stage. Apart from organising a university consortium for reference databases subscription, academic libraries are seeking more collaboration in resource sharing such as development of a union list of bibliographic records of academic research. Policies on quality control of service provision can be found in both academic and special libraries.

8.4.3. How are S&T information centres strategically managed? Which types of services are provided and what are their future plans?

The strategies adopted by each institution in order to fulfil their goals or targets are addressed. The scope of the strategies investigated includes: formulation of strategies and the participatory role of staff in strategic planning, communication approaches, common areas of strategic plans in each institution, and a shift to an e-library.

Strategic management of S&T information centres

In general, executives, library managers, and staff are aware of the need to develop strategies for policy implementation. All these groups believe that strategic plans have increased the effectiveness of services and are useful for conducting activities with a limited budget. Therefore, all libraries have developed their own strategies under the names of strategic plan, annual plan, or action plan. These strategies are initiated either by the top executives or from a meeting with full staff participation. However, results from managers and staff show that staff in many libraries rarely participate in the formulation of strategic planning. The factors considered when formulating the strategic plan include

385

institutional policy, organisational change, communication, timeframe and budget. In general, the library sector depends on the institutional policy, particularly when there is a change, for example, in educational or research trends. Libraries have to keep their services up-to-date with those changes and try to play a part by adapting strategies to meet the changing demands.

ICT management appears to be weak particularly with respect to communication; staff react passively and seem unaware of the plans. Executives think that the junior managers have a role to play by making the policies and strategies well known and by motivating staff to participate more actively. In managing strategies, the scope of activities needs to be flexible and comply with the timeframe and budget in order to achieve the targeted goals. However, most libraries are not satisfied with their limited budgets. They believe that an increase in budget would result in improved services, more resources and better ICT user support.

When examining the strategic plans of all libraries, the common issue arising is the area of ICT management. Poor ICT infrastructure and shortage of equipment was considered problematical for most libraries, but especially for special libraries. Therefore, all libraries have made an attempt by writing an ICT strategic plan focusing on integrated projects to maximise the use of ICT at a corporate level within the limitations of their budgets.

Acquisition of electronic resources is also discussed in the strategic plans. As most libraries are heading towards an electronic library, librarians try to acquire electronic resources as the budgets allow, either by buying, subscribing, compiling free resources, or sharing these resources. An important strategy used by all libraries is allowing users to play a role in recommending new resources.

Another issue raised in strategic plans is how libraries can improve service efficiency. Users offer recommendations for improvement and a priority, other than ICT, is concerned with staff attitudes. Users see that librarians and staff lack

positive thinking and eagerness in providing services. Similarly, executives think that there is a lack of creative thinking among librarians and staff. A personnel problem lies in a lack of qualified librarians and staff with scientific backgrounds, as well as a shortage of permanent staff. A strategy, widely used to improve staff efficiency, is providing staff with training courses together with increasing their English proficiency which is considered essential in their profession.

Users are also included in the strategic plans of most libraries. The areas covering user aspects are communication, feedback, training and cost effective use of resources. Currently, most academic libraries in Thailand communicate with their users via Web tools such as e-mail, e-newsletters, Intranet announcements, and Web bulletin boards. However, most special libraries communicate with their users via traditional printed media due to a lack of ICT. Similarly, user feedback is also obtained via electronic surveys in some libraries while paper-based questionnaires seem to be more widely used in others. User surveys are considered to be important; they are used to obtain feedback in order to improve library services, especially in the libraries where service quality is monitored. Awareness of user education and information literacy has increased in most academic libraries where electronic resources and library automation systems have grown. Therefore, those libraries try to provide training courses to users to help them maximise the use of costly resources. Most academic libraries give an introductory course to new users at the beginning of an academic year, plus additional training during term time when there are new resources to introduce. Mobile training is suggested by one campus as a strategy to motivate users in accessing electronic resources. Most libraries attempt to evaluate the cost-effective use of electronic resources, which are used less by users in comparison to traditional print resources.

E-library transition is mentioned in the strategic plans as an ultimate goal for all libraries in order to move forward. Therefore, libraries must prepare themselves with appropriate support systems and digital collections. Many institutions are

digitising their in-house thesis and research papers, repackaging information to serve the needs of users of specific groups such as entrepreneurs, locating free electronic resources, and procuring more online databases, in addition to the ones funded by MOE. University libraries in the provinces are planning to set up a provincial consortium and library network and to improve the service by using a smart card – one card for all provincial academic libraries. Many special libraries have just started to introduce automated library systems for their users as well as to develop electronic databases of the research papers of their parent institutions. Some have strategies to expand their market to attract users from business and industrial sectors. E-commerce has been initiated in order to provide more convenience to users. In order to accelerate the shift towards e-libraries, the topic of organisational change and management has been raised in the areas of knowledge sharing, regional incorporated strategic plans, cooperation with the private sector, personnel development, outsourcing technical services, and strategic positioning.

8.4.4 What are the barriers to S&T information service development in Thailand? Are people aware of them, and how can they be overcome?

The situation of S&T information services in Thailand

As mentioned earlier, S&T information is generally provided by two types of libraries: academic and special libraries. Chronologically, the S&T information service sector of Thailand has developed as follows:

- 1986: The Provincial University Library Network (PULINET) was established.

- 1988: The Science and Technology Information network centre (STIN) was established by the Thai National Information System (THAINATIS). The network centre aimed to enhance the efficiency of the country's library and information sector concerning infrastructure, collaborative

efforts, and S&T resource sharing. STIN is one of the six networks that comprises different subject areas and has the National Library of Thailand (NLT) as a node to coordinate between academic and special libraries. MOST was a coordinator among STIN library members.

- 1992: The Thai Academic Libraries Network-Metropolitan (THAILINET – M) was established.

- 1998: THAILINET-M and PULINET were unified into the Thai Library Integrated System (THAILIS), acting as a focal point for academic libraries in government universities, and having UNINET as an ICT infrastructure support unit and the MOE as a funding agency. Even though these were merged into THAILIS, PULINET members still maintain their status as a provincial network in order to boost more collaboration among local members.

- 1998: the *Journallink* project was started to promote resource sharing among academic and special libraries focusing on the sharing of serials in order to reduce duplicate subscriptions and save budgets. *Journallink* is now coordinated by the Technical Information Access Centre (TIAC), one of the S&T information centres under NSTDA, and provides electronic document delivery service to library members and users.

STIN is a national S&T information network comprising members of both academic and special libraries from the government and private sectors, while THAILIS is the national network for university members only. When discussing the overall development of the S&T information service in Thailand, the focus is therefore on the roles and activities of these two networks. All interviewees agreed that the country has potential for further development; however, progress of S&T information provision in Thailand is slow.

STIN

Established almost 20 years ago as the first network organisation of the country, the development of STIN was viewed as slow and not able to keep pace with change in global ICT. The interviewees believed that these problems with STIN

were caused by a variety of factors. First, there is a lack of ICT infrastructure to support the information service provision. Second, due to a lack of ICT support, information resource management is also weak. The network lacks an interoperable system to access and retrieve resources between members and most information is still provided in print format, thus inhibiting the concept of networked resources. Interlibrary lending and document delivery services are very slow; failing to meet user demands. Thirdly, over the last 20 years of its existence, political turbulence and policy change by successive governments has caused STIN to struggle. It appeared that STIN members actively collaborated only at the beginning of the organisation's history. Later, collaborative activities gradually declined partly because government level understanding of the value of information services, and corresponding budgetary provision, itself declined. Moreover, the restructuring of the government sector since 2002 has had tremendous impact on STIN activities as many parent institutions of STIN libraries have been reorganised or even dissolved. These factors have hindered STIN developing new activities and achieving its original goals. Because of this, all STIN members were eagerly anticipating the new national information policy from the current government.

According to the results of the questionnaires, a large number of library personnel, including executives, managers, librarians and staff (seven of 25 executives, ten of 36 managers, and approximately 36 percent of staff) are not familiar with the network due to the low profile of STIN. A majority of STIN members are not sure if STIN is still active but understand that its activities have been temporarily suspended due to lack of direction and policies from the government. Without a computerised network, STIN provides only restricted information resources to members (photocopying service and manual document delivery). A number of STIN members are running a collaborative project to digitise the Indexes of Thai S&T journals, with the aim of providing a digital collection and online services in the near future.

The views of those interviewees who represented their institutions in STIN show that the level of collaboration among members is low and fails to meet their needs. There were few collaborative activities and no commitment to implementation. From the members' point of view, STIN has a problem of communication, as executives and representatives cannot motivate participation at the local level. Meanwhile, staff report that the mission and goals of the network are not well known. A lack of equality in participatory roles was also raised as an issue by some members, who claimed that decision making is by a minority of powerful members. Smaller institutions feel that large libraries are not willing to share resources and are reluctant to collaborate. It was also articulated by the STIN coordinator that she has found difficulties in asking for collaboration from large libraries. While some STIN members are not satisfied with the leadership of the coordinator, it is interesting to note that the coordinating institution sees itself as powerless and cannot cope with the strong individualism of some networks members. The interviewee who acted as the coordinator admitted that in this changing situation, their ability to operate was limited, unless there was a clear policy from the government and strong leadership from the National Library. Therefore, the problem has developed into a chain reaction as without the government's policy, only a small budget has been allocated and inadequate financial support is gradually eroding collaboration.

PULINET and THAILIS

One of the main projects of THAILIS is a consortium which licences online databases for academic and student users. Funded by MOE, the consortium is rendering services to universities both in Bangkok and the provinces. Other projects undertaken by THAILIS are union cataloguing of the academic library collection and digital collection of academic research and theses. All THAILIS members are satisfied with the consortium as the sharing scheme has encouraged collaboration and has helped to save procurement costs, as well as generating effective communications among members. This is also considered a remarkable development as most databases available are in a specific scientific discipline.

Moreover, the THAILIS consortium has an advantage in updating members with new skills and knowledge through many seminars, meetings and conferences.

However, from the PULINET members' point of view, the consortium services did not meet their expectations since its network was technically poor and the system was unstable. A problem of inadequate ICT was also raised and indicated as the weak point causing the network not to be as effective as it should be. In addition, restricted purchasing rules delayed the subscription renewal of online databases at the financial year end, leading to temporary service disruption. One important problem showing that PULINET members are not satisfied with THAILIS is the level of collaboration. From the interviews, they thought that members from the central region were not very active and not willing to collaborate in the resource sharing projects. Therefore, the PULINET members preferred to maintain a provincial network and provide supplementary services which could meet the needs of provincial users.

Journal Link

Member libraries thought that *Journal Link* services were currently satisfactory since the services had been improved to provide online electronic resources. So far, there are 204 libraries subscribed to *Journal Link*.

Barriers to S&T information service development

When discussing the current state of S&T information service provision in Thailand, library personnel were quite negative. There were weak points in the areas of collaboration at the national level, resource management and sharing, and ICT infrastructure. However, the government's new plans to promote R&D in both the public and private sectors provide new opportunities for the academic and scientific research communities, including the dissemination of research papers and ultimately long-term benefits for the library sector. Meanwhile, the challenge of electronic resources has been recognised more by the library sector,

leading to an increase of S&T information resource management projects in parallel with modernised access and retrieval technologies.

On the subject of how to develop the S&T information sector, results from questionnaire surveys of 25 executives of academic and special libraries show that the following factors are seen as the top five barriers to the development of S&T information service in Thailand (from the most significant to the least significant ones):

- Lack of collaboration between institutions;
- Lack of skilled personnel;
- Lack of clear institutional policy;
- Inadequate budgets;
- Lack of clear national information policy and lack of information management.

It is evident that library executives viewed collaboration between institutions as necessary and observed that the lack of it had tremendously hindered the development of the sector. With the attempt of providers to develop services through the networks, namely, STIN, PULINET, THAILIS, and *Journallink*, the findings of both the interviews and the focus groups were that resource sharing was an ultimate goal of the national development which could be achieved by consolidating collaboration among the information service providers. The factors causing barriers to the development are shown in three main categories: policies, resources, resource sharing.

Policies

There were concerns with three levels of policy:

- National information policy;
- Institutional policy;
- Institutional information policy.

It appears that a lack of a clear national information policy has an impact on the development of S&T information sector along two dimensions: intra-institutionally and inter-institutionally (see Figure 8.5)
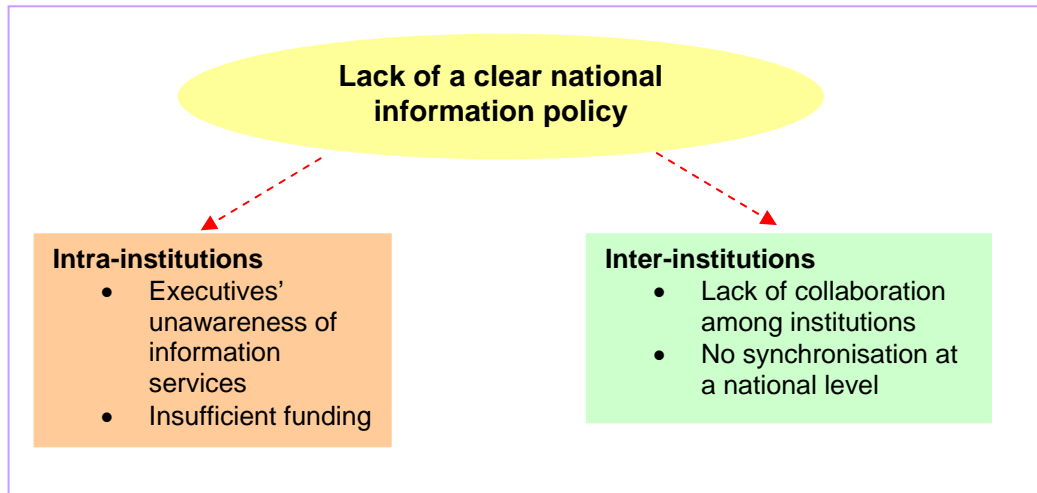
Figure 8.5 The impact of a lack of a national information policy on service development

Thus the lack of a clear national information policy, particularly for the S&T information sector, is considered to have an adverse effect on institutional policy as well as an institutional information policy. Unless the S&T information sector was addressed in a national information policy, awareness of information services was low among executives in institutions, leading to insufficient funding for service development.

Both the interviewees and the focus group participants agreed that the main cause of lack of collaboration and awareness originated from the unclear national information policy. Interviewees thought that the information policies of all S&T information providers should be integrated to ensure consistency. So long as the S&T information sector is still missing from the national policy, concerted effort in the S&T information sector of the nation can never exist. This is evident from the huge gap between development of academic and special libraries. Only large

libraries with sufficient funding, for instance in the academic sector, can procure advanced library automation technologies and resources and strive towards an electronic library whilst many special libraries, which are responsible for providing information to scientific researchers and industrialists, are struggling with old-fashioned services and out-of-date technologies and resources. In seeking synchronisation of the S&T information sector of the nation, the stakeholders are expecting the national information policies to be clearly written, define the roles and responsibilities of the parties concerned, and outline strategies for resource sharing between institutions. Some interviewees mentioned the policy of THAINATIS as a good example but as it was from almost two decades ago, it needed to be revised and updated. However, there has been so far no action from the government sector as regards issuing an appropriate information policy.

With respect to institutional policy and the institutional information policy, the policies of universities are more explicit in using information services as a means to promote research in addition to learning and teaching. Those of special libraries seem varied and ambiguous and there is a huge imbalance between policies and funding. According to interviewees, the policies were written with the aim of promoting R&D, but in practice, S&T information services were not recognised as important and only limited funding was allocated to the information sector, thus making them difficult to be implemented. The interviewees criticised executives' lack of background knowledge and understanding of library roles and information services. They thought this caused weakness in policy formulation as they rarely paid attention to the development of the information service sector and did not see its relevance within the institutional information policies or the R&D sector. Thus, in many special libraries, the information service is the last priority to be developed. This arises from the false perception that there are many free sources of information that librarians or users can access and retrieve.

Resources

Overall, both executives and library mangers were not satisfied with the current state of information services provided to end-users. This is evident from the results from questionnaires which show a low level of satisfaction because of the low quality and quantity of ICT and budgets allocated for the information services. The interviewees thought that low budgets were the root cause of difficulties in procuring resources and all aspects of development. Many libraries and information centres have found it difficult to make a transition from traditional to electronic services as this needs a high investment in an information management system, automated library technologies and electronic resources.

Apart from importing electronic databases from developed countries, domestic electronic resources also need to be developed. It was generally considered that there are many S&T research papers both from R&D institutes and universities in Thailand that have failed to be collected. This is due to the fact that there is no clear policy at parent institutions on this matter; hence there is no obligation for researchers to deposit their papers in libraries. Another cause is that researchers have their research papers printed in scholarly journals without informing librarians. This applies to preprints and grey literature which are difficult for librarians to manage. Moreover, all of these resources need to be transformed into digital formats in order to accommodate the service in a networked environment. In providing a domestic research database, the problem of intellectual property is considered as a major concern as an attempt to provide full-text databases has infringed copyrights of copyright holders. Open access to the full-text of Thai research papers is currently almost unattainable due to such factors as the confidentiality policy of parent institutions, terms and agreements of funding sponsors, copyright, or patent laws. The fact is that librarians have no authority to deal with researchers. Executives of the institutions were also not aware of the problems even though librarians tried to raise awareness. Apparently, there is no clear policy in relation to these matters.

Human resource issues were another topic that arose in the interviews and discussion. Staff shortage is the most severe problem and was found in most libraries throughout the country. Because the government has a policy of freezing the number of government officers, there is only a slim chance of recruiting permanent new staff. Yet, temporary staff can solve problems only for a short while. New staff also take time to train and learn new responsibilities. Lack of staff also has an effect on ICT personnel. Many institutions have a distinct need for ICT staff but cannot recruit them due to the government policy as mentioned earlier. Management has tried to solve the problem by training librarians or library staff with ICT skills but another problem occurred when those staff, particularly the seniors, were unwilling to update themselves with new technologies.

Executives and managers viewed it as essential to have their staff motivated to deal with technological change and the shift towards an electronic library. Management thought that librarians and staff needed to be trained in both ICT and professional skills in librarianship. They believed that librarians could deal with content development and service provision better than ICT staff, who understand only technical matters but lacked understanding in the S&T subject area. This is considered as a new role that librarians should acquire in order to eliminate negative attitudes towards the library profession as old-fashioned and lacking in initiative. Professional skills necessary for librarians are, for example, English language, and research proficiency. Librarians should be encouraged to do research themselves, particularly in the area of user needs and behaviours, as it is vital to service improvement and development of the overall S&T information service sector.

However, management thought that there were immediate problems to be solved. One was librarians' heavy workload which obstructed their chances of training or learning, and another problem was the negative reaction of senior librarians and staff to organisational change. It was suggested that there should be evaluation systems to measure performance improvements of staff after training. Some

library managers seemed unsatisfied with their executives' managerial competence and thought that the executives needed to be trained and enhanced with visionary thinking in order to create successful organisational development.

Resource sharing

Of the networks in Thailand, (STIN, PULINET, THAILIS, and *Journal Link)*, THAILIS and PULINET seem to meet the needs of members satisfactorily. Both of these networks are in the academic sector and provide access to expensive online databases. As it is subsidised by MOE, THAILIS does not suffer much from poor funding. THAILIS is considered as a great leap forward in service provision. However, it is still limited only to academic users. As for STIN, not many types of resources are shared as STIN has only partly adjusted to the new digital environment. Accordingly, members thought that STIN was weak in organisational development and failed to keep pace with ICT which, with numerous policy changes, has lead to degradation of the network and low-level collaboration among the parties concerned. So far, the only available resource sharing method among STIN members is hard copy interlibrary loans.

STIN has a low profile. The questionnaire revealed that seven of 18 library executives, 10 of 36 library managers, and 36 percent of librarians and library staff are not familiar with STIN. This is confirmed by the newly appointed executives interviewed, who said that they had no idea of STIN. Most interviewees said that there had not been collaboration so far; however, there had been member meetings to report the activities of each member library.

The *Journal Link* project is an attempt to share S&T scholarly journals subscribed to by academic and special libraries in Thailand among the scientific and academic research communities. So far, 204 libraries have been linked up in the project and members are growing each year. This is indicative of successful collaboration and users' satisfaction with the electronic document delivery service provided by *Journal Link*.

The results of a questionnaire survey of the group of library managers show that the most practical resource sharing scheme of academic and special libraries is interlibrary lending, followed by exchange of materials, production of union lists, union catalogues and bibliographic utilities, resource discovery system, staff training and cataloguing. It is noteworthy that licence agreements are ranked at ninth of the twelve resource sharing projects that the libraries have been involved in and collaborative collection and storing is the last. The results indicate that most libraries share resources via interlibrary loan and not many share agreements in the licensing of commercial online databases. This agrees with the finding that 32 of 36 libraries are involved with interlibrary lending schemes. Twenty-five of them are collaboratively produced union lists, union catalogues, and bibliographic utilities while six libraries have a plan to undertake such a project together. Similarly, 18 libraries currently share cataloguing while six more will share the same catalogue soon.

From the situation summarised above, it can be seen that resource sharing as well as collaboration is increasing in Thailand. Nonetheless, collaboration has faced some difficulties and needs to be improved in various ways. Library personnel who were involved in the questionnaires thought that significant barriers included unavailability of ICT, lack of skilled ICT staff for electronic access, lack of policy from parent institutions, lack of information about the S&T information network, system incompatibilities, restriction on laws and regulations, fears of unbalanced sharing, and high investment costs. This indicates that the most significant barriers lie in the area of policies and resources, for instance, ICT infrastructure as well as system compatibility, and finance. Other difficulties are attitudes (fears of unbalanced sharing) and management (laws and regulations, information of activities of STIN). It is interesting to note that executives and managers gave more weight to ICT, human resources, and an institutional policy while librarians and staff thought that they lacked information about the network.

Results from interviews have illustrated the barriers to resource sharing in greater detail.

Lack of policies on resource sharing

Policies also play a crucial part in the territory of resource sharing and, as in the overall S&T information service sector, there is a lack of resource sharing policies either at a national or an institutional level. This has a detrimental effect on awareness among the parties concerned and leads to poor funding. The interviewees thought that policies on resource sharing in many institutions were not clear enough for implementation or, sometimes, they were well written but not practical to implement. Politics was another factor that easily obstructed the policies. In many cases, the policies once written were rarely revised, so that they became out-of-date and not effective. The resource sharing schemes gradually dissolved. Where they did continue it was only because of good personal relationships among librarians or managers.

Special libraries which are STIN members suffer more from lack of resource sharing because STIN's activities are mostly suspended due to a governmental policy change. Moreover, executives of institutions did not give importance to the development of information systems and libraries as much as those in the academic sector. The interviewees thought that collaboration was aimless and the scope of sharing and types of resources to be shared were not clearly defined. This situation leads to difficulties in cross-institutional resource accessibility.

Lack of a powerful coordinating centre

The interviewees had experienced the weak performance of coordinating centres or hosting providers of the S&T information network in various ways. In fact, the government has attempted to establish coordinating centres for S&T information services but they seem not to be strong enough to manage the situation of resource sharing, especially in negotiating on matters of budget and financial support. Leadership of the National Library and MOST was criticised and the

interviewees desired that these two organisations should be empowered with full executive authority to develop the S&T information sector of the country.

Experiences of members of the coordinators include:

• **Loose collaboration.** Both members of THAILIS and STIN were not satisfied with the loose relationship among members. For instance, some of THAILIS members considered THAILIS as a buying club rather than a deep resource sharing consortium while STIN members saw STIN as having almost no collaboration.

• **Poor communication and relationship.** The disorganised environment of the S&T networks was revealed in communications and inter-organisational relationships. There seems to be communication problems between the coordinators and member libraries. Examples were found in the cases of slow or unresponsive replies from THAILIS or UNINET when the network failed to support the services. It was said that there was a communication breakdown between people who attended STIN meetings and local staff. Most librarians and staff of STIN were uninformed about policies and activities, leading to ineffective implementation and a lack of motivation to collaborate. There was also a comment that the atmosphere was rather authoritarian since the coordinator never supported the participatory role of members. Thus, members felt they had been disregarded in meetings and the decision making process. Gradually, they came to see no benefit in joining the network because they had no chance to suggest what they really needed. Poor communications also occurred in THAILIS because representatives in the consortium committee who were usually from central libraries did not update staff in branch libraries about consortium activities, thus resulting in dissatisfaction as well as eroding trust and collaboration.

Inter-organisational relationships were raised as problematic because members of THAILIS thought that its organisation was huge and loose, causing difficulties in collaborating. There were usually conflicts of opinion among members which remained unsolved. The most important point was that each member feared to be

dominated by others. This made provincial members think that they would prefer to maintain their local network and expand its linkages with other educational networks in the same geographical areas.

Inadequate resources to meet user needs

Library managers and librarians think that users' demands are unlimited and impossible for libraries to meet. In providing services to end-users, libraries always face a problem of inadequate resources either in ICT or information sources. For instance, in providing an online databases service, there were problems of a computer shortage and weaknesses in the network system. The growth of *Journal Link* is another example showing that user needs are difficult to serve satisfactorily within a context of proliferating resources through effective document delivery service. However, users in most special libraries are still demanding a variety of S&T resources other than scholarly journals and keep asking for the service of commercial online databases. This seems to be a weak point of many special libraries as they cannot afford to license them because of financial constraints. Yet, collaboration to establish a consortium among special libraries has not been discussed. Even though having long been established, STIN can sustain its collaboration only among special libraries because, many academic libraries which have been STIN members from the beginning, have now split off and become more active in their own THAILIS consortium.

The situation of inadequate resourcing seems more severe among special libraries as can be seen from their resource sharing schemes only being through interlibrary loan via photocopying. This service in general fails to meet users' demands and the following obstacles have caused the service to be evaluated unfavourably. Firstly, manual operation and delivery is too slow. Secondly, the loss of borrowed materials in the process due to loose controls also resulted in unwillingness to share especially from the libraries which lent. Thirdly, there was not good cooperation between universities in the provinces and Bangkok. Large libraries usually declined to cooperate and lend materials as they saw no benefit

in sharing. And, lastly, cooperation between central and branch libraries were very poor when the central libraries did not realise what resources were in the holdings of the branches. Users, therefore, were confused and had to wait longer until the problem was sorted out.

Moreover, borrowing of theses is not allowed in most libraries as there is usually only one copy in the collection; hence they are even unavailable for interlibrary lending. In an attempt to solve this problem by providing electronic full-text databases of Thai research, the issue of copyright infringement becomes an obstruction because some researchers do not allow their full-text papers to be open access. Special libraries which provide resources in the area of industry standards also faced the same problem as they had only one copy of those resources, thus making resource sharing impracticable.

Lack of a compatible information management system

A lack of technologies to locate resources in different libraries is an urgent problem that both academic and special libraries have encountered. The executives and managers stated that they required a standardised information system which could facilitate sharing. They made known a need for compatible software or an interoperable system appropriate for building a gateway to S&T information and supporting users from a single point of access.

Duplication of services

Currently, many S&T information providers offer the same types of services and information thus creating competition for funding, particularly between special libraries in the government sector. This causes difficulties in developing collaborative services because libraries view others as competitors and are not willing to work with each other. However, most special libraries are struggling with lack of finance.

Attitudes and work cultures

A number of attitudes and cultural differences were considered a hindrance to the environment of resource sharing. These include:

- Bad relationships between members and coordinators of the networks or consortia. Members had negative attitudes to those in leadership positions (e.g., coordinators). It is difficult for high-ranking members to accept and cooperate with one another.

- Too strong a sense of ownership. As resource sharing is one alternative that the library sector expects, it can help cut the costs of duplicate subscriptions and exorbitant prices of site licences and scholarly journals. However, in practice, most large libraries were unwilling to follow the rules. Having a strong sense of ownership, executives and managers decline to discard duplicate holdings (as they thought that they had large budgets to procure resources, they saw no benefit of sharing).

- Unwillingness to pay for information services. Some service providers and users perceived that users should not be charged for information. The notion of free information has driven executives to collect and provide information from free sources regardless of their credibility e.g., from search engines and believe therefore, that it is not necessary to spend money on resource procurement. Users also seek free information. An investment in information service provision is neglected because of this false perception.

- Misunderstanding of the nature of resource sharing. People think about collaboration as a voluntary or charitable activity. Therefore, the view is that no benefit can be earned from the resource sharing projects, leading to no incentive to share.

- Freedom lost. Most executives think that joining the sharing activities can ruin their freedom or power in a decision making process.

- Fears of unbalanced sharing. Two types of fears are found in the THAILIS consortium: first, library personnel fear that they have to share their own resources with others; and second, they fear that they will not

have an equal right to access to the resources that other libraries have. Some of THAILIS members asked for a right of equal access to online databases even though those databases were not useful to their users.

- Workload increase. Executives and library managers agreed that resource sharing projects actually increase workloads. However, where library resources of funding, space or facilities are limited, libraries need to head towards resource sharing.

- Resistance to change. It is difficult for senior executives to welcome change or approve new ideas of the younger generation. Instead, executives try to dominate the thinking and transfer their attitudes to junior managers.

- A lack of promotion of potential home technologies. The management favour imported technologies rather than home-grown ones regardless of their high prices.

- A lack of staff's creative thinking. From the management's view, some of their staff lack creative or analytical thinking, thus showing no competence in strategic planning. They also thought that some staff also lack a service mentality and avoid providing support to users.

User perception

An unsolved problem by most libraries in the consortia is interlibrary loan services. Users have an attitude of easy access to library materials and therefore only a few are interested in interlibrary loan services due to the long waiting time. Minimal collaboration among member libraries exacerbates the interlibrary lending, while inefficiency of the service is considered an additional impediment.

Poor information literacy was also thought to be barriers to resource sharing as well as S&T information service development. However, the interviewees thought it was not a severe problem. Academic librarians need to find strategies to change the information seeking behaviour of users, facilitating and educating them in using electronic resources cost-effectively. There are a large variety of users in special libraries, from researchers who are information literate and

demand more electronic resources to users from business and industrial sectors, who are less information literate.

User demand of free information was also a barrier to resource sharing. In many situations, users refuse to bear any costs pertaining to information services. They require libraries to support all costs, which librarians find difficult, as reliable information resources today are seen more as trading commodities than free of charge services.

Restrictions of rules and regulations

The rules and regulations concerning finance, purchasing and bidding are viewed as rigid and do not support resource sharing schemes. There are difficulties in promoting collaboration cross-institutionally due to restrictions of laws, and this leads to poor resource sharing between academic and special libraries.

The role of funding agencies in Thailand

It seems that funding agencies in Thailand played a small role in supporting research on information service provision or information systems. According to the interview results, most of the research projects funded were in sciences and social sciences of which results would have great impact on national economic development. Only a few projects in information services were funded. Thus, this could possibly indicate a low awareness of the development of the information sector in Thailand.

8.4.5. In relation to users within Thai S&T community, what is the extent of information literacy and what are the attitudes of and expectations for S&T information services?

Users' information literacy

Library users that participated in the research consisted of postgraduate students (33 percent), academics (26 percent), researchers (15 percent), undergraduate students (15 percent), research students (eight percent), and private sector staff (three percent). It is interesting to note that these users regularly used library services (31 percent once a week and 20 percent everyday). The type of services used was borrowing books or materials (86 percent) and use of periodicals/newspapers (65 percent).

While over half of users (59 percent) came to libraries to search the Internet, only 28 percent of users used the online full-text databases. It is also interesting to note that only 19 percent of users used interlibrary loan services. A higher number of users (76 percent) indicated that they preferred library resources in print format. This corresponds to user preference for information sources such as books, periodicals, and reference materials, in print format rather than electronic. Users also reported using print more often than electronic resources.

Even though a majority of users favoured print format over electronic ones, those same users prefer electronic searching to the traditional card catalogue giving reasons such as electronic searching was faster and more convenient. While users preferred this method, computer facilities provided by libraries were still in short supply. Users also thought that they were proficient in electronic searching even though results showed that only 60 percent of surveyed users said that they attended induction courses (library specific ICT training) provided by the libraries. When asked what types of training courses they desired when using library services, 80 percent of users requested courses in online full-text database searching, online database searching, online journal index searching, and Internet

searching. This indicates that users tend to focus on the use of electronic resources in the libraries.

In relation to the information literacy of users, the results from the questionnaire survey showed that users were well aware of the variety and quality of information sources and always evaluated currency, authority, and appropriateness of information.

In contrast to users' own view of their own information skills, results obtained from interviews and a focus group showed that library executives, managers, librarians, and policy makers in the funding agency thought that information literacy skills of users in the S&T research community were still inadequate. When comparing six groups of library users (research students, postgraduate students, undergraduate students, academics, researchers, and private sector staff), the interviewees revealed that researchers and academic staff were the most skilful in searching and locating electronic resources, while postgraduate and research students had a tendency to search more electronic databases (but only a small number were proficient in electronic searching). Undergraduate students preferred searching through a library catalogue or OPAC in order to find print materials. According to librarians, student users were not familiar with advanced searching technology. In general, regular and on-request training courses on ICT and electronic searching were provided by academic libraries, but it seemed that some users were not aware of the training. Even though most of them were skilled in using computers, electronic searching required understanding of the subject areas. It appeared that students used electronic resources only when required to do so by lecturers. Language was also found to be a significant barrier when accessing online databases as students seem to read English only when necessary. Other findings showed that users in small libraries asked for help or made enquiries more often.

Staff from the private sector, as well as users of special libraries who are industrialists and small-enterprise entrepreneurs, were found to possess low

information literacy skills. Librarians reported that those users lacked information seeking skills, especially in processing the information. Librarians found it difficult to meet their needs of this group as users had different expectations. They preferred an instant information package or immediate resolution to their business problems than searching through many research papers and processing the results. Librarians argued that this type of services needed library specialists or '*documentalists*' who were knowledgeable in multi-disciplinary research areas and could transform large volumes of information into precise packages.

However, the interviewees believed that the low information literacy of users was not a significant barrier to the S&T information service development and argued that the problem could be resolved by libraries providing training to users and promoting the use of electronic resources.

Users' attitudes and expectations

The results from the questionnaire survey indicated that users were satisfied with the overall quality of services provided by the libraries and also with staff effectiveness, the layout of libraries, communication media, and interlibrary lending services. Types of services which were not deemed good by users were service fees (even though they would get better services), and the range of electronic journals, printed journals, and books, respectively. The questionnaire results may have appeared more positive than is actually the case because the majority of users who participated in the survey used academic libraries (rather than special libraries), which offer a wider range of resources.

When asked to give comments on library services, users both from the questionnaire survey and focus groups provided additional comments on the following topics:

Policies and management

- Users requested more collaboration in resource sharing between R&D institutions, special libraries, and academic libraries, particularly in a consortium for joint-subscription to electronic journals and S&T online databases.

- It was suggested library personnel have more training on search skills in different S&T subjects.

- Users expected a central S&T library or national S&T information centre to be established, along with gateways to S&T information in Thailand.

- A central helpdesk collaboratively organised by academic and S&T libraries was requested in order to locate resources in each member libraries.

- Users also asked for research publications to be widely distributed to as many libraries as possible.

- Users suggested that the libraries play a greater role in developing research skills and information seeking behaviour in students. This should be undertaken in cooperation with academics in the departments.

- Users desired cross-institution searching which, so far, could not be fulfilled as the budgets of each institution were separately allocated; therefore, each library procured its own resources and provided services to users individually. The policies and agreements also did not cover the sharing of online databases.

Collection and acquisition of resources

- Users demanded continuous subscriptions to a larger variety of online full-text databases and electronic journals.

- Book collection was viewed as out-of-date.

- Other than books and periodicals, the reference collections were thought to be inadequate.

- Researchers asked for a special collection of international research on state-of-the-art of technology.

- Information resources for leisure were also requested.

- It was suggested that an S&T virtual library be developed.

- Strategies in acquiring library resources were recommended by users, for instance, organising seminars or meetings for librarians in specific subjects in order to help update new information sources, surveying user needs. With respect to electronic resources, it was suggested that there should be a needs survey to assure that those databases are really in demand.

- Users in special libraries thought that when full-text databases could not be provided as a result of inadequate budgets, libraries should subscribe to online abstracts of scientific journals which would help in exploring the trends of R&D.

- It was suggested that libraries, where online databases could not be provided, users should be provided with a list of free websites that they could access.

User services and training

- Users thought that the interlibrary loan services should be improved in respect of their interlibrary searching systems, resource locating, and delivery time.

- Publicity of interlibrary loan services was low. More advertisement was thought to be needed.

- Library usage skills were thought to be needed in the areas of searching, advanced searching and retrieval.

- Users thought that services at issuing desks (borrowing, reserving, and renewing) should be alternatively provided by the online system.

- Users viewed librarians as being unfriendly and not helpful especially in ICT support. However, it was commented by users that some users continued using traditional library services regardless of learning of new technology searching system.

Fees

- In general, service fees in accessing electronic databases in academic libraries were free of charge only to students and academic staff, but not to walk-in users. However, according to users, a range of charged services including fine fees, full-text online fees, interlibrary loan fees, and printing charges were considered expensive.

- Student users were against charging service fees for students. They thought these should be covered by tuition fees.

Equipment and facilities

- Users demanded more computers and audiovisual materials as queuing was used due to limited materials and facilities.

- Users of academic libraries required the clearer identification of the types of electronic resources available. They desired remote access to commercial electronic databases even though these were unavailable due to licence restrictions. They also suggested the use of THAILIS or UNINET to improve the capacity of the network as it was always down, unstable or the connection delayed.

- The problem of interior environment was raised in relation to light, noises, temperature, and cleaning. Users would have liked the library to be more spacious.

It is interesting to note that users agreed with the concept of resource sharing and expected the establishment of a consortium among special libraries. They suggested that libraries should put more effort into managing and settling reciprocal agreements which were acceptable to member libraries. Users felt that electronic resources should be shared. This indicates that users are interested more in using electronic resources but the problem has arisen that most special libraries cannot serve users' demand at this stage.

While there is greater variety of electronic resources, student users still require more training in advanced searching skills (some even ignored such resources).

Therefore, libraries have to find strategies to stimulate user awareness of electronic resources and consideration needs to be given to charging policies. A large number of users were unwilling to pay for information and thought that libraries, or their parent institutions, should support all costs of information services. Librarians believed this was a barrier to resource sharing and service development. Meanwhile, libraries continue to face financial constraints which have a great impact on developing services to meet user needs.

8.4.6. What would be appropriate information service models or roadmaps to aid the modernisation of S&T information service in Thailand?

In developing a national S&T information service, experiences from a number of developed countries, namely, the UK and the USA, indicate that resource sharing, either via consortia or computerised networks, is good practice for libraries or information centres (Hiremath 2001, p.82). Study of the developed countries also shows having effective national and institutional information policies is crucial for steering development (Prytherch 1998, pp.47-48; Nilsen 2001, pp.31-32; Law 2000, p.322; Smith 2002). Consequently, it is important for Thailand to adopt this strategy in modernising its own national S&T information service. Apart from issues around information policies and resource sharing, results from the interviews revealed that stakeholders suggested that a national S&T information centre should be established, which could be the focal point of development and act as a hosting provider. This national information centre could play an essential role in managing national information resources and in steering information service development.

The following discussion concerning service models will be based on the development of JISC, which has played a pivotal role in developing the national information service for UK academic and research sectors. The interviewees all agreed that an appropriate service model could be a networked library using an

integrated library system where members can locate, retrieve and access information resources in an electronic environment. However, the service models discussed in this research will not involve technical areas of setting up networks or computerised systems. Instead, it will focus on the strategic scope of developing a national information service based on the concept of resource sharing. The issues discussed include:

- Organisational positioning;
- ICT infrastructure;
- Library system development;
- Training and awareness;
- Electronic information resources
- Networking;
- Collaboration;
- Managerial strategies;
- User support; and
- Potential analysis of institutions which are eligible to be a hosting provider or network coordinator.

Organisational positioning

The roles of each stakeholder in the S&T information service sector of Thailand have not been clearly defined. As commented by most interviewees, while a national information policy does not exist, the mission of each institution will remain ambiguous, causing difficulties in creating a collaborative work environment. The interviewees believe a policy to be the most important part in developing the national S&T information service as it is used as a guideline for implementation, providing direction of implementation together with definitions of roles and responsibilities of the parties. The interviewees believe that once the policy is addressed, organisational positioning of each institution will follow in order to support the implementation. From the interviewees' point of view, institutions which need organisational positioning include the National Library, THAINATIS, THAILIS, PULINET, MOST, MICT, MOE along with any

institution which will act as a network coordinator or a hosting provider. For example, the interviewees thought that the role of the National Library in managing THAINATIS was not noticeable and its service was not meeting users' demand as large numbers of S&T information resources were missing. Similarly, THAINATIS recently lost its role in the development of the national S&T information sector, while PULINET seems to conflict with THAILIS concerning management issues and collaborative patterns. Some members demanded closer collaboration in the resource sharing scheme. Collaboration among Thai government departments was also viewed as a serious problem. Even though there has been an attempt to create more cooperation between MOST and MICT regarding development of S&T information service provision, the roles and responsibilities of each Ministry are not defined clearly. Lack of cooperation at ministerial level is also found with other Ministries such as Industry, Commerce, Energy, Agriculture and Cooperatives, and Natural Resources and Environment, which are also good sources of S&T information. This situation makes further implementation difficult. The interviewees saw that the e-government and knowledge-based policies of the government did not help much in development because the S&T information sector had been ignored. The status of special S&T libraries and financial funding were low when compared to academic libraries. Special libraries need to be enhanced in order to support the whole research community as, so far, academic libraries only serve the academic community. There has not been official and continual discussion about collaboration and resource sharing among special libraries of the government sector. Experience of developed countries, namely JISC of the UK, suggests that important roles which need to be defined are, for example, whether the parties concerned play a part in being consultants (for example a steering committee giving advice and guidance), project managers (conducting R&D and any information projects), or strategic partners(for example, other libraries and vendors).

An example of relationship between stakeholders can be shown in Figure 7.6.
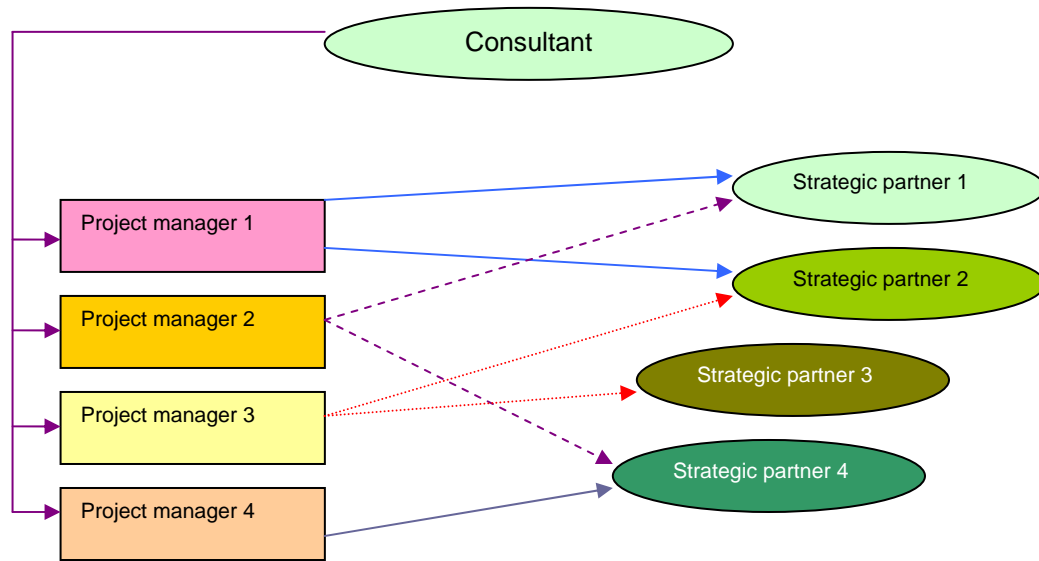
Figure 8.6 Organisational positioning and relationship of stakeholders

Figure 8.6 gives an example of a relationship in working collaboratively. Positioning of each institution needs to be defined in order to run activities under the role and responsibility undertaken. While a consultant provides guidance and direction of the development, each project will define its strategic partner(s), level of relationship, and scope of activities to be conducted collaboratively.

ICT infrastructure

JISC considers an information strategy as necessary for each institution to use as a guideline and for planning. It is also recommended that this should include an ICT strategic plan along with investment detail. In Thailand, even though the government has attempted to launch the National ICT Master Plan to be used as a framework in developing the ICT of the country as a whole, this Plan does not cover the issues necessary for the development of the S&T information sector. The role of MOST was also omitted. To solve this problem, representatives from the S&T information sector should participate in the ICT strategic plan formulation, either at a national or institutional level. At an institutional level, the ICT institutional plan fails to include the development of library systems and S&T information service provision due to lack of executives' awareness on this

matter. Evidently, some special libraries still provide old-fashioned services such as card catalogue, hard copy union lists, and print resources only. The ICT facilities are also limited as a result of low annual funding. An information strategy, therefore, will be useful in planning for investing in the ICT infrastructure.

Library system development

The interview results show that most academic libraries in Thailand have improved their services by using imported automated library systems while some special libraries are providing services using domestically-designed library systems. The reason for using this home-grown technology is the result of inadequate funding of these libraries. Having small budgets, most special libraries have had to buy automated library systems commercially that have been developed in Thailand, which have lower cost. However, some academic libraries in Thailand have stopped using the imported systems and started to develop the software on their own as they want to conserve their budgets and promote the innovation of home-grown technologies. This seems to contradict the attitudes of many library managers as they believed that the expensive imported systems were more reliable, convenient and standardised. Therefore, it is important for libraries in the S&T information sector to set policy on library innovation and discuss the trends in software and innovation development.

Training and awareness

Staff need to be introduced to the new environment they are going to work in. The results from the questionnaire surveys and interviews show that library staff currently possess adequate ICT and professional skills. The real problem lies in the limited numbers of staff causing heavy workload and preventing staff from participating in resource sharing projects. However, executives and managers expect their staff to play a proactive role in providing services. Therefore, other than ICT and professional skills, staff need to be motivated to work in a rapidly changing environment. They need to be aware of the challenges presented by new online technologies and should develop a positive attitude to its use, sharing

and benefits. The skills which librarians need most are proficiency in the English language and research methods.

Staff are of the view that executives and managers should be more aware of development of information service sector including library technology. In this area, the institutional policy is also a problem as staff and librarians thought that they did not have good support from parent institutions, particularly in wages, status, and academic promotion.

Electronic information resources

Major types of electronic resources in most research libraries in Thailand can be categorised into:

- Licensed electronic resources (databases, scholarly journals and books);
- Institution-owned resources (databases of in-house research, union lists, and lists of abstracts);
- Multimedia resources (images, audio visual products, software and CD-ROM).

The developing trend in the use of electronic resources in Thailand needs to be based more on the concept of resource sharing so that libraries can still maintain their quality of services in the midst of funding shortages. Comprehensive sharing should be promoted to include all sectors concerned such as academic and special libraries as well as other research institutions. Currently, academic and special libraries are procuring electronic resources in three ways:

- Acquisition of electronic licensed resources, such as electronic databases, journals and books. Academic libraries are more successful in providing this service;
- Digitisation of in-house research papers;
- Production of union lists of abstracts, which has been attempted recently in academic libraries.

These above projects are considered by the interviewees in this research as the most urgent that need to be developed, followed by the construction of subject-based databases. Moreover, librarians mentioned the problem of missing collections, especially research papers which in-house researchers sent to be published in scholarly journals without informing or sending copies to libraries. Preprints or grey literature, tacit knowledge and the expertise of staff, local wisdom, and knowledge from web bulletin boards are also another source of S&T information that librarians desire to collect in order to participate in organisational knowledge management. However, so far, librarians find it difficult to take actions which would promote knowledge management as there is no clear institutional policy in place. One solution suggested is to enhance the role of the National Library in order to deal with the national collection and to take ownership of Thai research papers as completely as possible. Librarians thought that the regulation requiring authors to send copies of their works to the National Library's collection needed to be enforced in a more strongly way to make it more effective.

Many special libraries suggest a programme of value-added information resources by developing instant information packages for users in the industrial sector and small businesses with low information literacy skills. This aims to enhance the cost-effective use of S&T information resources and meet specific demands of users. Meanwhile, some academic libraries have attempted to improve their quality of service by establishing subject-based databases in order to serve users more effectively.

Acquisition of electronic resources was one of the issues that the interviewees demanded a strategic policy from parent institutions. The interviewees said they needed a clear policy and strategy if they were to deal with the problem of duplicate subscriptions to expensive electronic resources. They also suggested a development programme of union lists or bibliographic materials to avoid wasteful duplication. Moreover, clear guidance and policies were thought to be needed to guide the acquisition of these expensive resources. A user survey

showed that users in special libraries want to participate in the process of resource acquisition in order to ensure that what they purchase meets user needs. Similarly, more comprehensive user surveys are suggested by library managers and librarians in order to ensure that electronic resources procured exactly meet user' demands and are cost-effective.

Networking services

First of all, Thailand needs the issue of S&T networking services to be stated in the national information policy. Considering the situation of the S&T information network, the S&T network members said they needed the policy to be revised in order to ensure active implementation and to receive more funding from the government. Members expected to participate in collaborative activities within the resource sharing programme in the real networked environment.

Technically, the networking services in Thailand still have problems with inadequate ICT infrastructure and facilities to support users. The low quality of ICT used in service provision is also a barrier to develop the networking services. So far, UNINET, the network for higher education in Thailand seems to be most successful in providing electronic services to the academic community. However, some interviewees in academic libraries commented that the UNINET network was frequently down and could not support heavy use of a large numbers of users, particularly in the searching of electronic resources. This system failure, thus, interrupts users when using electronic databases and journals and also obstructs cost-effective use of electronic resources. In most libraries, either academic or special types, ICT and facilities are still in great demand. ICT shortage is worse in most special libraries due to lack of policy and funding from parent institutions. In order to develop the networking library systems, it is necessary to invest in ICT. It is recommended that there should be an integrated ICT plan for the national S&T network in order to obtain compatible systems and ensure that the investment is cost-effective overall.

Users in special libraries demanded the S&T network to be established which embraced all research sectors; academic, government and private and industrial R&D.

Last but not least, many interviewees both from the library sector and users expected to have a specialised department in charge of developing gateways or portals to the national S&T information network.

Collaboration

Library collaboration in Thailand can be found in a number of activities of resource sharing. It is generally found in four types: document delivery service, interlibrary loan, consortia licence agreement, and bibliographic development. The level of collaboration, however, was viewed by the interviewees as low and disorganised, resulting from the lack of a clear policy from parent institutions, lack of clear agreements in operating collaborative activities and negative attitudes towards cooperation. This indicates that research libraries in Thailand need to steer towards effective collaboration. Apart from clear policy from parent institutions, it is necessary to set clear agreements on key activities, for example, document delivery service and interlibrary lending.

Document delivery services and interlibrary lending need to be improved in terms of resource location and delivery tools or technology. Moreover, results from interviews and focus groups show that time-consuming processes and long waiting times have made these two services unpopular. Therefore, the recent initiative taken by some libraries to participate in the *Journal Link* service has become quickly accepted by a growing numbers of libraries and their users. Services provided by *Journal Link* can be described as electronic document delivery service and resource sharing as each library in the project gives a list of S&T information resources it can share with other members. Services provided include both full-text databases of Thai S&T research and international scholarly journals. Even though there have been 204 libraries in the project, the interviewees expected to see more collaboration among these libraries,

particularly in the collection development of national S&T research both of full-text articles and bibliographic records, in order to provide one stop online services as users demanded. THAILIS's attempt to develop online union catalogue and union list of academic research, therefore, was a good start for the research community. It was expected that this activity would be undertaken by special libraries in the near future.

Apart from successful document delivery service provided by *Journal Link*, most managers and librarians also desired to maintain the interlibrary lending service as a benefit for users. However, this service needs to be improved in two areas: effectiveness (waiting time and cooperation among member libraries), and promotion of the service amongst its users. Furthermore, the policy and agreements among member libraries needs to be regularly updated. STIN is a case in point, as all STIN members have seen an erosion of the service generated from a lack of encouragement and continual policy updates from parent institutions. A project of using one smart card for all libraries as proposed by PULINET executives is a good alternative to improve the interlibrary loan service as it is more convenient for users to obtain the service from any library, particularly in the same geographical area. It was also suggested that the National Library should be more proactive with respect to the interlibrary lending service as librarians expected the National Library to possess S&T information resources and complete holdings of Thai research papers. Ideally, they wanted a the National Library comparable to those of the national libraries in developed countries such as the British Library in the UK.

Consortia licence agreement is another attempt through collaboration among THAILIS, PULINET and UNINET to provide an advanced service to higher education in Thailand. This service was mentioned as satisfactory. Only some issues were recommended to be improved which were concerned with the capacity of servers and network, and also cost-effective use. Recently, an interview with a THAILIS Consortium member of committee revealed that UNINET were trying to resolve these issues. However, there remains the issue of

poor user information literacy skills. According to managers and librarians, this problem is normally found in undergraduate students who are likely to be deficient in English language skills so most of them ignore English online databases. Librarians also called for more attention from lecturers to encourage students on this matter. Meanwhile, users in special libraries, who are the most frequent researchers, are claimed by librarians to have good searching skills and a greater variety of information needs, but lack opportunities to access licensed databases as a result of poor funding of special libraries. This problem, therefore, needs to be urgently solved in terms of national and institutional policies which could reflect a change of funding allocation. It is also necessary for the parties concerned to place this problem on the government agenda.

In providing document delivery services and running the resource sharing scheme, Thai research libraries have encountered a problem concerning copyright infringement, when some researchers disagreed with open access to full-text databases. As a result of business competition, researchers feared that their research would be used for commercial or industrial purposes while they had nothing in return. To solve this problem, many research libraries have collaborated in a bibliographic development project such as the development of a union list of research and union catalogue for users to search electronically and obtain a hard copy from libraries. However, this collaboration is more widely found in academic libraries (24 universities) while only a few special libraries are collaborating in these activities. The interviewees also expected to find practical solutions for copyright issues in order to make online full-text services available. One suggested solution is to follow a copyright fee pattern as practised in the UK research community where libraries charge a copyright or clearance fee for accessing full text from users (Jacobs *et al*. 2000, pp.139-148). It is possible that Thai research libraries might levy a copyright fee only on commercial users outside the academic community and the government research sector. Only authorised members could use the free service. This might create a fair deal between copyright holders, users, and libraries. In other ways, it could be a good incentive for researchers to conduct research for commercial and industrial

purposes and earn more benefits from their work. This could be an indicator of research trend and measurement of research quality.

One more copyright issue raised by the interviewees focused on fees for re-publication. This should apply to the reproduction of international textbooks which are highly demanded but too costly for small libraries to afford. It is suggested that libraries should bear the cost of copyright fees of re-publication. It is believed that this reduces acquisition costs.

It is necessary for the Thai research library community to set up a working committee to study these copyright issues, and find the best practice under the concept of fair trading which is acceptable amongst the parties concerned.

Managerial strategies

The key issues with respect to managerial strategies in this research include laws and regulations, governance, project management, evaluation systems, and strategic partnership.

• Laws and regulations

The interviewees agreed that laws and regulations in the areas of finance, budgetary management, and purchasing were too restricted and rather prohibited the development of information service provision. Most research libraries encountered the same problem of financial shortage due to budget cuts. Consequently, they were struggling with limited budgets. Among the options to address to these problems is resource sharing which is seen as being obvious from the academic sector. When compared to academic libraries, special libraries seem to suffer more with limited budgets and have less freedom in budgetary management.

Regarding this, relevant financial laws and regulations need to be regularly updated. It is necessary to eliminate the fixed budget categories and rigorous rules of purchasing which impede cross-institutional collaboration, especially of

different Ministries. Indeed, financial and purchasing rules should rather promote the pooling of budget for resource sharing purposes. Non-formulaic funding is another alternative to ensure flexibility in budgetary management. Purchasing regulations are another issue which need to be amended to accommodate the new management approaches, for instance, resourcing projects to improve work effectiveness and decrease staff's workload, e-commerce to offer convenient business transactions to users, and international business deals with international publishers to eliminate monopoly from domestic agents. As a result, an amendment of these rules is believed to be more supportive of resource procurement and quality of services.

• **Governance**

Governance in this context refers to the organisational administration in the realm of policy making, organisational structures, and organisational management.

With respect to the policy issues, there is a lack of policy making, both at national and institutional levels. Current policies are viewed as out-of-date or not covering all parties concerned. Thailand needs a clear information policy for all sectors including S&T information service provision. Hierarchical policies are needed at institutional levels to identify roles and responsibilities of staff at all levels. Participation of staff in policy making is considered important. However, separate demands that management and staff make of each other should be carefully balanced between them. Definition of staff's participatory role could help the management obtain better input from staff as staff are well aware of the contribution they can make in the decision making process.

Organisational structure is important especially when divisions or departments in the institution are merged or separated as this possibly means success or failure of the organisation in running its activities. For instance, some libraries have merged the IT division with the library, and have gained benefits from good cooperation while others have set up an individual IT division and found it

difficult to obtain cooperation. Therefore, the scope and authority of each unit or party concerned in the structure need to be clearly defined.

The critical problem of organisational management lies in change, which concerns values, attitudes, and the culture of institutions. Institutions need to eliminate negative attitudes towards sharing and creating an environment of user friendly services. At an inter-institutional level, management of networks or consortia also needs to be improved. The opinions of many network members reflected unsatisfactory experiences in the sharing of resources, strong sense of ownership, and a sacrifice of power or freedom. In this regard, concepts of consortia need to be clarified with acceptable practical criteria. More commitment is required from more members or staff. Uses of rewards and incentives could possibly help motivate staff to having a fuller commitment. However, since there is not a culture of punishment in the library sector and academic community, the use of sanctions might be a sensitive issue that executives need to be aware of when making a policy. Organisational communication is another area that executives have to be aware of when making a policy. According to the interviewees, meetings are the best tool for communicating a policy or in discussing its renewal or matters related to it. Staff are also satisfied with this communication channel because they can express their opinions in an open forum.

• **Project management**

It can be seen from JISC's development of national electronic information services that a large numbers of projects with clear policies and plans have been undertaken. Similarly, Thailand can follow this development trend by initiating projects of the same characteristics which are designed appropriately to the country's conditions. Skills in project management, therefore, are necessary to develop and bring about effective implementation. These skills are, for example, funding management, communication, planning, statistics, stakeholder management, and review and reporting on project performance. This is evident from JISC's experience when some projects were not successful because project

managers lacked skills in managing the projects (Pinfield 2004). It is also noted that having several projects of the same characteristics and objectives does not always mean overlapping work or responsibilities. On the contrary, this has advantages in yielding different approaches and varieties of experiences that staff can learn and share with one another.

• **Evaluation systems**

Evaluation systems for an implementation are essential. Evaluation ensures that policy and long-term strategies are implemented and driven in the right direction. Monitoring success and failure of organisations and projects also helps to fine-tune implementation processes and gain best results. Apart from organisational and project monitoring, proficiency of human resources also needs to be evaluated to ensure their effectiveness. The tool widely used in the library community in Thailand is the quality assurance system. This is applied to control, monitor, and measure the quality of services provided to users. However, it appears that, in an electronic era, manual tools employed to evaluate performance and quality do not match with the latest trends. Thus, measurements appropriate for a virtual environment such as E-metrics have been developed. White and Kamal (2006) view E-metrics as referring to "*both the electronic format of collected metrics and to the methods used for gathering metrics through electronic means.*" (p.2). They also define E-metrics as "*the data that is captured, collected, and analyzed to assess the behaviour of real customers who utilized a system of virtual electronic networked resources and services.*" (p.10) In the business sector, E-metrics are used to monitor e-commerce transactions, collecting data related to customer needs in order to achieve effective management and customer satisfaction. In the electronic library context, E-metrics can be used to measure transactions such as log-ins to library web sites or user interfaces, for example, visits, page views, downloads click-throughs, and click rates. They can also be applied to measure the cost effective use of online databases provided by libraries. Apart from being useful for library management and the resource sharing programmes for research purposes, these measurement systems can help identify and locate users as well as their particular interests in

diversified digital collections. Thus, libraries will know that operational aims, objectives and user needs are met.

One innovative system developed by scholarly publishers and intermediaries since 2002 is the project "COUNTER" (Counting Online Usage of Networked Electronic Resources), which aims to provide standardised statistical data on the use of online information resources. COUNTER is provided by vendors of electronic resources of both journals and databases. The outcome of COUNTER is shown in standardised sets of E-metrics reports, or so called the COUNTER vendor-supplied reports, which will present comparatively the frequency of usage of electronic journals and databases on a monthly basis. These E-metrics assist librarians in keeping records and interpreting online usage data based on the same standardised statistics and reports, hence are useful in developing the strategic planning on provision of electronic resources.

• **Strategic partnership**

Considering users' diversified information needs and behaviours nowadays, it is difficult for libraries alone to provide services that can satisfy all user groups. Having strategic partners is, therefore, a good alternative that can fulfil objectives of resource development, acquisition and sharing. This would result in a greater variety of resources and information sources, chances to learn new technologies, resource and knowledge sharing, and professional development. Given that the concept of building gateways or S&T portals is demanded, partnership is a crucial factor indicating healthy collaboration and the potential for success.

User support

Results from the user survey show that users in academic libraries are satisfied, in general, with the support and service provision they receive. Users of special libraries, however, made a large number of criticisms about the lack of information resources and of any innovations in the library systems.

However, when analysing information seeking behaviour and user needs, it shows that users both in academic and special libraries still prefer the print format to an electronic one. This is evident from the heavy borrowing of books and other printed materials (85.8 percent), as reported by questionnaire respondents. It is shown that users also go to libraries to use online resources such as full-text databases, journal indexes, and catalogues, but the findings from the research show relatively low usage of these; respectively they are 27.9, 27.5, and 23.6 percent. The use of interlibrary loans is also low, representing only 18.8 percent of users. (See Research question 8.4.5 for more details.)

In exploring users' information literacy, the results showed that library users in this research lacked information literacy skills. It is interesting to note that even though users tried to use electronic information resources, they searched more from search engines than licenced databases. This was viewed by some library managers that users were not aware enough of using electronic databases, thus causing ineffective exploitation of those resources. Some users, or even library executives, thought that searching from search engines was sufficient. They did not recognise the difference between search engines and licensed databases.

From the survey, users expressed their wish to be supported by libraries in the following categories:

• **Resources**

Most libraries should have a plan and strategy to acquire the necessary resources to run a service provision. The important resources, as demanded by users, lie in three types: ICT facilities, information resources, and human resource. In the case of academic libraries, users still desire more computers, work stations to access the Internet, remote access to these systems, printers, and photocopy machines. However, those facilities are even scarcely found in special libraries and over subscribed. Apart from this, users also need service innovation, for example, portals or gateways to S&T information, a central helpdesk in resource locating, and user friendly online catalogue searching systems.

Users would like libraries to provide them with more electronic resources such as e-books, e-journals, e-thesis (PDF files), and licenced databases. They also asked for a resource sharing project especially on subject-based collections and R&D papers both from R&D institutes and universities. In some universities, users demanded that libraries have resources covering all subjects or courses taught.

In the situation where users called for effective and friendly support from librarians and library staff, many libraries in this research mentioned their lack of personnel, particularly the ICT staff to do this. Furthermore, the staff they had still needed training or professional development courses in order to provide more effective services. The courses demanded include English language and searching skills. Librarians and staff also suggested having regular meetings or seminars in order to exchange their ideas and update themselves with new sources of information. Courses on developing positive service attitude were also recommended in order to create a user-friendly environment.

• User education

Apart from ICT facilities, users also need ICT support from librarians and staff. Users in academic libraries need more training in searching skills for online full-text databases and search engines. Interestingly, users said the provision of training courses was not well known, while librarians thought that users lacked awareness of the training courses on offer. Therefore, it is important for libraries to find effective communication tools to publicise training courses and make them more attractive. Some libraries attempted to solve this problem by providing mobile or on-request training. Given that some users still lack the ability to discriminate between the different types of electronic resources, evaluative skill training is needed to help users select appropriate information sources.

• Users' participation

Users expressed their wishes to participate in the process of resource acquisition and help in the improvement of services. They considered surveys as the best

means by which they could participate in either improving quality or the purchasing of resources. Concerning resource acquisition, users in both academic and special libraries wished that there would be a survey to discover what types of resources users really needed. However, some libraries have already conducted this kind of survey under a quality control system.

• **General services**

Other support users needed from libraries included the provision of one-stop services among academic libraries (one card for all), online borrowing, reserving and renewing services, free access to the Internet, less waiting time for interlibrary loans, remote access to services, more attractive advertisements of new resources or services, and longer service hours. It is remarked that most libraries in Thailand still do not use barcodes and sensors at the entrance or exit; therefore, users are not allowed to bring books and bags into the libraries. This was reported by users as an inconvenience. In addition, users want more reading space and study area as well as appropriate layouts and a good environment, for example, lights, noise, temperature, and cleaning were all issues.

It is interesting to note that users of academic and special libraries in Thailand have become more enthusiastic in exploring and using S&T electronic resources. However, their attention to skills training and level of information literacy are not satisfactory in the view of librarians and staff. This lack of skills and information literacy is considered a common problem for which many libraries need to find strategies to provide education to users and thus make more cost-effective the use of the increasing numbers of electronic resources. Some librarians wished that they could have more cooperation from lecturers who could '*force*' or convince students to use more information sources, especially electronic ones, when writing their projects or research. It is additionally noted that students need also to enhance their English language skills. When compared with users in the developed countries, namely the UK and the USA, users in those countries use English as their own language while Thai users prefer to find

information sources in Thai. This limits users' use to Thai resources as they are unaware of the wide variety of English information sources available.

• **Service fees**

Appropriate business models in service provision are another area that libraries need to focus on, as the survey results showed that the majority of users had a negative attitude towards service fees even if they would provide better services. Librarians viewed this as prerequisite to improving services in the current environment where commercially available information resources tended to be extremely expensive. Therefore, it is important for libraries to evaluate their own financial capability to support users or to decide how prepared users are to bear service costs. Given the fact that good quality information is necessary, it is important for users to begin to understand that they have to pay for resources if they want a good service. To this, end user training projects should include the real life situation of worldwide information services in order to help users to gain a better understanding of the costs of providing information.

However, the user survey conducted in this research can give only a rough overview of users' behaviours and needs. More comprehensive research on users is recommended to be undertaken if the successful development of these resources is thought to be important. This is evident from a large number of JISC research projects on users, together with library performance measurement and effective provision of electronic information resources. In conducting these research projects, diversified research tools and methods, for instance, questionnaires, transaction logs to investigate trend in behaviours of users, observations, interviews (face-to-face, telephone or e-mail), and focus groups should be used in order to obtain in-depth information for any further decision-making process. The scope of these investigations should include the products libraries offered to users (for example, electronic databases, and other electronic resources), service fees charged to users (admission, printing, photocopying), accessibility (on-site or remote access), support from libraries, users' preference

of electronic resources, for example, search engines, emails, e-databases and bibliographies, e-journals, CD-ROM, and e-multimedia resources.

It is also interesting to note that the research library community in Thailand should focus more on the trends of long distance learning or lifelong learning offered by higher education. In this regard, libraries must play a vital part in being a resource centre or an e-learning hub, and providing remote access for off-campus users. This is considered important for Thailand in its strive towards a knowledge-based society where people have equal chances to learn and access knowledge.

Potential analysis of institutions which are eligible to be a hosting provider or network coordinator

This section will discuss the potential of existing organisations in Thailand, in order to compare the possibility of these organisations playing a proactive role as a national system and network provider.

Earlier discussions have discussed the roles of STIN, UNINET (THAILIS and PULINET), and NSTDA (*Journal Link)* as national providers of information, here they are discussed in terms of their potential to provide a national information system and network for Thailand. Three key institutions which could fulfil the role of network provider include:

- STIN – S&T information network for members both in academic and scientific research sectors;
- UNINET (THAILIS) – S&T and social sciences information network for the academic community;
- *Journal Link* – Document delivery services based on S&T journals, full-text papers and some S&T databases which can be accessed online. *Journal Link* is hosted by NSTDA to provide web-based document delivery services to both academic and special libraries.

433

Potential of STIN

Compared to UNINET, STIN has lower ICT potential to be developed as a network provider. However, if STIN could restructure some of its activities and concentrate on developing its policies, in terms of organisation and direction, it could be a potential network provider. Strong points in favour of STIN are apparent in its good organisational structure and the diversified nature of its member libraries. According to the interviewees, at an early stage, STIN had a clear vision and mission with clear policies. The organisational structure of STIN involves key institutions and libraries of various research sectors, for example, academic, government R&D, and industrial representatives. This generated a good chance to be developed as a national S&T centre. STIN also has an advantage in owning rich information resources obtained from a large number of R&D projects under MOST, which is known as a key coordinating organisation of STIN members. Recently, there has been an attempt from MOST to accelerate the E-library Project in cooperation with MICT.

However, the weakest points of STIN, as discussed in the interviews of STIN members, were shown in these areas:

- lack of continuous development;
- lack of ICT support;
- lack of strong leadership by the coordinating organisation.

When first instituted almost 20 years ago, STIN had an excellent policy and mission at that time although a computerised environment had not been ubiquitously developed. Unfortunately, the development of STIN gradually declined as political changes occurred and the national information policy addressed earlier was not carried out by later governments. Therefore, STIN's role has gradually been eroded due to lack of budgets and clear direction. This situation hindered the acquisition of ICT facilities to support a computerised, networked system between members. As mentioned by interviewees, this partly resulted from a lack of strong leadership by the coordinator. Furthermore, poor communication and relationships caused poor collaboration among members.

Finally, collaborative projects declined and each member started to develop and provide services individually.

According to the interviewees, it would be possible for STIN to host the network provided that the coordinator made more effort to lead and consolidate the network by creating a participatory environment. The major difficulties needed to be tackled included individualism against resource sharing, budget allocation, ICT support, system and standard development, research funding, and consultancy services.

Potential of UNINET

UNINET is in a better position due to having ample funding and resources. Funded by MOE, UNINET was established as a network hub for academic libraries of Thailand HE in coordination with THAILIS (THAILINET-M and PULINET). The library consortium of THAILIS was considered successful in providing electronic databases and is generally regarded as satisfactorily meeting the objectives of resource sharing. During the data collection period of this research, UNINET had 24 members from universities from all regions of Thailand. As a result, the network and the consortium have been developed, integrated and consolidated rapidly. UNINET has clear policies and direction in providing library and information services to support learning, teaching, and research for academic community. Furthermore, it has a plan to include other educational institutes, for instance, vocational colleges and private universities. This indicates that UNINET has the potential to extend its services and be developed as a central node to provide networking services. With respect to funding, UNINET is mainly subsidised by the government (MOE) while THAILIS's budget partly comes from tuition fees paid each year. This makes UNINET and THAILIS financially stronger when compared to the special library sector. Integration between THAILINET-M and PULINET has made THAILIS and UNINET stronger in terms of resources and funding. With this in mind, UNINET might be considered as having a high potential to be developed as a

national network undertaking comprehensive resource sharing projects in cooperation with special libraries in the S&T information sector.

According to the interviewees, a weak point of UNINET only lies in the occasional system failure, thus interrupting its services. As for THAILIS, some members thought that poor collaboration, negative attitudes towards resource sharing, and organisational management were the problems that needed to be solved. This is evident from relationships between PULINET and members of THAILIS in the central region.

Potential of *Journal Link*

Journal Link has its strong points in its richness of serials compiled from 204 member libraries for pool use among academic and research communities. A union list of S&T serials having been developed to help locate scientific journals is viewed as an excellent tool in providing a web-based document delivery service. Members thought that *Journal Link* services were convenient and could meet the needs of users, particularly scientific researchers, who, in general, prefer to use journals as their information sources. Furthermore, electronic databases in medicine, agriculture and S&T compiled from Thai journals have been developed and provided to members.

So far, services of *Journal Link* have been limited to only the document delivery of serials and full-text papers from databases of some particular subject areas, but it is possible for *Journal Link* to expand its service and develop collaboration with other networks and information providers in order to provide full-scale services electronically.

Proposed service models

From the analysis of organisations providing networked information services in Thailand, there are currently three networked centres which have good potential to be a hosting provider of an S&T information service. It is worth noting that these networks have both strong and weak points, clearly some of which,

particularly the week points need to be enhanced or improved depending on the networks' potential and the policy of the government. From the analysis, four service models are proposed in this research along with preliminary roadmaps for the development of service models suggested by interviewees and the surveys answered by users of the different networks.

Model 1: STIN as a hosting provider

The model having STIN as a hosting provider can be shown in Figure 8.7.
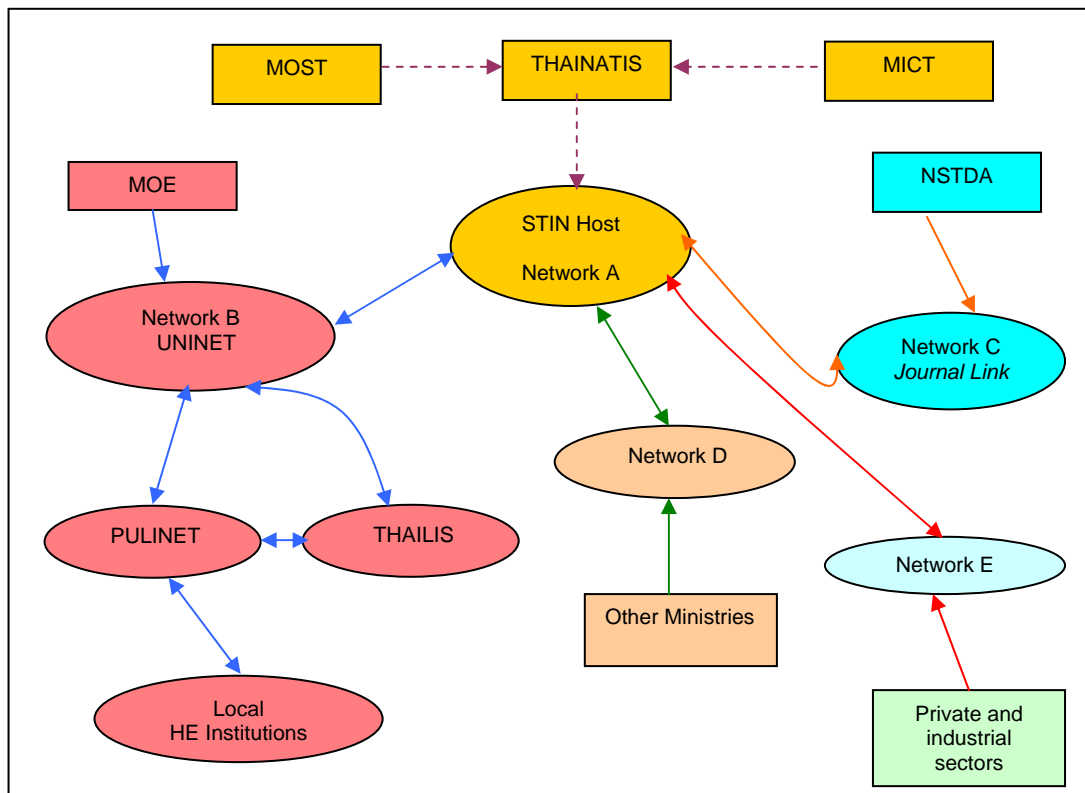
Figure 8.7 Model 1: S&T and ICT Ministries as a hosting provider

The model shows that STIN would be managed by MOST in cooperation with MICT. As STIN was originally established and supervised by THAINATIS, the dashed lines between THAINATIS and MOST and MICT suggest that THAINATIS might be able to continue the supervision of STIN in cooperation

with MOST and MICT. However, due to its declining role, it is necessary for the THAINATIS management to review its status and decide whether the organisation is still valid and able to carry on its activities in a more proactive manner. Decisions about the future of THAINATIS would require policy at the national level to be revised and a new management both for THAINATIS and STIN would need to be put in place. From the restructured government sector, the status of STIN members also needs to be reviewed to confirm the position of existing members or, if necessary, recruit new members.

Model 1 shows that STIN would act as a backbone network for the country (Network A), linking with other S&T information networks including the networks of academic libraries (Network B: UNINET of MOE), *Journal Link* (Network C), special libraries and S&T information centres of other Ministries (Network D), and those of the private and industrial sectors (Network E).

Double-headed arrows represent connection between networks while single-headed arrows show relationships between parent and subordinate institutions. The dashed lines with single-headed arrows show the possibility of collaborative management between institutions to perform activities.

Network A includes special libraries, documentation centre, and information centres under MOST; Network B (MOE/UNINET) includes academic libraries under THAILIS, PULINET, and other networks of higher education and further education (Ratchabhat and Ratchamongkol Universities) as well as private universities. Network C includes TIAC and *Journal Link* - web-based document delivery services of S&T journals; Network D includes special libraries in the Ministries concerned, namely, Commerce, Industry, Natural Resources and Environment, Energy; and Network E includes special libraries of the private R&D sectors, professional institutes and industrial centres.

Model 2: UNINET as a hosting provider

Figure 8.8 shows UNINET, a network under MOE as a hosting provider.
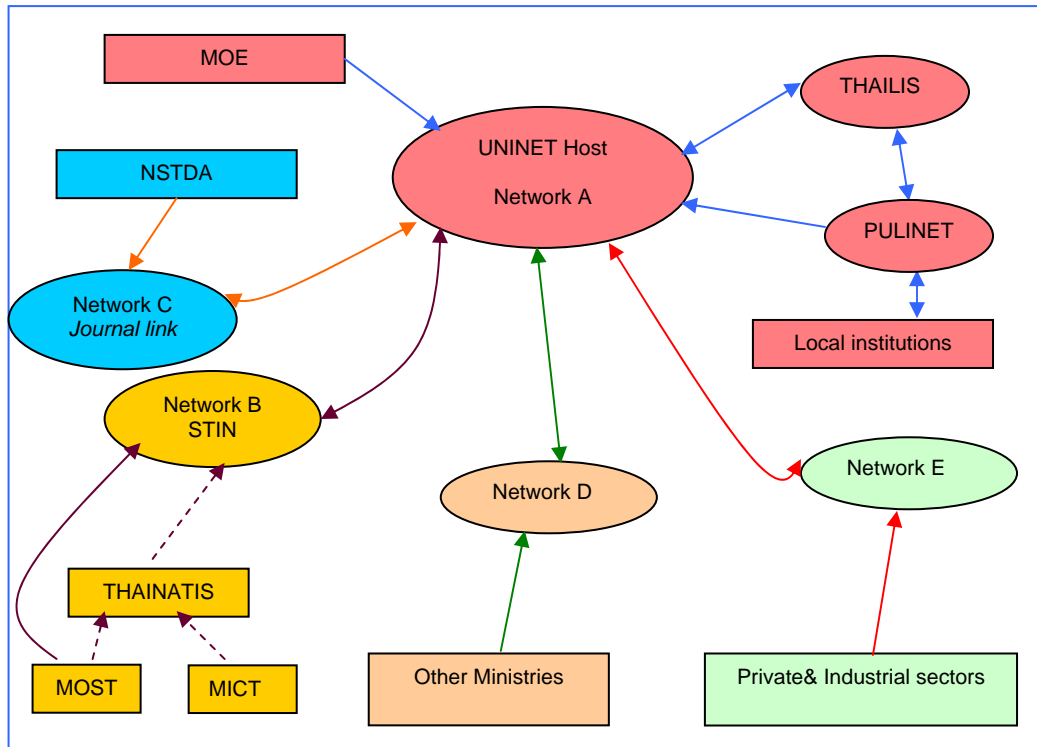
Figure 8.8 Model 2: Education Ministry as a hosting provider

Figure 8.8 depicts Model 2 having UNINET of MOE (Network A) as a hosting provider and backbone of the national network. UNINET, then, is connected with other clusters of networks, namely, STIN (Network B), *Journal Link* (Network C), other Ministries (Network D), and Network E of the private and industrial sectors. Arrow symbols indicate relationships among institutions and between institutions and networks as given in Model 1.

Model 3: *Journal Link* as a hosting provider

Figure 8.9 shows *Journal Link*, a networked S&T journals and databases under NSTDA as a hosting provider.
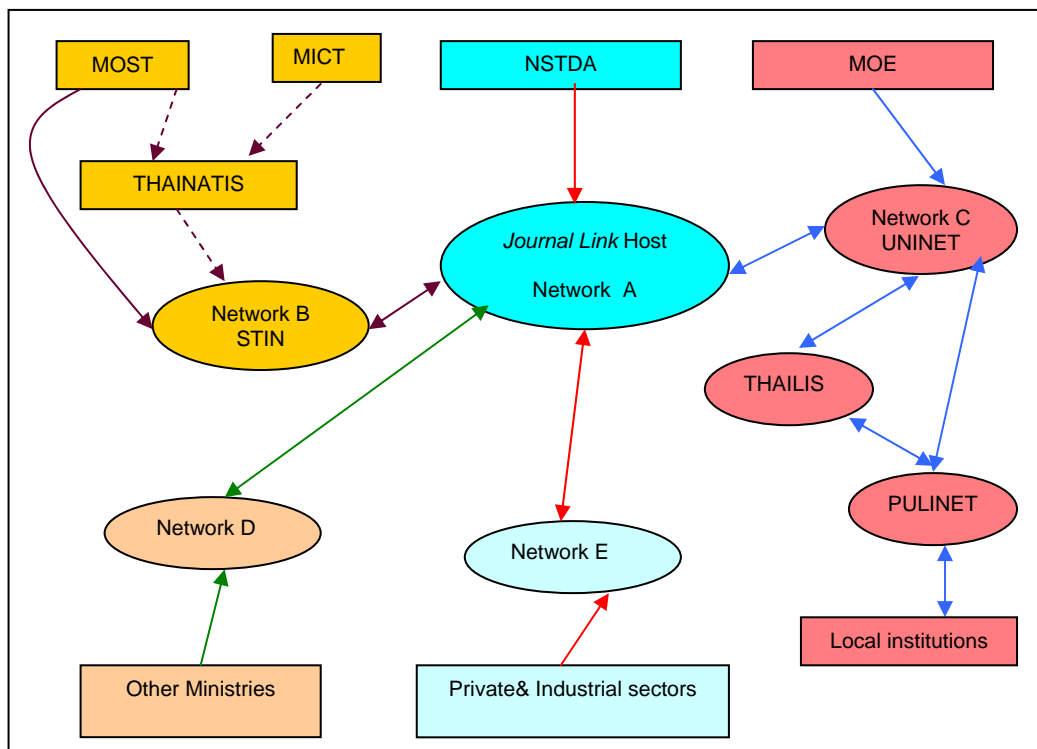
Figure 8.9 Model 3: NSTDA as a hosting provider

Having *Journal Link* as a hosting provider, relationships between networks and institutions as well as service models, makes this arrangement similar to Models 1 and 2. The *Journal Link* host is managed by TIAC, an S&T information centre under NSTDA.

Model 4: Synergistic hosting providers

As the term "synergism" is defined as "an interaction of discrete agencies (as industrial firms), agents (as drugs), or conditions such that the total effect is greater than the sum of the individual effects" (http://www.m-

w.com/dictionary/synergism), a synergistic hosting provider in this context refers to a collection of S&T information services which is organised and established as a national agency embracing all the key stakeholders in the S&T information and academic sectors in order to collaboratively manage the resource sharing schemes in Thailand. This approach was viewed by most interviewees in this research as a critical factor in accelerating the development of the S&T information service provision of the country. Figure 8.10 shows Model 4 depicting a synergistic approach by the hosting provider derived from collaboration of all the key stakeholders involved with S&T information service provision for academic and research communities.
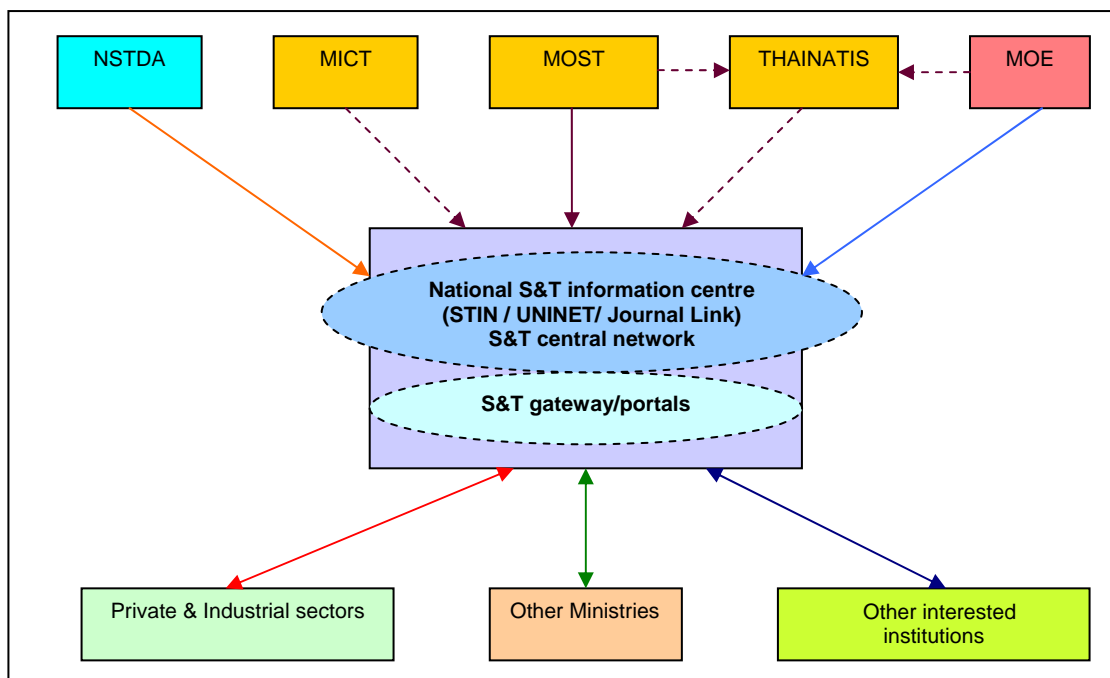
Figure 8.10 Model 4: Synergistic hosting providers

The key activity of this model would be to establish a national S&T information centre to act as a national node and seek cooperation from information providers including MOST, NSTDA, MOE while MICT and THAINATIS would be the other stakeholders concerned with ICT infrastructure and strategic policies, respectively. Model 4 shows how STIN, UNINET, and *Journal Link* could collaborate under a central or backbone network for the country, providing S&T

information services to other sectors, namely, private and industrial sectors, other Ministries, and other interested institutions. This central network would act as a gateway or portal to S&T information and provide a one stop service as demanded by users.

Preliminary roadmaps for the development of Thailand S&T information sector

In developing a national S&T information sector, roadmaps for each model are drawn in order to identify the key steps of activities necessary for achieving goals of the development. The roadmaps were developed based on a strategic roadmap defined by Allen (2005) as "*a coordinated and comprehensive longitudinal strategy that identifies key objectives and time-phased implementation elements, potential achievements, priorities, options, and decision points and criteria*". Allen (2005) also states that essential roadmap elements are consisted of:

- Goals, priorities, recommended activities or investigations, and a summary of anticipated discoveries and achievements;
- Suggested implementation approach and mission sets;
- Milestones, options, and decision points;
- Key dependencies and relationships of projects or activities;
- Required capabilities, facilities, human resources, technologies, and infrastructure.

This is similar to Tate's suggestion (1993). The author stresses that the roadmap should provide:

- A global timetable of expected capabilities and results in terms of the overall aims and benefits, the technology capabilities and the support requirements;
- A specification of the relationship between individual efforts in the overall programme and the roles that each effort is expected to have in achieving the overall aims;

- A framework for coordinating the activity within the programme, allowing the measurement of overall progress.

However, due to limited information and the research timeframe, only preliminary roadmaps for the development of Thailand S&T information sector are proposed in this research. Initially, the roadmaps can be categorised into two levels of implementation: national and institutional levels.

National level

A roadmap to develop the national S&T information services of Thailand is presented as a five-year programme. However all initiatives and projects are expected to be finished within one year, and later, it would be the phase for projects evaluation and revision of necessary issues such as review of the NIP.

Priorities of the initiatives are as follows:

1. To set up a steering committee. The main task of this committee will be to put forwards and promote a national information policy (NIP) that is supported and included in national agenda. The committee should be formed by representatives from each Ministry providing S&T information services and include other representatives, for example, MICT, MOST, MOE, Ministry of Industry, Ministry of Commerce, Ministry of Energy and Environment, academic libraries, and special libraries of the private sector (for example, professional institutions). The steering committee should have a responsibility for selecting host and overseeing the development of the national S&T information systems and services.

2. To set up working committees for defining the roles and responsibilities of all stakeholders. Stakeholders are likely to include the supervisory body, S&T information centres, funding bodies, project managers and counterparts, and the hosting provider.

3. To implement the national information policy and monitor its implementation.

Priorities of the above initiatives are shown as a roadmap diagram in Figure 8.11.
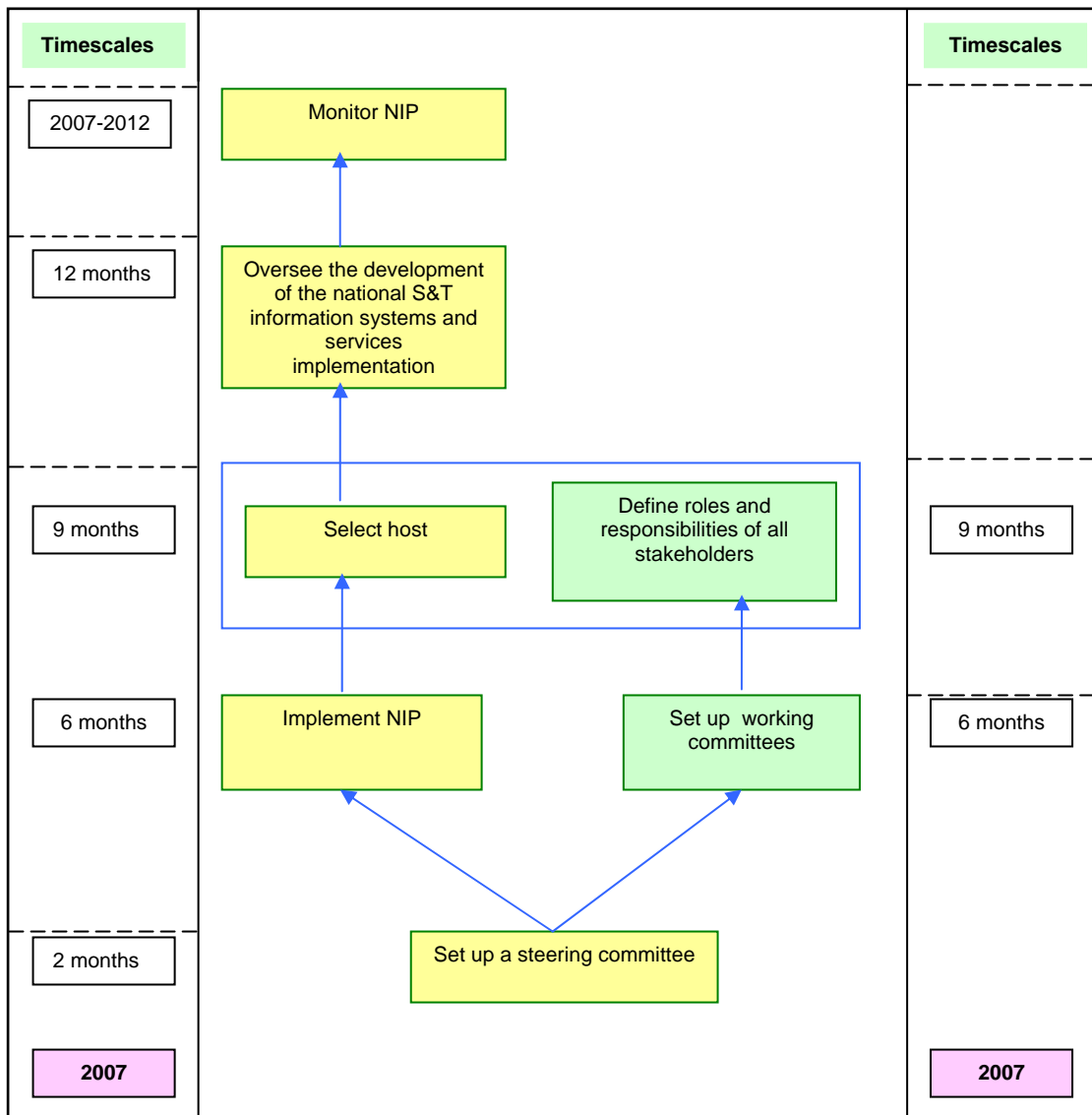
**Figure 8.11 A roadmap to the development of the national S&T
information service provision**

Figure 8.11 shows the order of initiatives and activities to be undertaken starting
from the bottom and working towards the top of the diagram. At the national
level, the key objectives should include:

1. To set out a national information policy;
2. To select a host for managing the resource sharing programmes;
3. To develop a national S&T information system and its services in order to
   promote the resource sharing;

444

4. To monitor the implementation of the NIP in order to gain the necessary achievements at an institutional level.

The arrow lines represent dependencies between specific projects and initiatives. That is to say, initiatives should have been completed first, and then the other projects at the upper level could be carried out. Timescales are also identified in order to allow for the assessment of each phase and the measurement of overall progress.

Institutional level

The four models that are proposed illustrate the situation how the S&T information services in Thailand could be developed in an environment of networking services and resource sharing. The development at an institutional level mainly concerns policy matters and organisational management of a supervisory body and member libraries. In general, there are five phases of development in the roadmaps but each is slightly different at the first phase in terms of a revision of policies to accommodate change and to meet all the needs of members.

Model I: STIN as a hosting provider

The initiatives required for STIN to become a hosting provider can be described as follows:

1. To set up a steering committee and working committees to revise STIN policies and to formulate an information strategy.
2. To restructure the STIN organisation by reviewing the list of current and potential members of STIN. The working committee should also review the laws and regulations related to aspects of collaborative services and resource sharing.
3. To develop a core information strategy or an institutional policy.

4. To develop communication strategies on the basis of interactions between management and staff in order to achieve effective implementation, then communicate policies and strategies to all levels: management and staff.

5. To implement policies.

6. To conduct a needs survey for development projects, for example, on ICT infrastructure, hardware and software for interoperable systems, collection development, consortium development, networking services, and resource sharing including electronic resources, interlibrary lending and document delivery services.

7. To define roles and responsibilities of the involved parties with the development projects including the supervisory body of STIN, S&T information centres, project managers and counterparts, and a hosting provider.

8. To make reciprocal agreements among members in sharing resources.

9. To discuss reciprocal funding arrangements between organisations.

10. To provide financial resources as necessary for operating projects and to promote the sharing of resources.

11. To organise training courses of relevant topics for members, for instance, change management, professional development, attitude development, and user education.

12. To monitor the implementation and evaluate all the programmes, projects, and activities.

Priorities of initiatives and projects are shown as a roadmap diagram in Figure 8.12.
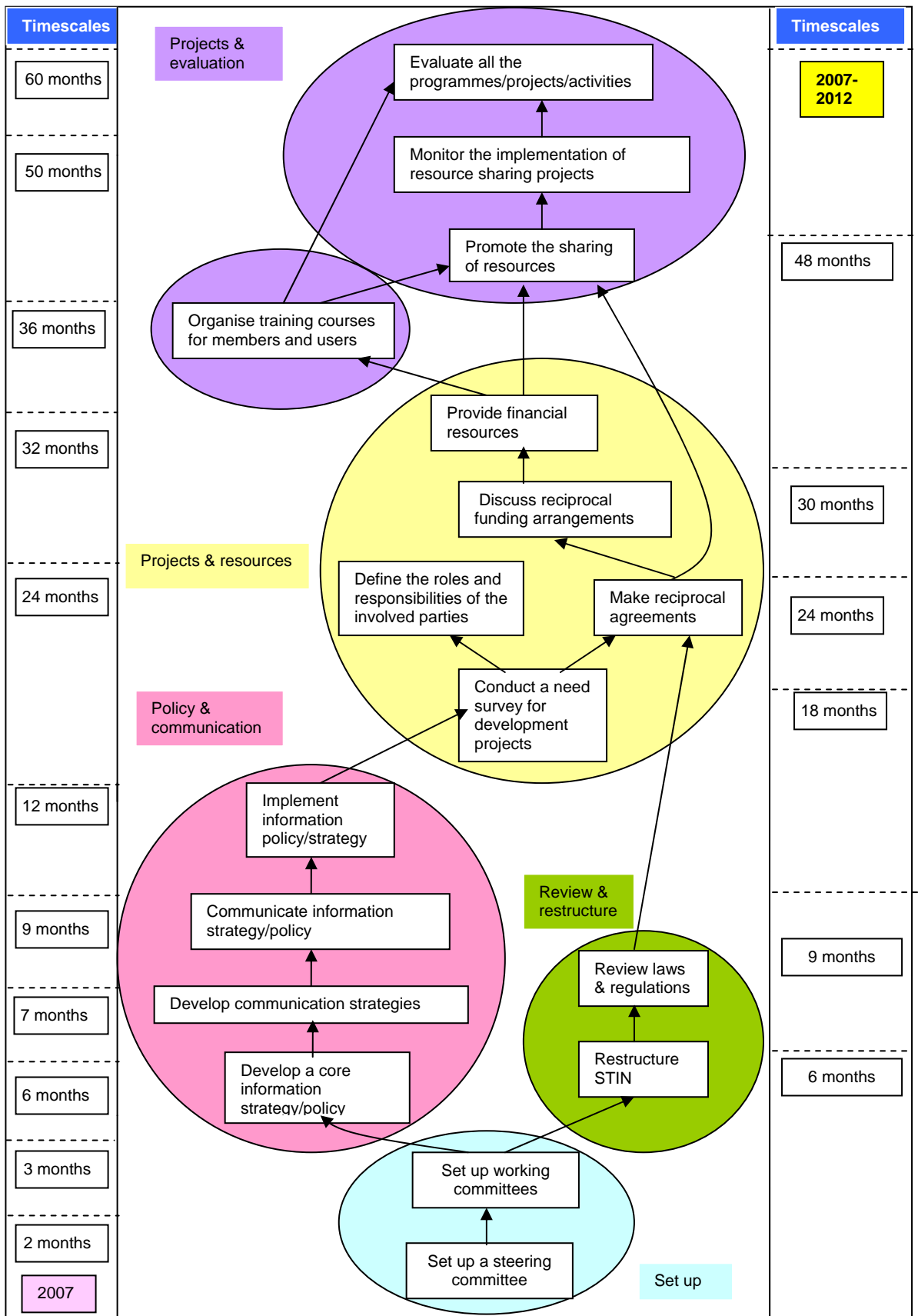
Figure 8.12 A roadmap to the development of STIN as host

Figure 8.12 show five phases of initiatives which include set up, review and restructure, policy and communication, projects and resources, and projects and evaluation (as shown in each circle). The initiatives, by priority, start from the bottom of the diagram and move upwards to the top. The arrow lines show dependencies between specific projects and initiatives. In other words, projects should be run from the lowest box to the upper ones as projects or activities in the lower boxes could help to achieve those in the upper ones. Timescales are also given in order to allow for the assessment of each phase and the measurement of overall progress. The dashed lines represent the timescales of projects/initiatives for both sides.

Model II: UNINET/THAILIS as a hosting provider

The initiatives required for UNINET/THAILIS to become a hosting provider can be described as follows:

1. To set up a steering committee to review the situation and availability of members. Initially, there were 24 universities subscribed to THAILIS. Recently, this has grown to 77 universities in total.

2. To define strategic partnership of other institutions in the research community, for instance, the R&D institutions, and some other special libraries.

3. To set up working committees to revise policies and the direction of services in order to serve the whole research community in Thailand. Currently, these services are focused on supporting learning, teaching, and research for the academic community only.

4. To develop policies and formulate a core information strategy.

5. To amend laws and regulations in order to enhance cross-institute resource sharing.

6. To develop communication strategies on the basis of interactions between management and staff in order to achieve effective implementation, then communicate policies and strategies to all levels: management and staff.

7. To implement policies.

8. To conduct a needs survey for development projects, for example, on ICT infrastructure, hardware and software for interoperable systems, collection development, consortium development, networking services, and resource sharing including electronic resources, interlibrary lending and document delivery services.

9. To make reciprocal agreements among members in sharing resources.

10. To define roles and responsibilities of the involved parties including the supervisory body of UNINET/THAILIS, S&T information centres, project managers and counterparts, and a hosting provider.

11. To discuss reciprocal funding arrangements between organisations.

12. To provide financial resources as necessary for operating projects and to promote the sharing of resources.

13. To organise training courses of relevant topics for members, for instance, change management, professional development, attitude development, and user education.

14. To monitor the implementation, and evaluate all the programmes, projects, and activities.

Figure 8.13 shows the order of those initiatives/projects which need to be completed to meet the key objectives.
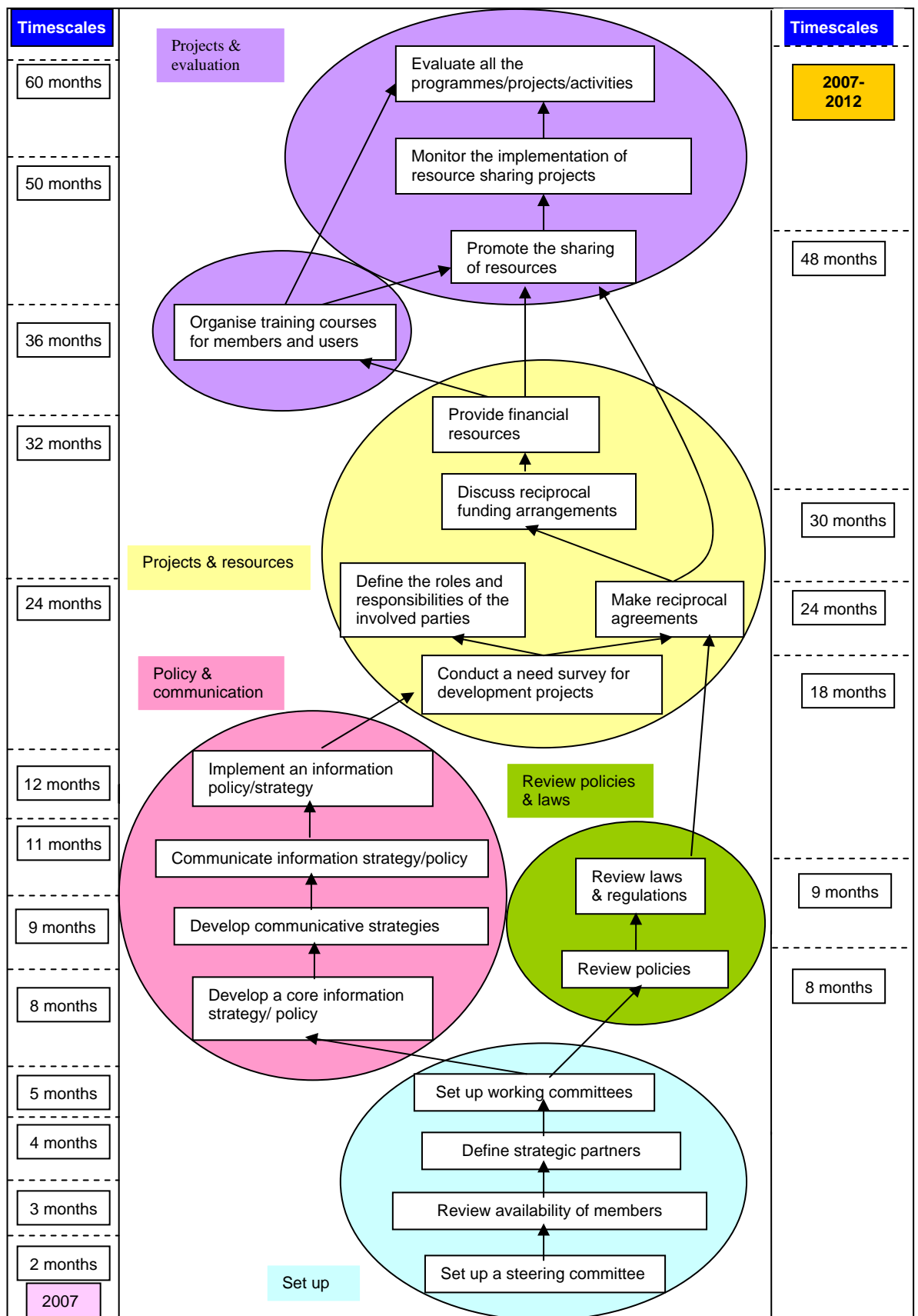
Figure 8.13 A roadmap to the development of UNINET as host

Figure 8.13 illustrates the time phases of the different initiatives necessary to achieve the key objectives. These include set up, a review of policies and laws, policy and communication, projects and resources, and projects and overall evaluation (as shown in each circle). These initiatives are shown in due order starting from the base of the diagram and moving upwards. The arrow lines show dependencies between specific projects and initiatives. In effect, projects should be run from the lowest point to the highest point as projects and activities in the lower boxes could help to achieve those in the upper ones. Suitable timescales are included which allow for the evaluation of each phase and the measurement of overall progress. The horizontal dashed lines represent the timescales of the initiatives or projects.

Model III: JOURNAL LINK as a hosting provider

Projects to develop *Journal Link* as a hosting provider can be prioritised as follows:

1. To set up a steering committee to review the situation and availability of their 204 members.
2. To set up working committees to revise policies and the direction of Journal Link services in order to extend their information service provision to the research community in Thailand. Currently, the services provided focus on document delivery services of serials and full-text papers from databases of some particular subject areas (medicine, agriculture, and S&T Thai journals).
3. To develop policies and formulate a core information strategy.
4. To amend laws and regulations in order to enhance cross-institute resource sharing.
5. To develop communication strategies on the basis of interactions between management and staff in order to achieve effective implementation, then communicate policies and strategies to all levels: management and staff.
6. To set out policies.

7. To conduct a needs survey for development projects by UNINET/THAILIS members, for example, on ICT infrastructure, hardware and software for interoperable systems, collection development, consortium development, networking services, and resource sharing including electronic resources, interlibrary lending and document delivery services.

8. To make reciprocal agreements among members in sharing resources.

9. To define roles and responsibilities of the involved parties including the supervisory body of THAILIS, S&T information centres, project managers and counterparts, and a hosting provider.

10. To discuss reciprocal funding arrangements between organisations.

11. To provide financial resources as necessary for operating projects and to promote the sharing of resources.

12. To organise training courses of relevant topics for members, for instance, change management, professional development, attitude development, and user education.

13. To monitor the implementation, and evaluate all the programmes, projects, and activities.

Figure 8.14 shows the order of the initiatives/projects which need to be fulfilled.
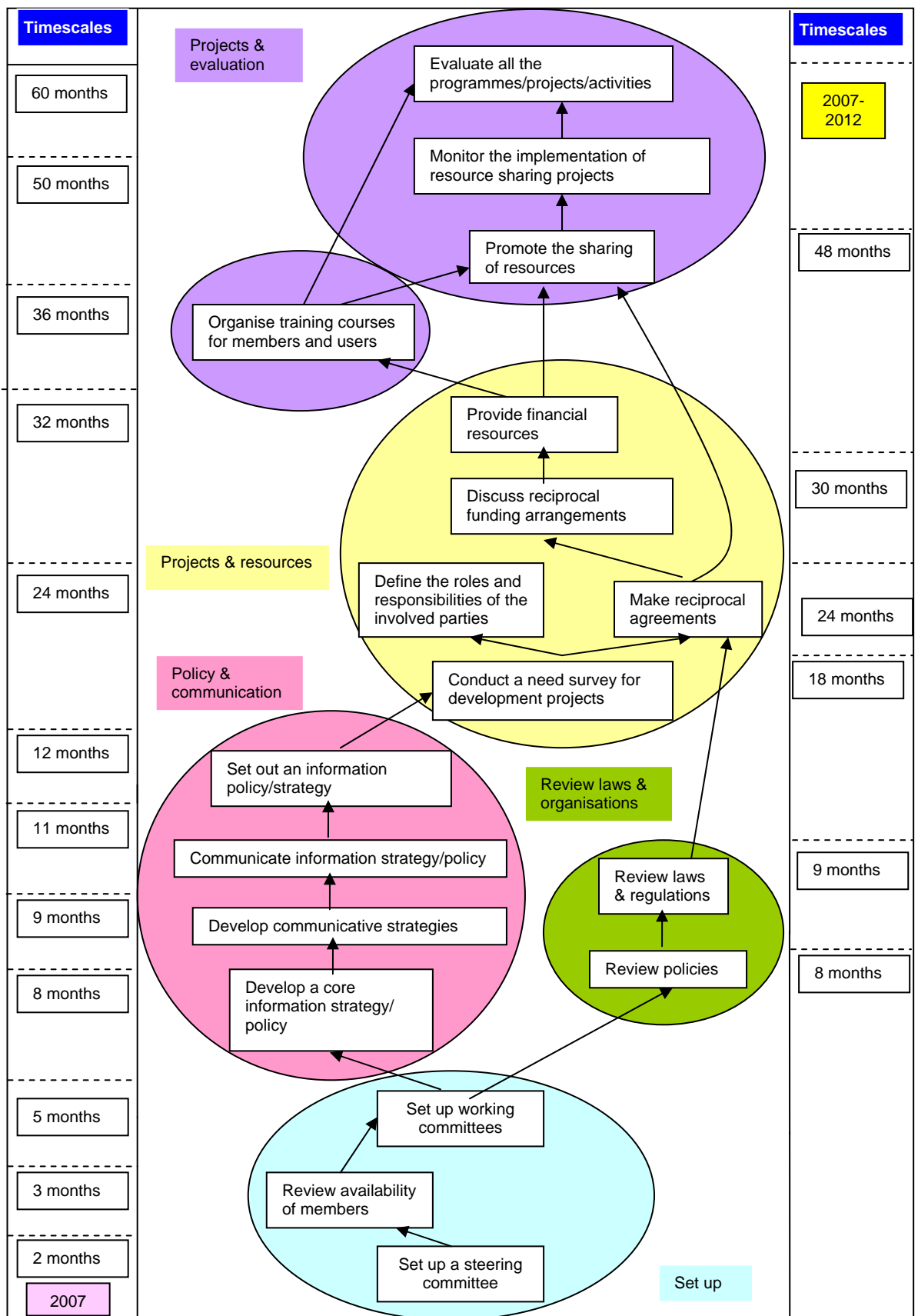
Figure 8.14 A roadmap to the development of Journal Link as host

453

Figure 8.14 outlines the key initiatives to be adopted in five phases. These include set up, a review of policies and laws, policy and communication, projects and resources, and projects and overall evaluation (as shown in each circle). As in previous models, the initiatives are shown starting from the bottom of the diagram and progressing to the top. Dependencies between specific projects and initiatives are shown by the arrow lines. In short, projects as shown in their boxes should be run from the lowest box to the upper ones. It is conceivable that activities in the lower boxes could help achieve those in the upper ones. Timescales are shown in the diagram to illustrate the linear progress of the projects and to allow for the assessment of each phase and the measurement of overall progress. The timescale markers as in the other models are shown by dashed horizontal lines on both sides.

Model IV: Synergistic hosting providers

A synergistic hosting provider would combine the key S&T information service providers of the government sector together including STIN, UNINET, and *Journal Link*. A national S&T information centre then would be established to operate the project. A roadmap of activities slightly different from earlier roadmaps can be drawn using the following priorities:

1. To set up a steering committee to review the situation and conduct a feasibility study into the establishment of a national S&T information centre.
2. To set up working committees to formulate policies and mission statements for a newly established S&T information centre.
3. To develop policies and formulate a core information strategy.
4. To review laws and regulations in order to enhance cross-institutional resource sharing.
5. To develop communication strategies on the basis of interactions between management and staff in order to achieve effective implementation, then communicate policies and strategies to all levels: management and staff.
6. To implement policies.

454

7. To conduct a needs survey for development projects, for example, on ICT infrastructure, hardware and software for interoperable systems, collection development, consortium development, networking services, and resource sharing including electronic resources, interlibrary lending and document delivery services.

8. To define roles and the responsibilities of the involved parties including the supervisory body of the newly established S&T information centre, project managers and counterparts, and a hosting provider.

9. To discuss reciprocal funding arrangements between organisations.

10. To make reciprocal agreements among members in sharing resources.

11. To provide financial resources as necessary for operating projects and to promote the sharing of resources.

12. To organise training courses of relevant topics for members, for instance, change management, professional development, attitude development, and user education.

13. To monitor the implementation, and evaluate all the programmes, projects, and activities.

Figure 8.15 shows the priorities of initiatives/projects which need to be completed to meet the key objectives.
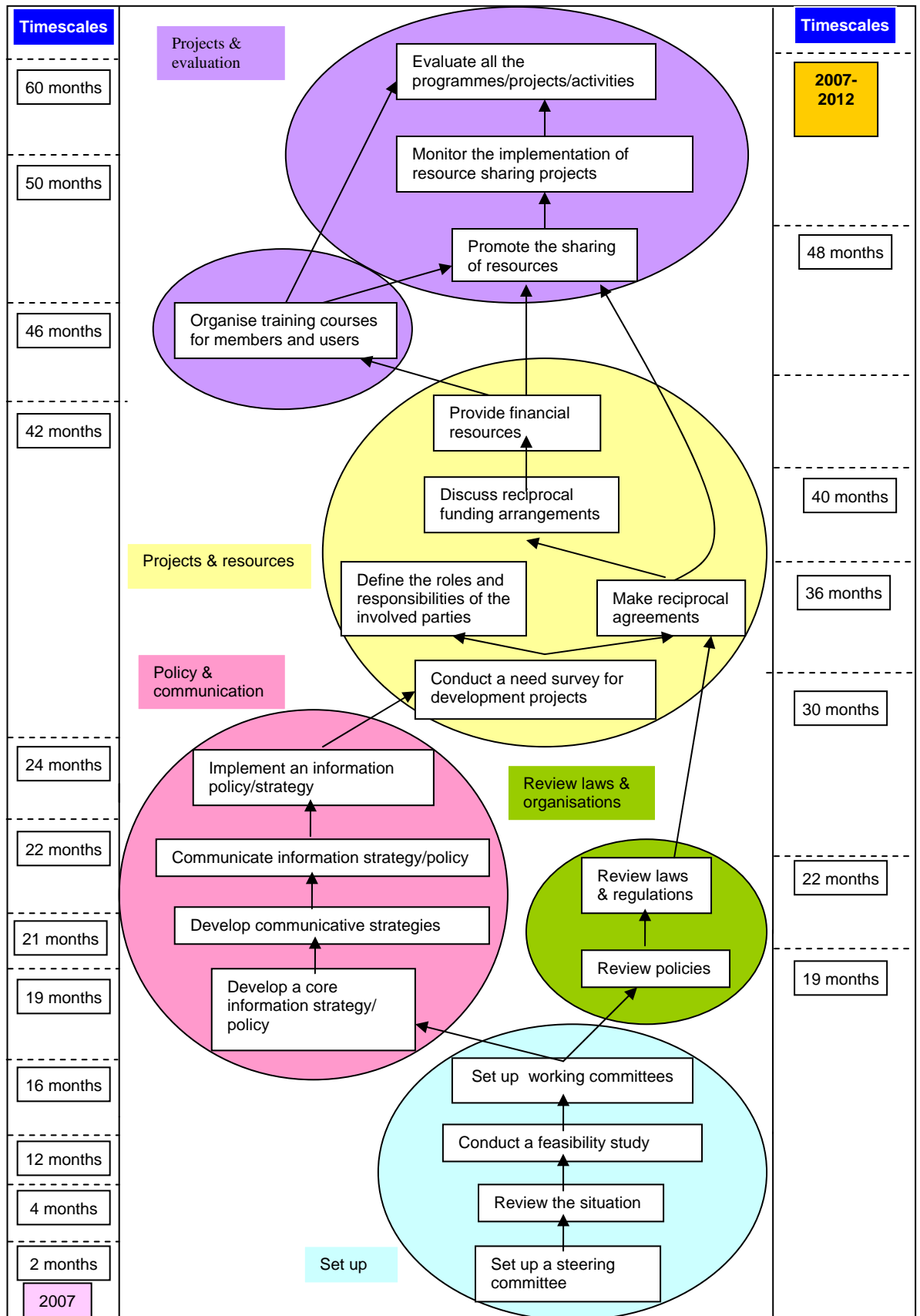
Figure 8.15 A roadmap to the development of synergistic host

The roadmap to the development of synergistic host has its functions similarly to those previously described in Figure 8.14

In order to assess the practicalities of implementing each model, an initial SWOT analysis was undertaken. This analysis is based on four areas consisting of strengths, weaknesses, opportunities, and threats, as shown in Table 5.38

When the four models are compared, it appears that Model 1, having STIN as host, would need huge development in terms of organisational management and funding. It seems that UNINET and *Journal Link* are more suitable as UNINET has already had high funding and well-managed resources while Journal Link is providing document delivery services of S&T full-text papers which successfully meet the needs of users in the research community. However, in the case of UNINET, there would need to be more discussions concerning financial support as UNINET is mainly funded by the Ministry of Education. Furthermore, members of UNINET (academic libraries) have their own funding allocated from tuition fees. Therefore, funding allocation needs to be discussed at a ministerial level in order to enhance a cross-institutional or cross-ministerial collaboration. This issue of collaboration can be assumed to be a common problem for all models. All are likely to seek collaboration from many institutions and from different parent organisations either from the government or the private sectors.

Table 8.1 SWOT analysis of the practicalities of implementing each model

Host	Strengths	Weaknesses	Opportunities	Threats
STIN	• Clear policy in sharing resources • A variety of libraries (academic and special ones) • Varied collection from different subjects of special libraries • Good union lists	• Lack of continuous development • No review of current member status • Low ICT support • Low funding • No review of relevant laws • Poor management	• Eagerness of members to collaborate • Extended services to the research community • Development of deep resource sharing • Creation and dissemination of new knowledge	• High investment in ICT needed • Need of interoperable systems • Need of laws to support cross-institutional collaboration • Need of strong leadership
UNINET	• Clear policy and direction in sharing resources to serve the academic community • Good ICT infrastructure • High funding • Well-managed resources	• Having only academic libraries as members • High competition and sense of ownership • Lack of commitment by some large libraries to share resources • Poor relationship between the central and provincial members	• Eagerness of members to collaborate (from PULINET members) • Extended services to the research community • Development of deep resource sharing • Creation and dissemination of new knowledge	• High investment in ICT needed • Need of interoperable systems • Need of laws to support cross-institutional collaboration
				To be continued

458

Table 5.38 SWOT analysis of the practicalities of implementing each model (continued)

Host	Strengths	Weaknesses	Opportunities	Threats
Journal Link	• Varied serials holding • Good union lists • Good collection of e-databases in particular subject areas • Good services which meet user needs • A variety of libraries (academic and special ones)	• Limited resources (only serials and a few databases) • No deep resource sharing • No clear policy in sharing other types of resources • No clear policy in further collaboration • Limited services (DDS of full-text papers only)	• Extensive services to the research community • Development of databases in other subject areas • Development of deep resource sharing • Creation and dissemination of new knowledge	• High investment in ICT • Need of interoperable systems • Need of laws to support cross-institutional collaboration
Synergistic host	• Consolidation of the S&T information sector • A variety of resources and services	• No clear policy • Lack of laws to support an establishment • Complicated funding • Lack of expertise	• The establishment of a national S&T information centres • Well-managed resources and better services • Provision of an S&T information gateway • Creation and dissemination of new knowledge	• A high investment project (infrastructure and ICT) • Need of effective planning/funding • Need of interoperable systems • Need of laws to support cross-institutional collaboration • Need for hosts to work together

Model 4 seems to be the best alternative for providing and developing a national S&T information service. However, it does call for effective committed collaboration from each stakeholder concerned as well as huge investment in ICT infrastructure. Despite this, Model 4 could be the most appropriate roadmap for the development of the national S&T information sector provided that the government focuses more on launching a national information policy and providing the necessary funding.

In following the roadmaps, the baseline or strategic goal for all Models is to develop a one stop access for S&T information. This could be initiated by the current and potential institutions (Roadmaps 1-3), or a newly established national S&T information centre as described in Roadmap 4. Therefore, measures or metrics that could be used for assessing their progress should include their success in:

- Organisational restructuring;
- Resource management;
- Collaborative activities;
- Quality of service provision.

There are six criteria of project metrics as recommended by Turbit (2005) which include:

- Time (How are we going against schedule);
- Cost (How are we going against budget);
- Resources (How much time are we spending on the project);
- Scope (Is the scope creep in line with expectations);
- Quality (Are we reviewing and fixing quality problems);
- Actions (Do we have action items outstanding)

(Turbit, 2005, p.1)

Moreover, in implementing the roadmaps, Thailand needs to select benchmark organisations or exemplars that are recognised as achieving significant milestones in their progress towards an information society. According to Gibb *et al.* (2006, pp.44-58), benchmarking is "*a technique for measuring processes, services, products and strategies against their equivalent (or near-equivalents) in competitors or comparable enterprises in other sectors.*" The authors note that benchmarking can be applied in

three main areas: process benchmarking, performance benchmarking, and strategic benchmarking. This technique can help an organisation identifying its relative strengths and weaknesses, thus leading to further improvement.

Two exemplars identified and recommended in this research are JISC of the UK, and the consortia in the Asia such as India and China. These three countries are recommended due to their outstanding success in organising resource sharing programmes and developing national information systems for their irrespective research communities. To learn from their experiences, therefore, would be beneficial to Thailand. While JISC has been widely recognised as a world-class leader in the innovative use of ICT in supporting education and research, India and China are huge countries in Asia that have made remarkable advancements in the sharing of information resources and knowledge within the research communities (Kaul 2001, pp.9-26; Rao 2006, pp.463-484; Lee and Meng, pp.179-181). The institutions which play essential parts in the resource sharing schemes for these two countries are, for example, National Science Library at INSDOC (Indian National Scientific Documentation Centre), Centre for Scientific and Industrial Research (CSIR, India), the National Science and Technology Library (NSTL) of China, and Consortium of National Information Resource Sharing, the National Library of China. The success of the mentioned institutions could be used for benchmarking the development of the S&T information sector in Thailand. There are several ways to learn from the countries who have well-developed information systems. The benchmarking data can be obtained by:

- Organising seminars, conferences, public forums and inviting guest speakers from these benchmarking institutions;
- Using any consultancy services (if any) or having consultants from these institutions;
- Organising training and workshops related to resource sharing programmes undertaken by these institutions. Exchanges of resource persons may be needed;
- Making official visits for exchanging view and opinions with respect to activities, projects, and programmes in resource sharing;

- Conducting research on the issues of projects, performances, and strategies of these institutions in order to determine critical success factors.

Guidelines for the development of Thailand S&T information sector

In order to develop a national S&T information sector according to the above conceptual models, it is important for the stakeholders concerned to be aware of the following crucial factors:

1. There must be clear policies and strategic planning at all levels, at both the national and institutional levels. One significant policy includes promotion of collaboration in information services among institutions of different Ministries. The national information policy should call for strong collaboration between the academic community, government R&D, Departments promoting industry, and the private sector.

2. The Government must promote the concept of cross-institution or cross-Ministry collaboration by amending, adjusting or eliminating laws and regulations that might obstruct this kind of comprehensive collaboration.

3. There must be clear policies and reciprocal agreements among institutions which participate in the network and resource sharing projects concerning types of resources to be shared. It is essential that all institutions participate in and share resources as equally possible. In particular, this could include resource acquisition, levels of funding, collaborative projects (professional development, user education, and user survey), and trends in resource and collection development.

4. Basic collaboration and resource sharing projects, for example, interlibrary lending, document delivery services, and purchasing consortia must be promoted in a more focused way with clear direction.

5. There must be an integrated ICT plan for the S&T information sector in cooperation with the academic sector. The integrated ICT plan should include details of interoperable systems, investment of infrastructure, and national standards.

6. An appropriate network topology or types of networks must be selected to accommodate the potential of information providers and the demands of users. For instance, the interviewees in this research agreed that the decentralised

network would be the most appropriate as it offered members more freedom to collaborate than the centralised system. However, selection of an appropriate network system depends on financial support and the ICT policy of the government as well.

<div align="center">

CHAPTER NINE

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CONCLUSIONS AND RECOMMENDATIONS

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9.1 Introduction

The concluding chapter of this research reviews the important points of the objectives of the research and the main findings that were presented in the previous chapters. It also presents conclusions and recommendations derived from the study of the policies and strategic management of science and technology information services in Thailand and their roles to promote research and development. This chapter outlines the following issues: overview of the research, objectives of the research, conclusions, recommendations, challenge and expectations, limitations and suggestions for further research.

9.2 Overview

The changing face of Thailand from an agricultural to an industrialised country has had a tremendous impact on all aspects of development. Science and technology (S&T) is recognised as an effective accelerator for achieving national growth. The 9th National Economic and Social Development Plan (2002-2006) set the target of harnessing the national S&T base, particularly in research and development (R&D). The underlying thinking is that the strengthening of S&T will have a great effect on the prosperity of the industrial sector and eventually generate a wealthy national economy. Consolidation of scientific R&D, through private and public sector partnerships, is proposed to enhance S&T, and advance

knowledge and innovation which is needed to compete in today's global economy. Organisations included in these two sectors are universities, government R&D agencies and S&T service departments, and private institutions.

It is also emphasised in the Symposium of the United Nations University (1998) that the most important difference between developed and developing countries is the knowledge gap, which can be defined as the lack of a capacity to generate, acquire, disseminate and use S&T knowledge. Thailand, like many other developing countries, is categorised as information-poor. Weak points include duplicated collection of information, the use of different formats or codes, inadequacy of electronic information resources, and the lack of collaboration amongst information service centres. These problems lead to ineffective utilisation of S&T information and need to be addressed. The development of an S&T information sector is needed since its growth is core to the success or failure of the economic well-being of the country.

This research on *"Science and Technology Information in Thailand: Policies, Strategies and Provision"* was conducted with the aim of investigating S&T information services provided by the sectors concerned, namely, academic libraries and special libraries. These institutions are the main ones which provide S&T information services to the research community. This research focused on the policies and strategic management of science and technology information services in Thailand with the aim of providing an overview of the current position of the S&T information services in Thailand and recommendations for the future development of the S&T information service sector of Thailand. The thesis has produced a good practice framework, as discussed in Chapter Eight, for S&T information service provision in Thailand and in doing so has provided a better understanding of networked resource sharing and identified the need to strengthen collaboration in scientific R&D amongst academic institutions, government agencies and the private sectors in order to make optimum use of electronic and printed information. Within this research framework, various theoretical models of information management and their particular features were examined.

The research also focuses on the information service provision for the research community in the UK, particularly the success of JISC. The results obtained are expected to be used as a benchmark for future development of the S&T information service sector in Thailand.

The scope of this research embraced 46 S&T information centres playing an active role in providing S&T information services to the research community. These institutions belong to both the public and private sectors and have been generally recognised as the key S&T information resources of the country. They include twenty-five academic libraries, of which 24 are members of THAILIS, fifteen academic and special libraries under THAINATIS and five information centres under the Ministry of Science and Technology and the National Science and Technology Development Agency. Two key funding agencies involved with national research promotion were also investigated. The stakeholder groups in the population include executives/policy-makers of information centres, executives/policy-makers of funding agencies, library managers, librarians/ library staff and end-users.

Data were collected using a mix of quantitative and qualitative methods: questionnaires, semi-structured interviews, focus groups and a review of the relevant literature. It is anticipated that these methods would shape the research design in both its general and detailed structures. Specifically, general information was gathered by questionnaire while in-depth information was obtained from open-ended questions in semi-structured interviews and focus groups.

9.3 Objectives of the research

Six objectives that this research attempted to achieve are as follows:

Objective 1

To examine the current status and roles of S&T information centres in Thailand

S&T information centres in this research consist of two main types of libraries: academic and special libraries. The main difference between these two types of libraries lie in that academic libraries are supervised by the Office of Higher Education Commission, Ministry of Education, while special libraries are managed by different parent institutions, for example, R&D institutes, scientific service centres, industrial and professional organisations, commercial and industrial centres, and funding agencies. Thus, special libraries provide a wide range of services depending on different user needs. When compared with special libraries, academic libraries appear to be a much more closely knit community with clear missions, specified users, and clear policies in resource sharing. However, parent institutions of most special libraries give little or no priority to information services, resulting in unclear policies and poor collaboration. Most libraries are a hybrid type aiming to develop and provide electronic resources. The key roles of academic libraries are supporting teaching, learning, and research as well as taking part in curriculum planning. Some institutions have started to play the role of knowledge managers for their communities and educators by enhancing users' information literacy. Meanwhile, special libraries have just started information management and collection development. However, there is a need for a gateway to S&T information. There is also a call for intensive collaboration amongst S&T information centres to accomplish the E-library Project, which has been viewed as still lacking direction. Yet, the role of the parties concerned has not been defined. In general, executives of academic libraries are satisfied with their role and status while those of special libraries wish to have more funding and support from parent institutions.

Objective 2

To examine policies and goals, or achievement targets relating to information services and information technology in Thailand as well as their implementation

Two levels of policies were investigated in this research: the national information policies and the institutional information policies.

The national information policy

Most academic libraries said they were familiar with the national information policy, for example, e-government policies, an establishment of MICT, promotion of e-learning environment, the National ICT Master Plan, and a living library project and the Thailand Knowledge Centre (TKC). However, some executives and managers from both academic and special libraries thought that these policies were related more to ICT infrastructure without reference to the development of information service provision, particularly the S&T information sector. They also criticised the policy as being vague and not good for effective implementation. More important, they thought that the roles of the academic and special libraries, the National Library, and the stakeholders concerned in S&T information sector such as MOST were not defined in promoting the research community and that the level of cooperation was not clearly stated. Some executives, managers, and staff did not agree to the establishment of the new information centre (TKC) aimed at managing the national information resources. Instead, they thought this task should be the responsibility of the National Library because of its long experience and expertise. The research also showed that the national information policy was not well known amongst the S&T information service providers. This is hardly surprising because the S&T information policy has not been revised for 17 years. A new policy with more focus on the S&T information sector, therefore, is highly desirable.

Institutional information policies

Executives were more familiar with the institutional information policies when compared to their staff. However, staff thought that they knew the institutional

information policies well. In general, policies were communicated via meetings, which were considered to be the most effective tool. Library managers were expected to be more proactive in acting as an intermediary between executives and staff. Quality assurance systems are another tool to help generate policy and promote effective intra-institutional communication. The institutional information policies were influenced mainly by the institutional policies and also by the government's information policy, excluding those of some special libraries in the private sector. The information policies were formulated by the executives who also participated in formulating the institutional policies. The institutional information policy of academic libraries aimed to support learning, teaching, and research while special libraries wanted the policy to support research and publicise S&T knowledge to entrepreneurs, industrialists, and the general public. The existing institutional information policies were criticised for lacking issues on information or data access and disclosure, promotion of inter-institute collaboration, information resource sharing, and library roles in current circumstances. The targets of most libraries are to provide electronic services via the e-library project, establish a consortium for resource sharing, and seek more collaboration in a deep resource sharing project. Concerning implementation issues, it seemed that managers and staff demanded focused policies from executives while executives gave only broad policies in order to motivate staff to think by themselves and then use their initiative. Regarding this, executives needed to clarify their demands and make managers and staff understand what they wanted to communicate in order to resolve misunderstandings between executives, managers and staff.

Objective 3

To examine the strategic management of S&T information centres along with types of services provided and their future plans

Executives and library managers and staff were aware of developing strategies for policy implementation. They believed these strategies had increased the effectiveness of services. Strategies were considered important, particularly when

working with limited budgets. All libraries had developed strategic plans and called them by different names, for example, annual plans or action plans. In general, these strategic plans were initiated by top executives with rare participation from staff. Executives thought that staff were not aware of strategic plans and hence staff reacted passively. Factors to be considered in developing strategies included institutional policy, organisational change (for example educational or research trends), communication, timeframe and budget. The strategic plan was flexible depending on timeframe and budgets. In strategic planning, the common problem was the shortage and low quality of ICT infrastructure. Therefore, integrated projects were proposed to make best use of ICT with limited funding. Other issues included acquisition of electronic resources, service improvement, particularly in the area of staff attitudes (lethargy, lack of positive thinking and creative thinking towards service provision). Training courses which explained strategy were sometimes used to improve staff understanding. In relation to users, strategic plans focused on communication, feedback, training and cost effective use of resources. Communication media generally used were web tools, such as email, e-newsletters, Intranet notice board, and Web forums. However, some special libraries still used   paper media to communicate with users due to a lack of ICT. In order to obtain user feedback, surveys were conducted only in some libraries. User education was more widely found in academic libraries where e-resources were provided. Most libraries tried to find methods to evaluate the cost-effective use of electronic resources.

E-library transition was also mentioned in the strategic plans of most libraries with a focus on support systems and digital collections, free electronic resources, and repackaging of information in specific topics. There was an attempt to use a smart card in the resource sharing project amongst provincial libraries. Special libraries had a plan to shift to automated library systems and to attract more users from industrial and business sectors, for example, an initiative to use e-commerce to provide convenient services to users. The topics of organisational change and management were thought important in connection with the development of e-libraries. Other topics listed in strategic plans included

knowledge sharing and management, regional incorporated strategic plans, cooperation with the private sector, personnel development, outsourcing technical services, and strategic positioning.

Objective 4

To identify barriers to S&T information service development in Thailand, awareness of the problems and their solutions

Until now, the main S&T information service providers have generally provided networked services such as STIN, THAILIS, PULINET, and *Journal Link*. Amongst these four networks, only STIN does not provide computerised networking services due to a lack of ICT infrastructure. Even though STIN had established a computerised system almost twenty years ago, it has not been updated with the latest technologies, leading to a failure to serve as a focal point and meet member needs. Under the e-government policies of the government, each network has recently attempted to improve its services by focusing more on performing collaborative activities and resource sharing amongst members. STIN still struggles under these circumstances due to the restructuring programme of the government sector. During this process, some institutions under STIN were reorganised or dissolved, resulting an unstable network. Collaboration and policies, therefore, gradually failed. The future development of STIN is difficult until, that is, the government sets clear policies relating to the S&T information service sector.

In comparison, THAILIS and *Journal Link* are successful in providing the networked services through advanced computerised systems which meet user needs satisfactorily. Levels of collaboration are good, particularly in the consortium management and resource sharing projects. However, these two service providers still need to develop their organisations in terms of organisational management, resource management, promotion of collaboration, and consortia negotiation. As for *Journal Link*, it needs to extend the services to

cover a wider range of resources other than journal locating and online document delivery services.

The discussion on barriers to S&T information service development in Thailand reveals that there are two significant barriers which lie in the areas of inadequate policies and resources.

Concerning the policy issues, it seems that the lack of a national information policy has resulted in poor institutional information policies. At an intra-institutional level, executives of the institutions tend to lack awareness of information services and fail to provide funding for improving the service provision. This leads to a lack of collaboration at an inter-institutional level, which eventually reflects a lack of synchronization at a national level. It is evident that there is a huge gap, in development terms, between the academic and S&T information sectors. Even though both types of institutions have the same policies and objectives to provide information services to support research activities, strategies of academic libraries seem to be more explicitly written and implemented than those of special libraries. Thus, it is recommended that the government launches a national information policy which states the clear roles of the stakeholders concerned, the scope of resource sharing, and strategies for promoting inter-institute collaboration. On matters of institutional and institutional information policies, it is important to balance these and their funding in order to achieve effective implementation. In some libraries, the executives' awareness needs to be enhanced so that they give priority to the development of information service systems.

With respect to resources, there are four categories involved: financial resource, ICT infrastructure, information, and human resources. Poor budgets and a lack of investment are the root cause of a poor quality ICT infrastructure. This is a considerable difficulty in the transition from a traditional library service to an electronic one. Moreover, there is a lack of electronic information resources as well as an incomplete collection of Thai R&D papers. Another problem concerns the lack of open access to full-text Thai research databases due to copyright

infringement. ICT staff shortage is another problematic area that needs to be solved. Some libraries attempted to deal with this problem by improving their librarians' ICT skills in order to also improve staff efficiency and create a positive attitude towards the library profession. It is also recommended that librarians' heavy workload needs to be reduced so that they can have more opportunities to improve themselves rather than doing routine work. Last but not least, the negative reaction of senior librarians and staff to organisational change is another important factor considered as a hindrance to the S&T information service development.

It is also recommended that statements of policies on resource sharing need to be more focused. So far, the resource sharing activities mostly practiced in academic and special libraries comprise interlibrary lending, document delivery services, THAILIS consortium (academic libraries only), and production of union lists and catalogues (one for academic libraries under THAILIS and another one for some special libraries). Although there is some resource sharing in the Thai S&T research community, there are still important barriers which need to be tackled. These significant barriers to resource sharing situation in Thailand are as listed below:

- lack of policies;
- lack of a powerful coordinating centre (resulting in poor collaboration, poor communication and relationship);
- inadequate resources to share;
- lack of a compatible information management system;
- duplication of services;
- negative attitudes (resistance to leadership of other institutions, too strong sense of ownership, unwillingness to pay for information services, misunderstanding of the nature of resource sharing, freedom lost, fears of unbalanced sharing, workload increase, resistance to change, disfavour of home grown library technologies, and a lack of staff's creative thinking);
- user perception (lack of interest and patience in an interlibrary loan service, lack of information seeking behaviour and information literacy,

and a negative attitude towards fees charged for using information services);

- restrictions of rules and regulations.

Awareness amongst the parties concerned seems to be a problem. As mentioned earlier, some executives were neither aware of the development of S&T information systems nor the resource sharing schemes. Even though most of them were aware of the barriers, they thought the problems could not be solved as long as there were no clear policies from the government. Therefore, it is important that the committees of these networking organisations work in close collaboration for two purposes; first, to create awareness amongst executives, managers, and staff, and second, to bring the issues of S&T information service development to the attention of the government in order to obtain clear policies.

Objective 5

To identify users' information seeking behaviours, information literacy, needs, and attitudes towards the services

The results from the user survey of this research showed that the majority of users in both academic and special libraries preferred using print to electronic resources and that not many users used online full-text databases. However, they were in favour of searching through online catalogues. Users thought that they could use electronic resources skilfully but only 60 percent of users in this research had attended the training courses in electronic searching. This corresponds to the service providers' perceptions as they thought that users' information literacy skills were still low. Amongst the different groups of users, researchers and academic staff were the most skilful in searching and locating electronic resources while student users were not familiar with advanced searching technology. Even though libraries provided training courses, some students were not aware of them. Language was also a significant barrier affecting information seeking behaviour and information literacy skills. Users from the industrial sector seemed to have lower skills in information literacy.

Librarians in special libraries found it difficult to meet the needs of users as there are different kinds of user groups with diversified needs. They thought that having information specialists in scientific subject areas would be of great help in service provision. However, managers and librarians thought that low information literacy of users was not a significant barrier to the S&T information service development.

Users thought that overall services in terms of staff and facilities were satisfactory. However, users of special libraries were not pleased with service fees and inadequate print material as well as electronic resources. According to users' attitudes and expectations in relation to policies and management, collection and acquisition of resources, services and training, fees and equipment and facilities, it can be concluded that they demanded more collaboration of libraries in resource sharing and provision of a one-stop service. A consortium amongst special libraries or a joint-consortium between special and academic libraries was highly requested to promote the sharing of electronic resources. Users also wanted libraries to provide a wide range of resources, especially electronic ones. They requested an interlibrary loan service to be improved in terms of effective cooperation and processing time. Library usage and information literacy skills in an electronic environment especially advanced searching skills were also required by users. Users in academic libraries disagreed with fee charging. Computers were still highly needed by users both in academic and special libraries. Users in some academic libraries desired to have remote access to electronic databases.

Objective 6

To develop appropriate information service models or roadmaps to aid the modernisation of S&T information service in Thailand

All participants in this research (executives, managers, and staff of information centres, users, and executives of funding agencies) agreed that the best strategy to modernise the S&T information service in Thailand is to adopt the practice of

resource sharing via consortia or computerised networks. A global trend towards resource sharing in many countries has shown good success and would secure a promising future for Thailand by developing the S&T information sector. It is suggested that, first of all, the government must place emphasis on national information policies, which will later have an impact on institutional information policies. Then, a national S&T information centre should be established to act as focal point or a hosting provider, managing national information resources, and take a leading role in developing the information sector.

The models for collaboration with respect to resource sharing were developed in this research in order to propose collaborative patterns with the purpose of establishing a national consensus within the S&T information community. In developing these models, important factors borne in mind included: organisational positioning, ICT infrastructure, innovation, training and awareness, electronic information resources, networking, collaboration, managerial strategies, user support, and the potential of a hosting provider.

First, the roles of stakeholders involved with the S&T information service provision need to be defined together with their mission and responsibilities at institutional level. Positioning of the institutions, strategic partners, and level of collaboration among service providers also need to be clearly stated.

Second, there should be an information strategy at national and institutional levels. This should include an ICT strategic plan to make the investment of ICT infrastructure more cost-effective.

Third, there should be a clear policy on promotion of home grown technologies for library systems or technologies imported from abroad. The policy should also discuss the trends in software and innovation in order to balance home-grown and imported technologies.

Fourth, there should be a system to support staff in a changing working environment. Increasing workload needs to be balanced in order to give more

opportunity to staff to participate in resource sharing projects. Executives need to develop closer working ties with their staff to promote and foster understanding and cooperation such that each has a clearer understanding of each other's roles and responsibilities. In this process, the status of librarians within the academic community should be properly recognised and rewarded by the institutions.

Fifth, more external and institution-owned electronic and multimedia resources need to be acquired or developed further to meet the increasing needs of users in the future. The missing collections of Thai research papers seem to be a problem since librarians get little or no cooperation from Thai researchers. There is a call for the National Library to work on this matter. There is a need from users for librarians to act as knowledge managers to collect knowledge found from different sources. In acquiring electronic resources, there should be a clear strategic policy from the parent institutions so that librarians will be able to manage those resources by avoiding unnecessary duplication. User surveys are another method suggested for evaluating the cost-effective use of electronic resources.

Sixth, the national information policy should clearly state the issues of S&T networking services that would lead to effective implementation. Guarantee of continuous funding should also be made. Members are expecting to share resources between all sectors concerned via interoperable computerised networks. In this regard, the shortage and low quality of ICT infrastructure needs to be tackled as a first priority. An integrated national ICT plan is suggested as the best solution. An establishment of the S&T network of inclusive members (academic, government, private and industrial sectors) is also recommended.

Seventh, library collaboration in Thailand needed to be promoted with clear policies and reciprocal agreements. Apart from key collaborative activities such as document delivery service, interlibrary loan, consortia licence agreement, and bibliographic development, the parties concerned expressed their wish to promote more collaboration in providing the national S&T information as one-stop services. In doing this, it needs to consolidate collaboration between the

academic library and special library sectors need to be consolidated. The National Library is also expected to be empowered to manage the national S&T information resources. With respect to collaborative activities, an interlibrary loan system is deemed as a basic and necessary service which should be improved in terms of time and process to meet user needs. Three critical challenges that the S&T information sector has to solve lie in the problems of low rates of electronic resource use, poor funding of special libraries, and copyright infringement of document delivery services and open access.

Eighth, each institution needs to develop managerial strategies with respect to these following issues: review of the legal framework which could be a barrier to resource sharing, governance, project management, evaluation systems, and strategic partnership. Specific strategies to deal with these matters are considered important. For example, the strict rules of budgetary management and purchasing need to be revised in order to promote inter-institute collaboration, e-commerce, and international business transactions. Moreover, there should be clear information policies and strategies which are applied nationally; good governance and relationships between management and staff, policy on change management, evaluation systems using E-metrics for management improvement, and the identification of strategic partners in resource sharing activities.

Ninth, fundamental support should be given to users. Attempts should be made to fulfil user needs and expectations, adequate resources (ICT infrastructure and electronic information resources) and appropriate education and training should be provided. Users should be consulted about service fees.

Last, but not least, the potential of institutions to be a hosting provider needs to be analysed. The findings in this research reveal that there are three institutions or bodies which have high potential, namely, STIN, UNINET (THAILIS), and *Journal Link*. Potential analysis of the aforementioned institutions is presented. Four service models are, therefore, proposed in this context depicting each institution as a hosting provider. The fourth model illustrates the synergistic

hosting providers embracing three institutions to develop a gateway for the S&T information service provision.

From the investigation, it can be concluded that:

1. Even though, the S&T information service is generally known as having the key role in harnessing the R&D of the country, awareness at policy making levels is low. There is a notable lack of information policies both nationally and institutionally.

2. Most S&T information service providers are not familiar with the national information policy and the policy on S&T information. It is noteworthy that, in many R&D institutions, there is no policy or strategy for promoting information services to support R&D. However, the academic sector seems to have a clear policy and strategy on development of the information sector to support the academic R&D.

3. The most important strategy of both academic and special libraries is the development of the E-library by acquiring automated library systems and electronic resources. However, a lack of funding is a severe problem that prohibits the development of service provision.

4. A lack of awareness from parent institutions is considered critical amongst most special libraries since it leads to poor funding and resources. Most special libraries lack institutional information policies or information strategies.

5. It is viewed that the development of S&T information service has not progressed even though there are several institutions dealing with the S&T information sector. Significant barriers to the development lie in lack of clear policy and awareness, inadequate resources, and lack of collaboration and comprehensive resource sharing.

6. The role of institutions concerned in the S&T information sector has not been clearly defined, leading to difficulties in collaboration and weak organisational management.

7. It is generally recognised that resource sharing is the best practice in service provision and the way toward for improving the national

information service. Yet, collaboration for resource sharing amongst S&T information centres, particularly special libraries, is low. Most special libraries, therefore, provide the services individually. Good collaboration can be found only in the academic sector where a consortium licence agreement is established for the academic community.

8. The critical barriers to resource sharing lie in a lack of policies and awareness on resource sharing, a lack of strong leadership of a coordinator, inadequate resources to share, lack of interoperability, duplication of services, attitudes and work cultures, user perception, and the restrictions of burdensome rules and regulations.

9. Regarding values and attitudes, it is interesting to note that these problems are related to the lack of a sharing culture, a strong sense of ownership, and a fear of freedom or power loss as well as unbalanced sharing.

10. Commitment is one essential factor of collaboration. The case of STIN represents weak collaboration and poor commitment among members. Commitment is also important in organisational management. The culture of punishment is not found in the library and academic sectors in Thailand, thus probably leading to weak commitment. Similarly, there is no incentive for libraries to participate in resource sharing activities.

11. So far, there is neither a focal point from which to steer the development of the S&T information sector nor a hosting provider to oversee networked information services.

12. There is a tendency that users are using more electronic resources even though their search skills and information literacy are not satisfactory.

13. There are no clear agreements on interlibrary lending. Collaboration amongst academic and special libraries under STIN is eroded.

14. Copyright is a problem when providing open online access.

15. Users demand a one stop service centre or a gateway to S&T information.

16. Apart from the development of collections, professional development is deemed important as the status of library profession in Thailand is relatively low when compared with academics.

17. It is interesting to note that, in developed countries such as the UK and the USA, many professional institutions have been established to deal with information service development or implement projects in relation to the development of service provision. Apart from service providers, there are other professional organisations providing advice and consultancy. Unfortunately, it seems that there are very few organisations in Thailand managing these kinds of activities. Neither are there particular funding agencies supporting the information sector.

18. There is very little research on information projects and library services. Most of the research papers concerning these issues were of dissertations or theses whilst only a few were produced by librarians or service providers. This is different from the situation in the developed countries. For instance, in the UK, there are many national institutions cooperating and involved with research or funding with a view to developing information service provision.

9.4 Recommendations

In pursuance of the development of the national S&T information sector, it is recommended that Thailand take the following actions:

1. The parties concerned at policy level need to launch policies and strategies focusing on consolidating the S&T information sector of the country. An integrated national information policy is needed to address the need to raise general awareness and aid policy implementation at institutional levels.

2. The role and responsibility of each institution concerned needs to be defined. One institution must be established or identified as a national body steering the development of the national S&T information sector. This institution should be managed by a group or committee. One main responsibility is to bring the information policy issues into the government's agenda and keep updating the policy when necessary.

3. Collaboration among the parties concerned must be emphasised in the national information policy. The collaboration should be promoted and embraced by all sectors responsible for research and information of all regions, namely, the government and the private R&D institutions, special libraries, and academic libraries.

4. In the national information policy, higher priority should be given to information resource sharing.

5. In order to practise resource sharing, consortia or networked information centres need to be promoted. It is important that funding should be properly allocated to support the operation of consortia and networked services.

6. Professional organisations need to be established with the aim of conducting the information projects and working collaboratively.

7. Patterns of funding, for example, formulaic and non-formulaic budgets, should be reviewed to support collaborative activities or cross-institution collaboration.

8. A national S&T information centre needs to be established to act as a focal point in providing services. This centre could be both a depository for archiving national S&T information resources and a dissemination centre of S&T research and information. The concept of having a platform or gateway to Thailand S&T information resources should be progressed.

9. An organisation to act as a national hosting provider also needs to be established to manage the national networked information services for the education and research community.

10. The organisational management problems, so far, encountered by the academic consortium need to be minimised. These problems include, for example, weak points of consortial management, poor relationships between metropolitan and provincial libraries, low cost-effective use of electronic resources, lack of maintenance of networks, mutual agreements on interlibrary loan and document delivery services, and poor user information literacy.

11. Change management should be emphasised in policy and strategy. Particularly, negative attitudes towards resource sharing needs to be improved amongst both executives and staff. This includes the strategy to deal with change and global trends of information services.

12. In managing the information networked services to promote resource sharing, strong commitment and the perception of networked resource sharing needs to be developed in order to make sharing durable and long lasting.

13. More research projects which will be beneficial to the S&T information service provision need to be created and funded. Librarians should be encouraged to conduct research on the issues of users and services.

9.5 Challenges and expectations

From the problems and recommendations discussed above, the S&T information sector of Thailand faces challenges in managing the information service provision to meet the needs of all types of users in the research community with limited funding. These challenges lie in the process of establishing sustainable cooperation amongst the parties concerned. In meeting challenges, it is expected that:

1. There would be strong collaboration between academic libraries, special libraries and the S&T research sector in providing S&T information services in the resource sharing environment.

2. A national S&T information centre would be established to oversee the development of the national S&T information resources and the service sector.

3. The national hosting provider would be established as a backbone, providing the networked S&T information services to the research community for both the academic sector and other R&D sectors in the country.

4. The library and information sector in Thailand would be consolidated and developed in the same direction under the strong leadership of professional institutions.

9.6 Limitations

This research aimed to develop service models and find a roadmap for S&T information service provision which could meet the diversified needs of users in the research community. Initially, the parties or stakeholders concerned in the S&T information service sector was explored in order to investigate their roles and it was found that there were many institutions involved in providing S&T information. By limiting the institutions to be investigated, the scope of the research was confined to only STIN under THAINATIS, academic libraries (THAILIS), and S&T information centres under the government sector. Therefore, this research may have some limitations in the following ways:

1. Due to time and budget limits, only some institutions were selected on the basis of their essential roles and member status. These were identified as key S&T information service providers in Thailand by the National Research Council.

2. It should be noted that, after the research had started, political changes and the later restructuring programme of the government sector had a severe impact on these groups as well as their operations. For example, many departments were reorganised or relocated; the Ratchabhat Univeersities (originally Teachers' Training Colleges) and Ratchamongkol Technology Universities have now been upgraded to university status. However, these institutes are not included in the investigation of this research.

3. It should be acknowledged that the information sector has undergone some rapid changes. Therefore, some of the findings given here may not be current. During the period of this research, it is likely that some changes will have taken place that has improved the information services. Before this research was finished, some problems may have been already

solved. However, it is expected that this research would yield benefits in recording whatever had happened in the development process of the S&T information service sector and could be used as a lesson or experience for further development.

9.7 Suggestions for further research

As Thailand still needs to conduct more research in the area of its information sector and services, it is recommended that this further research should be undertaken with respect to these following issues:

1. Change management of the information service organisations. This should include improvement of librarians' role and status, their participation, attitudes, and work cultures in order to prepare staff for changing environments and maximise potential of human resources. Meanwhile, strengths and weaknesses of the organisations should be analysed for organisational positioning.

2. Information strategy at an institutional level. Each institution should study both internal and external factors which have influences on the development of an information strategy. This should also focus on the role of the information sector within the institution, how to increase awareness amongst executives and staff, and the direction that each institution is striving to move towards.

3. Needs, information seeking behaviours, and information literacy of each user group. From the findings in this research, it is apparent that users do not make cost effective use of the resources provided. In many cases, electronic resources are ignored. Therefore, studies on users may help to improve the quality of services and effective management of resources, particularly, in special libraries where diversified groups of users are found.

4. Improvement of document delivery services and interlibrary lending. The finding reveals that these two services are not frequently used by users. Even though these kinds of services are on the decline in many countries

such as the UK, they are considered appropriate to Thailand where the digital divide and electronic resource procurements are still problems. Therefore, an improvement of the services may help motivate users and staff into greater resource sharing and collaboration.

5. Establishment of a national S&T information centre, a hosting provider for the networked services and professional organisations. Before these organisations are established, their structures, operations, and responsibilities should be carefully identified and widely discussed.

6. Development of a special library consortium. Given that the country may not be ready to develop a consortium embracing the entire S&T information sector, the special library group should review its own potential to organise its own consortium in order to meet their users' demand.

9.8 Concluding remarks

This research has highlighted the policies and strategic management of the S&T information service in Thailand. Its main objective was to investigate the information policies, the institutional information policies, and institutional strategies of the S&T information sector. The research also included an analysis of the effectiveness of policy implementation and the role of the S&T information service sector in promoting the national R&D effort and support for the research community. Furthermore, the focus has been on a development of an appropriate service model to meet user needs and expectations, leading to the best practice in S&T information service provision.

The investigation reveals that the future development of the S&T information sector in Thailand is moving towards networked resource sharing with an aim to optimise the use of limited resources. The research, therefore, has illustrated the challenges that the parties concerned in the S&T information sector have to overcome. These comprise the issues of policies, resources, and barriers to resource to sharing. It can be concluded that awareness of the S&T information

service sector needs to be increased both at government and institutional levels. Information policies and strategies need to be emphasised more. There should be more attempts by the parties concerned to place the development of the S&T information service provision on the government agenda. Meanwhile, an understanding of networked resource sharing and the concept of consortia need to be created whilst collaboration amongst information service providers such as academic institutions, government agencies, and the private sectors needs to be strengthened. It is recognised that the development of the national S&T information sector is important due to the fact that success in providing S&T information refers not only to the quality of services, but also implies the accomplishment of the national scientific R&D which can generate the overall prosperity of the nation.

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Appendix I
Development of JISC and
Key activities

Development of JISC and key activities

JISC was established on 1 April 1993. It was developed from the Computer Board, which, at that time, had an initial focus merely on the computing systems for research communities. Later, with some vision of a few members of the Board, they steered the agenda towards both information technology and information services. The mission was then reviewed and re-formulated to place emphasis on both the provision of ICT infrastructure and value-added information services (Brindley 1998).

Brindley (1998) gave an overview of JISC development by categorising the development period into four phases: experimentation, consolidation, innovation, and maturity. (See Figure AI-1.)

National information service for UK academic and research sectors

1. Experiment

- Provision of citation databases, e.g. BIDS-ISI
- Development of models for electronic services
- Rationalisation of policy
- Establishment of
  - the Information Systems Committee (ISC), or later Joint Information Systems Committee (JISC)
  - the National Funding Councils for England, Scotland, and Wales / the Follett Committee
  - the Information Systems Sub-Committee (ISSC)

2. Consolidation

- Seeking cooperation and formulation of policy
- Development of JISC strategies: acquisitions, data centres (Bath, Manchester, and Edinburgh), datasets and e-resources, funding models, negotiating deals, user groups (pricing and charging models)

3. Innovation

- A report of the Follett Committee (based on the studies of IT Sub-Group)
- E-Lib programme
- Follett Implementation Group for Information Technology (FIGIT)
- Provision of e-resources, databases, and digital collections
- Invention of resource discovery tools and subject gateways
- Organisational convergence of academic services
- Development of Information Strategy Initiative

4. Maturity

- A combination of ISSC and FIGIT into a Committee for Electronic Information (CEI)
- Provision of services under the Distributed National Electronic Resource (DNER)
- Finding more strategic partners
- Reviews of charging models, policy on networking and e-information services
- Evaluation of cost-effective use of e-information services
- Collection of resource development policy document
- Access for open, distance and life-long learning
- Long-term preservation and discarding of e-resources

Based on Brindley's analysis

Figure AI-1 JISC development phases

- **Experiment phase**

Before JISC was established, the Computer Board had initiated the build up of information resources in an electronic environment. An example of service provision can be seen in the development of citation databases, for instance BIDs-ISI, and a range of models for electronic services. The policy in service provision dealt particularly with the issues of service charges, subscription models, service models, and users' access. Brindley (1998) said that human resource and training were also a main focus at this stage because librarians needed to be prepared for the changing role in order to manage the access arrangements and deal with the new economic models. In 1991, the Computer Board became the Information Systems Committee (ISC) of the Universities Funding Council. Brindley considered that the chance of librarians to participate in this committee had engendered awareness of library services to be included in the development of computing systems. Meanwhile, the service of BIDs-ISI database was successful. Therefore, development of datasets became the focus of the ISC.

The government's policy in establishing separate national funding councils for England, Scotland, and Wales caused decline in the ISC's role. Finally, the work of the ISC was continued with the provision of networked information services, under the newly established organisation named JISC.

- **Consolidation phase**

During the consolidation period, JISC was involved more with the policy and strategy as its scope was expanded to serve both the universities and the ex-polytechnics and higher education colleges. Three sub-committees, set up to accommodate the wide range of activities, included:

1. Advisory Committee on Networking;
2. Committee on Awareness, Liaison and Training;
3. Committee on Electronic Information;
4. Technology Applications Sub-Committee.

The strategies in the consolidation phase included, for example, acquisitions, datacentres, and service discipline. The datacentres include:

- BIDS - Bath Information and Data Services

- EDNA - Edinburgh Data and Information Access

- MIMAS – Manchester Information and Associated Services

Brindley (1998) viewed JISC as having good support from the government with a well-structured national framework, which made JISC an outstanding organisation when compared to those in other countries. Provision of datasets in the fields of Science, Engineering, and Social Sciences run by the Information Systems Sub-Committee (ISSC) and the strategic partners was considered a success. JISC also began to take part in funding models, pricing and charging models, and negotiating deals as a result of a growing numbers of users. Evaluation of user needs and behaviour began to be a priority as there was also a variety of user groups who used different kinds of resources at different frequencies.

- **Innovation phase**

The innovation period involved innovative projects and research, for example, the Follett Committee was appointed by the Funding Councils to study the situation of libraries, ICT and information provision in HE, the IT Sub-group conducted a feasibility study of electronic libraries with the aim of solving economic and access problems and the Electronic Libraries Programme (ELib) was established as a pilot project.

As JISC's policy focused on collections of electronic resources and access, innovations were considered as important in order to accommodate the changing situation, and a huge amount of budget (for example, approximately £16 million for the ELib project) was initially allocated to the programme. At the end of the Follett study, the Report was distributed and the Follett Implementation Group for Information Technology (FIGIT) was established to conduct the ELib programme. A key characteristic of these innovative projects was integration, covering all areas (services, tools, software, research and

development, infrastructure, skills and policies.) Brindley (1998) emphasised that budgetary management was an essential factor to the success of the projects. She believed that conducting a variety of innovative projects with the same goal under the shared budget was more advantageous. The results were positive and accelerated the concept of national digital collections, and for their development, which led to a successful convergence of IT and information services. Working with a shared budget was also seen as the best solution for budget constraint. However, it was suggested that traditional budget structures needed to be adjusted to accommodate the shifts from "holding of library materials towards an access to information strategy" (Brindley 1998: pp.273).

An Information Strategies Steering Group (ISSG) was also set up in cooperation with Coopers & Lybrand in order to provide guidance and advice to the community in developing the information strategies. Six universities participated in developing an institutional information strategy:

1. Bath Spa University College;
2. The Queen's University, Belfast;
3. The University of Glamorgan;
4. The University of Glasgow;
5. The University of Hull;
6. The University of North London.

- **Maturity phase**

Brindley (1998) mentioned that a remarkable achievement in the maturity phase was the development of the JISC five year strategy on national electronic collections in 1993. At this time, the committee structure was also re-arranged combining the ISSC and FIGIT to become the Committee for Electronic Information (CEI). The JISC website (http://www.jisc.ac.uk/) states that four sub-committees were established to support the committee:

1. Advisory Committee on Networking (ACN);
2. Committee on Awareness, Liaison and Training (CALT);
3. Committee on Electronic Information (CEI);

4. Technology Applications Sub-Committee (TASC).

The five year strategy aimed to rationalise the balance between the technology and the content of information resources at the national scale. The term "virtual university" was introduced along with the new concept of distributed national electronic resources (DNER), aiming to provide a holistic service in the areas of:

- Digital content;
- Software tools and common interfaces for information services;
- System standards;
- Development opportunities;
- Training and support elements.

JISC also extended partnerships with other institutions for the implementation of the strategic plan, for example, the Department of Education, Northern Ireland (DENI). Electronic collections increased to cover a large variety of information such as bibliographic databases, non-commercial and commercial resources, digitised content, resources in different disciplines, static images and the moving images. The five year strategy was periodically updated, (for example, Five Year Strategy 1996-2001, Five year Strategy 2001-2005, and JISC Strategy 2004-2006).

The policy issues at this stage, as Brindley (1998) noted, focused on two areas: charging models and user behaviour in the networked environment. JISC added these two issues to the agenda in order to create coherence between JISC policy and national policy in relation to networking and electronic information services. Subscription models were developed to encourage use of electronic services from other groups, particularly those in small and specialist institutions, and user behaviour was investigated in relation to the cost-effective use of electronic resources under the eLib programme.

Other key tasks in this phase included:
I. Production of collections and resource development.

Further collection was developed for:

- integrated resources in each discipline;
- information resources to support research, teaching, and learning;
- information sources other than the national collection;
- cost-effective use of information and investment;
- increasing collaboration with publishers;
- digitisation priority of important material;
- quality metadata.

II. Information services to open and distance learning as well as lifelong learning.

An off-campus subscription model was initiated in order to open wider access to students and staff.

III. Long term preservation and discarding of electronic resources.

Criteria for preserving and discarding electronic resources of national information services were set. It was decided that those national resources would be reviewed and assessed periodically for potential retention or withdrawal.

"A brief history of the JISC" (see http://www.jisc.ac.uk/) states that in 1999 the user community was expanded when the further education funding bodies became funding partners and new committees were set under a restructuring scheme, as follows:

1. JISC Committee for Authentication and Security (JCAS);
2. JISC Committee for Electronic Information (JCEI);
3. JISC Committee for Integrated Environments for Learners (JCIEL);
4. JISC Committee for Awareness, Liaison and Training (JCALT);
5. JISC Committee on Networking (JCN).

Brindley (1998) stated that the strategy and activities of JISC faced continual changes because many new challenges had emerged, (for instance, the national

education trend, government's policy on information service provision, an integrated policy of ICT and information services, a policy on national research, etc.) and the success of several projects had led JISC into more sophisticated activities based on the concept of continual improvement. This also resulted in increasing collaboration with other stakeholders from industry, the non-academic research community, schools, public libraries, and publishers. This conformed to the statements made concerning strategic activities that JISC had a vision in "providing world-class leadership in the innovative use of ICT".

(see http://www.jisc.ac.uk/index.cfm?name=about_strategic).

As JISC aimed to provide "*ubiquitous and reliable access to an information and communication environment*", this was achieved by "*the development of sophisticated tools, complex management mechanisms, services to support users and the collaboration of activities across different communities*."

(see details in http://www.jisc.ac.uk/index.cfm?name=about_strategic)

In implementing the strategy, a six monthly progress report was submitted to the JISC Board for reviewing activities and programmes.

Discussing the JISC's role in providing electronic information, Brindley (1998) supported the concept of JISC as an organisation to deal with the national site licence, rather than having overlapping consortia of various libraries or individual developments of an institution's gateway service:

> Consortial confusion is an increasing danger, and it is becoming an even more complex task for information managers to evaluate the range of possible routes to the same electronic information via these different arrangements. (p.275)

Even though viewing JISC as a highly successful organisation in creating high level collaboration with other institutions, Brindley thought that JISC needed further cooperation at an international level as well as with further domestic institutions such as the Library and Information Commission, the British Library, and publishers, in relation to digital library services.

Interestingly, Brindley (1998) noted that the integrated policy of ICT with information services was highly significant in shaping an organisation such as JISC.

The Follett Report

The Follett Report was an outcome of the Review Group chaired by Professor Sir Brian Follett. The Review group, consisting of members from education and funding bodies (England, Scotland, Wales, and Northern Ireland), was set up in order to review the library and information service provision of the HE in the UK. The Review Group had as its main aims to investigate the situation of libraries and information provision in HE, reassess the position of libraries and librarians and their functions, clarify their objectives, and resources. This task concept derived from the fact that university or college can function more effectively with a good library service. Due to a paradigm shift in users' information behaviour, it is impossible for any single library to possess all resources alone that meet user needs. Serious shortfalls in space, budget and the increasing price of materials provided to users as well as rapid developments of ICT also forced all institutions to act in repositioning themselves in library and information service provision in order to deal with these to best advantage. The Review Group tasks, therefore, focused on reassessing the particular needs of users (students, staff and researchers) and made recommendations to the funding councils and institutions. Dealing with a user group of researchers was considered important as it had an impact on selectivity in the funding of research. Apart from the Review Group, there were the Sub-groups working on several consultancy studies, surveys and paper review, namely:

- The LISU Survey, based at Loughborough University, conducted quantitative and qualitative surveys in aspects of information service provision, for example, the availability of space, the effects of cost increases, change in teaching and research methods and organisation, and information delivery development.

- Library Staff Consultancy investigated the staffing aspects of library management and raised awareness of library staff to effectively supported teaching, learning and research.
- The Information Technology Sub-group produced papers concerning ICT and gave recommendation on the ICT related issues.

Recommendations given in the Follett Report included these following issues:

The management of the library in the institution

- The institutions should encourage their library staff to be fully involved in decision making concerning the management of information. Librarians should play more a participatory role in the organisational management.
- The institutions should develop a clear strategy for meeting the information needs of users (students and staff). Strategy should cover the issues of development of ICT, organisation of teaching and learning, information service provision, and organisational arrangements.
- Each institution should have its own strategy as it has different backgrounds and aims. Therefore, each institution should review its own environment and make a report of detailed recommendations which cover strategic planning. Integrative strategy between library services and other plans of the institutions is needed in relation to staff management and development, purchasing policy and practice, quality assessment, and the use of generic set of performance indicators for libraries.

Library resources

- The institutions should have a vision for library services befitting the needs of students and staff from within the resource available. In order to deploy resources effectively, it needs good strategic management of library and information services, a clear and explicit assessment of users, effective liaison between staff and library managers at all levels.

- Space for library use is also important.

- It is recommended that the funding councils should give high priority in allocating resources.

- There should be collaborative arrangements among institutions or groups of institutions.

Library provision in support of research

It was discovered that there was variation in the library services each institution provided to researchers. The level of service provision in each institution was different. Some institutions provided library resources to outside researchers as well. Constraints of funding and price inflation of periodicals and books had prohibited many institutions to meet all the research related needs as demanded by users. It was recommended that, in addition to meeting the basic library needs of researchers, libraries should develop a more strategic approach to promote cooperation and more resource sharing schemes. The Review Group gave three interesting recommendations with respect to funding patterns, allocation of non-formulaic funding, and development of a strategic approach. It was recommended that, firstly, more funding (10 million pounds a year as stated in the Follett Report) should be set aside in addition to the main formulaic allocation to support the costs of specialised research collections widely used by researchers in the whole community. Secondly, the non-formulaic funding should be provided to the specialised subject (in this case to the two legal deposit libraries of Oxford and Cambridge) in order to support the free access to researchers within the UK higher education communication. Thirdly, a strategic approach of library service provision in support of research in all subjects needed to be developed involving the stakeholders of both HE institutions and other research libraries and information services. In the Report the stakeholders were, namely, senior representatives of higher education institutions, the funding councils, the British Library, the national libraries of Scotland and Wales, the British Academy, and the Research Councils.

Information technology

It was recommended to the funding councils that 20 million pounds should be invested for the three-year projects on development of the use of ICT in selective areas in order to meet the needs of library users and library management. As stated in the Folett Report (1993), the series projects should include:

- "the development of standards;
- pilot projects to demonstrate the potential of on-demand publishing and electronic document and article delivery;
- a feasibility project to promote the development of electronic journals in conjunction with relevant publishing interests;
- the development of a database and dataset strategy;
- investment in navigation tools;
- retrospective conversion of certain catalogues;
- investment in the further development of library automation and management systems."

Copyright

Stakeholders involved in the copyright issues were publishers, librarians, users, and others who desire to protect the copyright of the holders. It was recommended that the potential in using or developing new technology should only be conducted with the full awareness that infringing copyright laws was an issue to be borne in mind. Therefore, a pilot project should be undertaken by HE institutions in cooperation with publishers to find the best practice.

JISC's Key Projects and Activities

As JISC's responsibilities have been shown in many strands of activities, only some key projects have been selected to be reported in this research in order to give an overview of what JISC has conducted. These projects are considered as major achievements by JISC, representing the process of the development of national information service provision, which should be useful to the development of information service provision in other countries.

Selected key projects and activities include:

I. Development of Data Centres

Three data centres have been established at different locations:

- BIDS - Bath Information and Data Services.
- EDINA -Edinburgh Data and Information Access.
- MIMAS - Manchester Information and Associated Services.

BIDs

BIDs was established in 1991 to provide a national service of network access to commercially-supplied bibliographic databases of various subjects, namely, science, engineering, medicine, economics, politics, and education. An access to scholarly publications via the IngentaJournal with more than 5,000 fulltext e-journals is also included. BIDs is one among three data centres funded by JISC. It is located at the University of Bath.

As the service is given to the academic and research community in the UK, an operation has been carried out on a not-for-profit basis.
The service is provided on a site licence basis which staff and students at licensed institutions can use without limit. More details can be found on http://www.bids.ac.uk/.

EDINA

Hosted by the University of Edinburgh, EDINA is another one of the JISC-funded national data centres providing data, information and research resources via the networked services to academic and research community in the UK. The service is free of charge for members in the subscribing institutions. EDINA provides varied content of online services, for example, texts, pictures, and sounds. Other services include reference, repositories of content, provision of information facilities in order to assist navigation and usability and support JISC's aim in building the JISC Information Environment. Users of EDINA are

staff and students from collages and universities, as well as researchers from specialist research centres. More details can be found from http://edina.ac.uk/.

MIMAS

MIMAS is a national data centre operated by the University of Manchester. Supported by JISC, MIMAS provides the UK higher networked access to databases of various subjects and other information resources. MIMAS also provides the service on specialist support and training, data sharing and gateway services. The services are offered free of charge to students and staff of the UK HE or FE institutions. However, some databases need to be accessed via site subscription with Athens username and password.

MIMAS also focuses on collaboration with other organisations, namely, EDINA, the British Library, the UK Data Archive, CURL, Eduserv Chest, and other universities in Manchester in order to provide services at a wide range of user groups. For more details, see http://www.mimas.ac.uk/.

II. The eLib Programme

The eLib Programme originated from the recommendations of the Follett Report in 1993 when a full scale review of the academic library system had been performed and the findings of the Report eventually became the strategy for the UK academic libraries. The eLib Programme was initiated by FIGIT in order to launch pilot projects to demonstrate the potential of on-demand publishing and electronic document and article delivery as it had been suggested in the Follett Report that there should be *"a feasibility project to promote the development of e-journals in conjunction with relevant publishing interests, the development of database and dataset strategy, investment in innovation tools, retrospective conversion of certain catalogues, and investment in further development of library automation and management systems."* (Follett Report, 1993)

The main aims of the eLib Programme as mentioned by Pinfield (2004) included:

1. To solve technical, managerial and legal problems which arose from the e-library activities at both institutional and national levels.

2. To promote the use of ICT to improve delivery of electronic library services, to explore different models of intellectual property management, and to encourage new methods of scholarly publishing.

3. To promote the changes in organisational culture, so-called "cultural change"

Pinfield (2004) viewed the organising body of the eLib Programme as having loose coordination in its conduct of the R&D programme. There was a central programme office which managed a large number of distributed projects. The structure in organising the programme can be shown as in Figure AI-2.
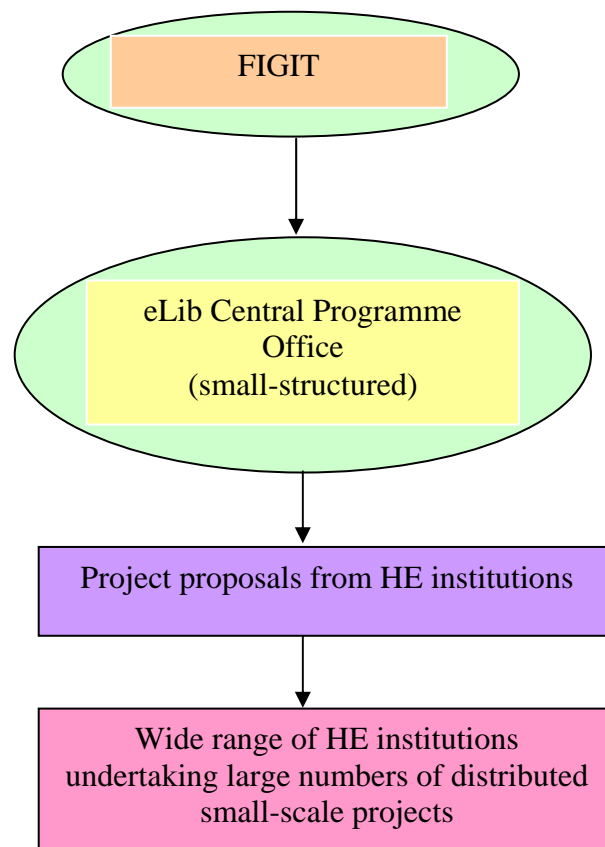
Figure AI-2 Structure of the eLib Programme

In running activities, many of the projects were conducted in a pattern of consortia of institutions. Pinfield (2004) remarked that the nature of the eLib

research was shown in a way that more than one project had investigated the same issues at the same time, but different approaches. This was so-called "practical emphasis", which means provision of real world services in a practical or demonstration way. Pinfield (2004) saw benefits from this style of management as each project manager had enough freedom to experiment in the necessary aspects under regular reporting schedule and accountability.

Focuses on activities of the eLib Programme can be categorised into three phases (see Table AI-1)

Table AI-1 Activities of the eLib Programme during three phases

Phase 1 Innovation phase	Activities
	• e-document and article delivery
	• e-journals
	• digitisation
	• on-demand publishing
	• training and awareness
	• access to network resources
	• supporting studies
Phase 2 Cooperation phase	• preprints and grey literature
	• quality assurance in the electronic environment
	• electronic reserve "short loan" collections
Phase 3 Integration phase	• hybrid libraries
	• large scale resource discovery (z39.50 clumps)
	• digital preservation
	• projects to services

It was mentioned that £15 million were invested in 59 projects of the innovation phase and cooperation phase of the eLib Programme. In Phase 1 and Phase 2, subject hubs were developed under financial support from the Resource Discovery Network (RDN) in order to:

- access to network resources;
- identify and catalogue quality Internet resources across different subjects;

- develop portals to a wider range of quality data and metadata.

In Phase 3, the focus shifted from project operation to applications and service provision. There were twelve projects costing £4 million. At this phase, essential activities and services were, namely:

- HERON(Higher Education Resources on Demand) - a national organisation for copyright permissions for retrospective digitisation of published works;

- E-short loan;

- On-demand publishing services (part-funded by a commercial provider);

- Higher Education Digitisation Service (HEDs), which provided advice and support in addition to conducting digitisation work for HE institutions;

- Electronic publishing. In addition to the set up of a number of e-journals, other electronic publications were also created in order to publicise developments of the eLib Programme and publish articles on e-library developments apart from eLib activities.

- Information searching and retrieval. Two main tasks were conducted: Clumps projects (groups of metadata resources which can be searched together to facilitate discovery), and COPAC (the joint catalogue of the Consortium of University research Libraries).

- Other projects, for instance, Digimap, LAMDA document delivery project, etc.

- Training awareness project e.g. Netskills.

- Hybrid library projects. There were two projects which were HEADLINE and ANGEL, focusing on an investigation of how electronic library services could incorporate into wider online learning environments

- Community awareness. This involved provision of information to the community in order to develop the thinking and awareness of electronic information services.

- Conceptual understanding for further development. Two projects were carried out:

  MODELS – aiming to generate and encapsulate the latest thinking of information delivery;

  SuperJournal – aiming to analyse the uses of electronic journals and investigate ways in which the journal literature can be developed in an online environment. This aimed to provide inormation to the information professionals, publishers, and commercial suppliers.

- CEDARS. This project had an objective to develop formal and informal standards in important new activities, for example, digital preservation standards.

- Clumps. The project focused on developing Z39.50 standards.

Moreover, there were supporting studies and research in the areas of cultural change concerning structural and social changes within an organisation or linked organisations. This also included the studies of socio-cognitive aspect in relation to the shared ways of thinking, beliefs, values, procedures, and relationships of stakeholders. These studies had the main objective to arouse interests and strengthen knowledge of professional library practice. In addition, they aimed to increase higher standing and more confidence in library professionals.

Pinfield (2004) stated that the eLib Programme was conducted as the joint-dissemination activities in collaboration with other partners including:

- Library organisations;
- Academic institutions;
- Publishers;
- System supplies, and
- Libraries (the major partnership).

Apart from institutions related to JISC, the eLib Programme could also extend its partnership to a variety of institutions.

Pinfield (2004) noticed that the success of the eLib Programme was its capability in finding solutions for technical, managerial, and legal problems as well as cultural changes. Meanwhile, the programme also had failure in the areas of unsuccessful project management (as some projects were failed), inadequate cooperation, and duplication of projects (some projects were tackling the same problems, thus resulting in scarcity of resources allocated.) This resulted in competition between projects within the same activity. A programme manager, therefore, was a key person who should encourage inter-project interaction and cooperation. Another failure mentioned by Pinfield (2004) concerned the omission problem, as it was remarked, there were gaps in the programme activities and their coverage. For instant, economic constraints had prevented eLib from developing a critical mass of online material; strategic developments were missing; and some projects in relation to commercial providers and the profit-making sector somehow failed. However, Pinfield (2004) viewed the overall eLib Programme as successful because it had a good start based on recommendations in the Follett Report which aroused the sense of direction and urgency through the UK academic sector. Another important factor was the good environment of World Wide Web and well-prepared infrastructure provided by the Joint Academic Network (JANET), which facilitated the Programme to sail ahead in order to solve the library crisis concerning space and costs. Focusing on the technical infrastructure and supportive policy, the eLib Programme was viewed by Pinfield (2004) as providing content-based services, which later has been developed into the Distributed National Electronic Resource (DNER).

Other projects playing key role in the development of information services for the research community include:

CURL and COPAC - A union catalogue, giving free access to merged online catalogues of CURL. A JISC funded service.

JANET - Joint Academic Network. This links all higher education institutions, Research Council sites, many FE colleges and other bodies working with the higher education and research community.

DNER - Distributed National Electronic Resource. This project focuses on provision of electronic resources which appears seamless to users. The services are available through JANET for staff and students to access resources via customised interfaces.

NESLI - National Electronic Site Licensing Initiative. It has been generated after the establishment of the Pilot Site Licence Initiative. This project provides services to the UK higher education institutions with access to nationally negotiated electronic journals on a subscription basis.

RDN - Resource Discovery Network. A distributed service which focuses on locating resources for learning, research, and cultural purposes by facilitating access to high-quality Internet resources through the development of subject-based gateways.

UKOLN- Formerly known as 'The United Kingdom Office for Library and Information Networking', UKOLN is a centre of expertise in digital information management. It provides advice and services to the library, information, education and cultural heritage communities. UKOLN is based at the University of Bath and is funded by the JISC and Resource: the Council for Museums, Archives and Libraries, MLA as well as project funding from JISC and the European Union.

Appendix II

A list of target institutions

A List of Target Institutions

A. Academic libraries

1. Burapha University
2. Chiang Mai University
3. Chulalongkorn University, Centre of Academic Resources
4. Huachiew Chaleum-phrakiet University
5. Kasetsart University
6. Khon Kaen University
7. King Mongkut's Institute of Technology Chaokhuntahan, Ladkrabang
8. King Mongkut's Institute of Technology North Bangkok
9. King Mongkut's University of Technology Thonburi
10. Maejo University
11. Mahasarakham University
12. Mahidol University
13. Naresuan University
14. National Institute of Development Administration (NIDA)
15. Pramongkutklao College of Medicine
16. Prince of Songkhla University - Hat Yai campus
17. Prince of Sngkhla University - Pattani campus
18. Ramkhamhaeng University
19. Silpakorn University
20. Srinakharinwirot University - Prasanmit campus
21. Srinakharinwirot University - Ongkharak campus
22. Sukhothai Thammathirat Open University
23. Suranaree University of Technology
24. Thammasat University
25. Ubon Ratchathani University
26. Walailuk University

B. Faculty libraries, Special S&T Libraries and Information Centres

1. Chulalongkorn University, Faculty of Engineering
2. Chulalongkorn University, Faculty of Science
3. Department of Energy Development and Promotion, Ministry of Energy
4. Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment
5. Department of Industrial Promotion, Industrial Development Division, Ministry of Industry
6. Department of Intellectual Property, Services and Information Division, Ministry of Commerce
7. Federation of Thai Industries, Technical Department Information Centre
8. Mahidol University, Faculty of Science (Stang Mongkolsuk Library)
9. Minister of Science and Technology, Office of the Permanent Secretary Information Centre
10. National Research Council of Thailand
11. Office of Atomic Energy for Peace, Ministry of Energy
12. Technological Promotion Association (Thailand - Japan), Technological Information Centre
13. Thai Industrial Standards Institute, Standards Information and Library Services Sub-Division, Ministry of Industry
14. Thai National Documentation Centre (TNDC), Thailand Institute of Scientific and Technological Research
15. The Engineering Institute of Thailand
16. Department of Science Services (DSS)
17. Technical Information Access Centre (TIAC)
18. National Electronics and Computer Technology Center (NECTEC)
19. National Centre for Metal and Material Technology (MTEC)
20. National Centre for Genetic Engineering and Biotechnology (BIOTEC)

D. Funding agencies

1. National Research Council of Thailand
2. The Thailand Research Fund

Appendix III

Cover letters, definitions of terms and questionnaires

Thailand Institute of Scientific and Technological Research
196 Phahonyothin Road, Chatuchak, Bangkok 10900
Tel. +66(0)25791121-30 E-mail: tistr@tistr.or.th

Dear Sir/Madam,

Subject: Asking for cooperation in a questionnaire survey and an interview

My name is Narumol Ruenwai, Technologist level 8 in the Division of Media Production and Dissemination, Thai Documentation Centre (TNDC), Thailand Institute of Scientific and Technological Research (TISTR). Under the sponsorship of the Ministry of Science and Technology (MOST), I am currently a research student at the Department of Information Science, Loughborough University, United Kingdom. I am doing my doctoral thesis in "Science and Technology (S&T) Information in Thailand: Policies, Strategies and Provision".

In this regard, I would like to ask for your assistance and cooperation in this research. I would be grateful if you could spare a few minutes of your time to fill in the enclosed questionnaires. It would be also most appreciated if you could possibly spare your time to participate in an interview to discuss these. Your responses will be highly valuable to the development of S&T information service provision in Thailand to help support research and development.

The enclosed questionnaires are for four groups of stakeholders involved in the service provision: Executives of S&T information centres, Library managers, Librarians/staff, and end-users. I would be grateful if you could distribute the questionnaires to end-users in your library as well.

If you have any enquiries, please feel free to contact me (N.Ruenwai@lboro.ac.uk), or Dr. Anne Morris, my supervisor (A.Morris@lboro.ac.uk). Thank you very much for your kind consideration.

Yours sincerely,

(Miss Narumol Ruenwai)

Thailand Institute of Scientific and Technological Research
196 Phahonyothin Road, Chatuchak, Bangkok 10900, Thailand
Tel. +66(0)25791121-30 E-mail: tistr@tistr.or.th

Dear Sir/Madam,

Subject: Asking for cooperation in a questionnaire survey and an interview

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In this regard, I would like to ask for your assistance and cooperation in this research. I would be grateful if you could spare a few minutes of your time to fill in the enclosed questionnaires. It would be also most appreciated if you could possibly spare your time to participate in an interview to discuss these. The data collected would be highly valuable to the development of S&T information service provision in Thailand to help support research and development.

If you have any enquiries, please feel free to contact me (N.Ruenwai@lboro.ac.uk), or Dr. Anne Morris, my supervisor (A.Morris@lboro.ac.uk). Thank you very much for your kind consideration.

Yours sincerely,

(Miss Narumol Ruenwai)

Thailand Institute of Scientific and Technological Research
196 Phahonyothin Road, Chatuchak, Bangkok 10900
Tel. +66(0)25791121-30 E-mail: tistr@tistr.or.th

TISTR

Dear Sir/Madam,

Subject: Asking for cooperation in a questionnaire survey and an interview

With respect to my doctoral thesis in "Science and Technology (S&T) Information in Thailand: Policies, Strategies and Provision", about two weeks ago I sent you questionnaires which asked you and your staff about the development of the S&T information sector in Thailand and R&D support. At this stage, the records show that your questionnaires have not yet been returned.

Recognising your important role in the development of Thailand S&T information sector, I am writing to you again in order to make sure that you and your staff are willing to participate in this research both by filling in a questionnaire and having an interview. It would be most appreciated if you and your staff could possibly spare time to help me in this project. Your opinion would be of great benefit to the development of the S&T information services.

I would be grateful if you and your staff could send the questionnaires back to me in prepaid envelopes as provided within…………………….(specified date). Or if you would like me to send you the questionnaires again, please feel free to let me know.

If you have any enquiries, please feel free to contact me (N.Ruenwai@lboro.ac.uk), or Dr. Anne Morris, my supervisor (A.Morris@lboro.ac.uk). Thank you very much for your kind cooperation.

Yours sincerely,

(Miss Narumol Ruenwai)

Science and technology information in Thailand:
policies, strategies and provision

Introduction

The Government of Thailand has put policy and strategies in place to harness the national science and technology (S&T) base for research and development (R&D). The underlying thinking is that the strengthening of scientific R&D will give a great benefit to the economic development of the country. The 9th National Economic and Social Development Plan (2002-2006) has raised a key issue to consolidate scientific R&D through the partnerships of public and private sectors in order to make more use of R&D results from the public sector for commercial purposes.

The S&T promotion policy also increases the Government's awareness of the value of S&T information. Meanwhile, the global trend in information management reveals that the most important difference between developed and developing countries is the knowledge gap, which can be defined as the lack of capacity to generate, acquire, disseminate and use S&T knowledge. Therefore, strengthening the S&T information sector in Thailand is needed in terms of development of information resources and services, in order to make more effective use of S&T information.

The global trend in information and knowledge management also shows that policy and strategic management are important to the development of information sector. The proclamation and implementation should be described in a hierarchical manner, ranging from national, institutional, and operational levels. Key stakeholders generally involved and considered as essential in developing the national S&T information service sector comprise executives of institutions concerned, library managers, librarians or library staff, end-users, and funding agencies.

Aims and the Methods of the Research

The research on "Science and technology information in Thailand: policies, strategies and provision" has been conducted with the aim of investigating S&T information services provided by the sectors concerned, namely, academic libraries and S&T information centres. The study concentrates on the policies, present and future roles, and strategic management of service provision in order to develop a model of an effective service, appropriate to Thailand. Various resource inputs which should be included in the process of development of a model, therefore, are examined in the research framework.

The methods of data collection are a mix of quantitative and qualitative approaches. The research tools comprise questionnaires, semi-structured interviews, and focus groups. These will shape the research design both in general and detailed structures.

Significance of the Research

It is anticipated that the results of the investigation could improve utilisation of S&T information, which in turn, will benefit the scientific R&D of Thailand. The research will yield a twofold advantage to the R&D community, which consists of researchers, academics, lecturers, and students; and the S&T information service sector, comprising academic or research libraries, and S&T information centres. The research will give a holistic view of the future development of the S&T information service sector in Thailand, particularly in respect of networked resource sharing. This will lead to an achievement of a best practice framework for S&T information service, outlining an optimum utilisation of S&T information resources and collaborations in scientific R&D among academic institutions, government agencies and the private sectors in Thailand.

Contact Persons and Addresses

If you have any enquiries concerning the research, please contact.

Address in Thailand	Address in the UK	Supervisor
Narumol Ruenwai *Thailand Institute of Scientific and Technological Research (TISTR)* *196 Pahonyothin Road* *Chatuchak* *Bangkok 10900* *Thailand*	Narumol Ruenwai *Research student* *Department of Information Science* *Loughborough University* *Loughborough* *Leicestershire* *LE11 3TU* *United Kingdom*	Dr. Anne Morris *Department of Information Science* *Loughborough University* *Loughborough* *Leicestershire* *LE11 3TU* *United Kingdom*
Email: N.Ruenwai@lboro.ac.uk 　　　narumol_r@tistr.or.th		Email: a.morris@lboro.ac.uk

Definition of Terms

National information policy This refers to the written documents, either in paper or electronic formats, produced by the Thai government, which are publicised to the public and related parties. The content of the document should describe statement of action, proposed by the government, related to information sector which may include S&T information. These documents may be in different types, e.g. Master Plan, Development Plan, Strategic Plan, or any kind of government document which is currently used as an action framework for the national information sector.
Institutional policy This refers to the written documents, either in paper or electronic formats, produced by your institution, which are publicised to staff or clients or related parties. The content of the document should describe statement of action, main responsibilities, vision, mission, institutional goals and achievements, etc.
Institution's information policy This refers to the written documents, either in paper or electronic formats, produced by your institution, which are publicised to staff or clients or related parties. The content of the document should describe statement of action related to information management in your institution, including resources, services, responsibilities, goals, etc.
Strategic plan for information management and services   This refers to the written documents, either in paper or electronic formats, produced by your institution, which should describe detailed methods in managing your institution's information resources or other related resources, for instance, personnel, finance, facilities, information and communication technology, operational goals and future development, framework for implementation and evaluation of achievements, etc.
Resource sharing scheme for information service This refers to collaboration among the concerned libraries or information centres with a purpose of resource sharing, which may include information resources, human resource, equipment and facilities, information and communication technology, etc. The collaboration has an aim of improving service effectiveness or saving costs. Examples of resource sharing scheme are as follows: • Collaborative collection and storing • Exchange of information resources • Inter-library lending • Inter-institute document delivery • Production of union lists union catalogues and bibliographic utilities • Cataloguing • Resource discovery system • Licence agreements • Abstracting and indexing services • Microform services • Staff training • Conservation and preservation of materials

- User support procedures
- Etc.

Note : *The document policies or strategic plans may refer to any types of documents which might be called or named in different titles. But the content of such documents should include the statements as mentioned in each definition of terms above.*

Science and Technology Information in Thailand:
Policies, Strategies and Provision

Respondent: *The Management or the policy makers of the Institution*

Policies and Strategic Management

1. How familiar are you with the following statements?

	Don't or not sure we have one	*Unfamiliar*	*Familiar*	*Very familiar*
Thailand's national information policy	❑	❑	❑	❑
The S&T information proclamation within the national information policy	❑	❑	❑	❑
Your institution's information policy	❑	❑	❑	❑
The S&T information proclamation within your institution's information policy	❑	❑	❑	❑
Your institution's strategic plan for information management and services	❑	❑	❑	❑

If "don't or not sure we have one" or "unfamiliar" with Thailand's information policy , please go to Question No.3

2. If familiar or very familiar with Thailand's *information policy*, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The policy is easy to understand	❑	❑	❑	❑	❑
The policy is easy to implement	❑	❑	❑	❑	❑
The policy has increased awareness of the role of S&T information in promoting competitiveness	❑	❑	❑	❑	❑
The policy has increased the demand for S&T information	❑	❑	❑	❑	❑
The policy has had no effect on the overall provision of S&T information in Thailand	❑	❑	❑	❑	❑
The policy is not well known by S&T information providers	❑	❑	❑	❑	❑
The policy has shaped the provision of information policies for each region of Thailand	❑	❑	❑	❑	❑
The policy has had no effect on my institution	❑	❑	❑	❑	❑

3. Please rank the _top five_ barriers to development of S&T information services in Thailand.
(Please rank   a "1" representing the most important barrier, "2" for second most important barrier, "3" for third most importance barrier and so on for the top five barriers.)

	Rank
The clarity of the national information policy	
The clarity of institutional information policy	
The lack of collaboration among institutional concerned	
Budget inadequate for information service provision	
Lack of skilled personnel	
Poor users' information literacy	
Lack of ICT provision	
Lack of appropriate information resource management	
Restrictions on laws and regulations	
Other (please specify)...	
....	
....	

If "don't or not sure we have one" or "unfamiliar" with institution's information policy, please go to Question No.5

4. If familiar or very familiar with your institution's *information policy*, please rate your agreement   with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
My institution has clear policies in promoting R&D	❑	❑	❑	❑	❑
The information service is considered important by my institution when promoting R&D	❑	❑	❑	❑	❑
My institution actively promotes the S&T information service	❑	❑	❑	❑	❑
My institution considers library system development to be important	❑	❑	❑	❑	❑

If "don't or not sure we have one" or "unfamiliar" with the strategic plan , please go to Question No.6

5. If familiar or very familiar with the *strategic plan for information management and services*, please rate your agreement   with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
Library staff have participated in formulating the institution's strategic plan for information management and services	❑	❑	❑	❑	❑
The strategic plan has increased effectiveness in information service provision	❑	❑	❑	❑	❑
The strategic plan states a goal to integrate ICT and S&T information resources	❑	❑	❑	❑	❑

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
The strategic plan mentions the end-user oriented strategy	❑	❑	❑	❑	❑
The strategic plan states the transition to an electronic library environment	❑	❑	❑	❑	❑
The strategic plan states the professional development of library staff	❑	❑	❑	❑	❑
The strategic plan states the collaborative activities for resource sharing with other institutions	❑	❑	❑	❑	❑

6. Please indicate which services your institution currently provides :

    ❑ Traditional library   ❑ Hybrid library (traditional and electronic)

7. In your opinion, how would you rate the following relating to S&T information service in your institution ?

	Poor	Fair	Satisfactory	Very good	Excellent
The budget allocated for information service provision	❑	❑	❑	❑	❑
ICT provision (quantity)	❑	❑	❑	❑	❑
ICT provision (quality)	❑	❑	❑	❑	❑
Your satisfaction with the information services provided to your end-users	❑	❑	❑	❑	❑

S&T Information Resource Sharing in Thailand

	Unfamiliar	Familiar	Very Familiar
8. How familiar are you with the *S&T information network in Thailand*?	❑	❑	❑

If "unfamiliar", please go to Question No 10

9. If familiar or very familiar, how strongly do you agree or disagree with the following statement?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
Resource sharing benefits the S&T information service sector in Thailand	❑	❑	❑	❑	❑
The S&T information network increases our collaboration with other institutions	❑	❑	❑	❑	❑
The S&T information network increases the demand for our S&T information	❑	❑	❑	❑	❑

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The S&T information network reduces our cost of S&T information	❑	❑	❑	❑	❑
My institution makes a lot of use of the network	❑	❑	❑	❑	❑
My institution wishes to play a more active role in the network	❑	❑	❑	❑	❑
My institution doesn't see any benefit in using the network	❑	❑	❑	❑	❑
The network increases workload in my library	❑	❑	❑	❑	❑

10. If unfamiliar with the S&T information network, how strongly do you agree or disagree with the following statement?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
My institution has never been informed about the network	❑	❑	❑	❑	❑

11. Please rank the _top five_ barriers to S&T information resource sharing in Thailand. *(Please rank a "1" representing the most important barrier, "2" for second most important barrier, "3" for third most importance barrier and so on for the top five barriers.)*

	Rank
Lack of time from staff	
Lack of skilled ICT staff for electronic access	
Fears of unbalanced sharing	
Increase of workload	
No policy from parent institution	
Not necessary to share	
System incompatabilities	
Cost	
Staff attitudes	
Unavailability of ICT	
Lack of information about how the S&T information resource sharing body in Thailand is operating	
Restrictions in laws and regulations	
Other (please specify)..	
....	
....	

12. Any other comments?

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| **Background Information** |
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13. What is your age? ❑ 21-30   ❑ 31-40   ❑ 41-50   ❑ 51-60   ❑ over 60

14. What is your gender?   ❑ Male   ❑ Female

15. What is your highest academic qualification?
❑ PhD   ❑ MSc/M. Eng   ❑ MA/MBA   ❑ BSc/BA   ❑ Other (Please specify)
……………………………….

16. How long have you been working in your present institution?
❑ Less than 5 years   ❑ 5 to 10 years   ❑ More than 10 years

17. What type of institution are you working in?
❑ University   ❑ Public Organisation   ❑ Private Organisation
❑ Other (Please specify)

....

*After completion, please return the questionnaire in the stamped addressed envelope
provided. Thank you very much for your co-operation.*

**Would you be prepared to have an interview or discuss in
more details, which would be very useful, the development of
S&T information service provision in Thailand?**

❑ **Yes**   ❑ **No**

If yes, your contact telephone number is…………………………
Your name ……………………………………………………
Email address ………………………………………………

Science and Technology Information in Thailand:
Policies, Strategies and Provision

Respondent: *Library manager*

Policies and   Strategic Management

1. How familiar are you with the following statements?

	Don't or not sure we have one	*Unfamiliar*	*Familiar*	*Very familiar*
Your institution's information policy	❑	❑	❑	❑
The S&T information proclamation within the institution's information policy	❑	❑	❑	❑
Your institution's strategic plan for information management and services	❑	❑	❑	❑

If "don't or not sure we have one" or "unfamiliar" with   your institution's information policy , please go to Question No.3

2. If familiar or very familiar with your *institution's information policy*, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The policy is easy to understand	❑	❑	❑	❑	❑
The policy is easy to implement	❑	❑	❑	❑	❑
The policy has increased awareness of the role of S&T information in promoting competitiveness	❑	❑	❑	❑	❑
The policy has shaped the provision of information services in my institution	❑	❑	❑	❑	❑
The policy has had no effect on the overall provision of S&T information in my institution	❑	❑	❑	❑	❑
The policy is not well known by library staff	❑	❑	❑	❑	❑

If "don't or not sure we have one" or "unfamiliar" with the strategic plan , please go to Question No.4

3. If familiar or very familiar with the *strategic plan for information management and services*, please rate your agreement   with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
I have participated in formulating my institution's strategic plan for information management and services	❑	❑	❑	❑	❑

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
Library staff have participated in formulating the institution's strategic plan for information management and services	❑	❑	❑	❑	❑
The strategic plan has increased effectiveness in information service provision	❑	❑	❑	❑	❑
The strategic plan has identified clear responsibility for implementation	❑	❑	❑	❑	❑
The strategic plan is useful for conducting activities in information services	❑	❑	❑	❑	❑
The strategic plan states a goal to integrate ICT and S&T information resources	❑	❑	❑	❑	❑
The strategic plan mentions the end-user oriented strategy	❑	❑	❑	❑	❑
The strategic plan states the transition to an electronic library environment	❑	❑	❑	❑	❑
The strategic plan states the professional development of library staff	❑	❑	❑	❑	❑
The strategic plan states the collaborative activities for resource sharing with other institutions	❑	❑	❑	❑	❑
The strategic plan is generally known to the library staff	❑	❑	❑	❑	❑

4. Please indicate which services your institution currently provides :

    ❑ Traditional library   ❑ Hybrid library (traditional and electronic)

5. In your opinion, how would you rate the following relating to S&T information service in your institution ?

	Poor	Fair	Satisfactory	Very good	Excellent
The budget allocated for information service provision	❑	❑	❑	❑	❑
ICT provision (quantity)	❑	❑	❑	❑	❑
ICT provision (quality)	❑	❑	❑	❑	❑
Your satisfaction with the information services provided to your end-users	❑	❑	❑	❑	❑

6. How would you rate your agreement with these statements concerning services provided to end-users?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
My library provides ICT training for end-users	❑	❑	❑	❑	❑
My library provides end-users with library usage skills	❑	❑	❑	❑	❑
My library advertises new resources to end-users	❑	❑	❑	❑	❑
My library conducts user surveys at least once a year	❑	❑	❑	❑	❑

7. How would you rate the following statements relating to personnel management?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
Library staff in my institution have adequate skills in ICT	❑	❑	❑	❑	❑
Library staff in my institution have adequate skills in librarianship	❑	❑	❑	❑	❑
My institution doesn't have adequate staff to deal with a high workload	❑	❑	❑	❑	❑

8. What items are covered in the resource sharing scheme of your library?

	Yes	No	To be developed
• Collaborative collection and storing	❑	❑	❑
• Exchange of materials	❑	❑	❑
• Inter-library lending	❑	❑	❑
• Inter-institute document delivery	❑	❑	❑
• Production of union lists, union catalogues, and bibliographic utilities	❑	❑	❑
• Storage of materials	❑	❑	❑
• Cataloguing	❑	❑	❑
• Resource discovery system	❑	❑	❑
• Licence agreements	❑	❑	❑
• Abstracting and indexing services	❑	❑	❑
• Microform services	❑	❑	❑
• Staff training	❑	❑	❑
• Conservation and preservation of materials	❑	❑	❑
• User support procedures	❑	❑	❑

9. What other resources has your library shared with other libraries?

………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………

10. Please prioritise the need for improvement of the following aspects in your library. *(Please rank each item with a "1" for mostly needed, "2" for second mostly needed, "3" for third mostly needed and so on.)*

	Rank
• Staff skill	
• Service performance	
• ICT	
• Space	
• Location	
• Annual budget	

S&T Information Resource Sharing in Thailand

	Unfamiliar	*Familiar*	*Very Familiar*
11. How familiar are you with the S&T Information Network in Thailand?	❑	❑	❑

If "unfamiliar" please go to Question No 13

12. If familiar or very familiar, how strongly do you agree or disagree with the following statements?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
Resource sharing can generally benefit S&T information service sector in Thailand	❑	❑	❑	❑	❑
S&T information network can increase our collaboration with other institutions	❑	❑	❑	❑	❑
S&T information network can increase the demand for S&T information	❑	❑	❑	❑	❑
S&T information network can reduce our cost of S&T information	❑	❑	❑	❑	❑
S&T information network enables us to obtain S&T information more quickly	❑	❑	❑	❑	❑
S&T information network can eliminate duplication in acquisition of S&T information resources	❑	❑	❑	❑	❑
My institution wishes to play a more active role in the network	❑	❑	❑	❑	❑
My institution doesn't see any benefit in using the network	❑	❑	❑	❑	❑
The network increases workload in my library	❑	❑	❑	❑	❑

13. If unfamiliar with the S&T information network, how strongly do you agree or disagree with the following statement?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
My institution has never been informed about the network	❑	❑	❑	❑	❑

14. Please rank the _top five_ barriers to S&T information resource sharing in Thailand. *(Please rank each item with a "1" representing the most important barrier, "2" for second most important barrier, and "3" for third most importance barrier and so on.)*

	Rank
Lack of time from staff	
Lack of skilled ICT staff for electronic access	
Fears of unbalanced sharing	
Increase of workload	
No policy from parent institution	
A view that it is not necessary to share	
System incompatabilities	
Cost	
Staff attitudes	
Unavailability of ICT	
Lack of information about how the S&T information resource sharing body in Thailand is operating	
Restrictions in laws and regulations	
Other (please specify)...	
....	
....	

15. Any other comments?

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Background Information

16. What is your age?   ❑ 21-30   ❑ 31-40   ❑ 41-50   ❑ 51-60   ❑ over 60

17. What is your gender?   ❑ Male   ❑ Female

18. What is your highest academic qualification?
❑ PhD   ❑ MSc/M. Eng   ❑ MA/MBA   ❑ BSc/BA   ❑ Other (Please specify)
....

19. How long have you been working in your present institution?
❑ Less than 5 years   ❑ 5 to 10 years   ❑ More than 10 years

20. What type of institution are you working in?

❑ University   ❑ Public Organisation   ❑ Private Organisation
❑ Other (Please specify)

....

After completion, please return the questionnaire in the stamped addressed envelope provided. Thank you very much for your co-operation.

Would you be prepared to have an interview or discuss in more details, which would be very useful, the development of S&T information service provision in Thailand?

❑ **Yes**   ❑ **No**

If yes, your contact telephone number is…………………………
Your name …………………………………………………………
Email address ……………………………………………………

**Science and Technology Information in Thailand:
Policies, Strategies and Provision**

Respondent: *Librarian/library staff*

Policies and Strategic Management

1. How familiar are you with the following statements?

	Don't or not sure we have one	*Unfamiliar*	*Familiar*	*Very familiar*
Your institution's information policy	❏	❏	❏	❏
The S&T information proclamation within your institution's information policy	❏	❏	❏	❏
Your institution's strategic plan for information management and services	❏	❏	❏	❏

If "don't or not sure we have one" or "unfamiliar" with your institution's information policy, please go to Question No.3

2. If familiar or very familiar with your institution's information policy, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The policy is easy to understand	❏	❏	❏	❏	❏
The policy is easy to implement	❏	❏	❏	❏	❏
The policy has increased awareness of the role of S&T information in promoting competitiveness	❏	❏	❏	❏	❏
The policy has shaped the provision of information service in my institution	❏	❏	❏	❏	❏
The policy has had no effect on information service in my institution	❏	❏	❏	❏	❏
The policy is not well known by library staff	❏	❏	❏	❏	❏

If "don't or not sure we have one" or "unfamiliar" with the strategic plan , please go to Question No.4

3. If familiar or very familiar with the strategic plan for information management and services, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
I have had opportunities to participate in formulating my institution's strategic plan for information management and services	❏	❏	❏	❏	❏

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
The strategic plan has increased effectiveness in information service provision	❑	❑	❑	❑	❑
The strategic plan has identified clear responsibility for implementation	❑	❑	❑	❑	❑
The strategic plan is useful for conducting activities in information services	❑	❑	❑	❑	❑
The strategic plan states a goal to integrate ICT and S&T information resources	❑	❑	❑	❑	❑
The strategic plan mentions the end-user oriented strategy	❑	❑	❑	❑	❑
The strategic plan states the transition to an electronic library environment	❑	❑	❑	❑	❑
The strategic plan has states the professional development of library staff	❑	❑	❑	❑	❑
The strategic plan has states the procedures for resource sharing	❑	❑	❑	❑	❑
The strategic plan is generally known by library staff	❑	❑	❑	❑	❑

4. Please indicate which services your institution currently provides :

❑ Traditional library   ❑ Hybrid library (traditional and electronic)

5. How strongly do you agree or disagree with the following statements?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
I have had opportunities to participate in library management	❑	❑	❑	❑	❑
I have had opportunities to attend training courses regularly	❑	❑	❑	❑	❑
Library staff in my library have adequate skills in ICT	❑	❑	❑	❑	❑
Library staff in my library have adequate skills in librarianship	❑	❑	❑	❑	❑
The workload given to me is satisfactory	❑	❑	❑	❑	❑
I can manage new ICT with strong institutional support	❑	❑	❑	❑	❑
I have conducted research in the field of information science or library system	❑	❑	❑	❑	❑

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
I am involved in teaching information literacy skills to end-users	❑	❑	❑	❑	❑
I am involved in managing knowledge of my institution	❑	❑	❑	❑	❑
I am satisfied with the quality of service provided by my library	❑	❑	❑	❑	❑

S&T Information Resource Sharing in Thailand

	Unfamiliar	Familiar	Very Familiar
6. How familiar are you with the S&T information network in Thailand?	❑	❑	❑

If "unfamiliar", please go to Question No 8

7. If familiar or very familiar, how strongly do you agree or disagree with the following statements?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
Resource sharing benefits the S&T information service sector in Thailand	❑	❑	❑	❑	❑
The S&T information network increases our collaboration with other institutions	❑	❑	❑	❑	❑
The S&T information network increases the demand for S&T information	❑	❑	❑	❑	❑
The S&T information network reduces our cost of S&T information	❑	❑	❑	❑	❑
The S&T information network enables us to obtain S&T information more quickly	❑	❑	❑	❑	❑
The S&T information network eliminates duplication in acquisition of S&T information resources	❑	❑	❑	❑	❑
My institution wishes to play a more active role in the network	❑	❑	❑	❑	❑
My institution doesn't see any benefit in using the network	❑	❑	❑	❑	❑
The network increases workload in my library	❑	❑	❑	❑	❑

8. If unfamiliar with the S&T information network, how strongly do you agree or disagree with the following statement?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
I have never been informed about the network	❑	❑	❑	❑	❑

9. Please rank the top five barriers to S&T information resource sharing in Thailand. *(Please rank   a "1" representing the most important barrier, "2" for second most important barrier, "3" for third most importance barrier and so on for the top five barriers.*

	Rank
Lack of time from staff	
Lack of skilled ICT staff for electronic access	
Fears of unbalanced sharing	
Increase of workload	
No policy from parent institution	
A view that it is not necessary to share	
System incompatabilities	
Cost	
Staff attitudes	
Unavailability of ICT	
Lack of information about how the S&T information resource sharing body in Thailand is operating	
Restrictions in laws and regulations	
Other (please specify)...	
....	
....	

10. Any other comments?

....
....
....
………

Background Information

11. What is your age?   ❑ 21-30   ❑ 31-40   ❑ 41-50   ❑ 51-60   ❑ over 60

12. What is your gender?   ❑ Male   ❑ Female

13. What is your highest academic qualification?
❑ PhD   ❑ MSc/M. Eng   ❑ MA/MBA   ❑ BSc/BA   ❑ Other (Please specify)
…………………………….

14. How long have you been working in your present institution?
❑ Less than 5 years   ❑ 5 to 10 years   ❑ More than 10 years

15. What type of institution are you working in?
❑ University   ❑ Public Organisation   ❑ Private Organisation
❑ Other (Please specify)
....

After completion, please return the questionnaire in the stamped addressed envelope provided. Thank you very much for your co-operation

**Science and Technology Information in Thailand:
Policies, Strategies and Provision**

Respondent: Library users (Research staff, Research student, Undergraduate and Postgraduate students, Academic, and Researcher

1. How often do you use the library?

❑ Daily   ❑ Weekly   ❑ Monthly   ❑ Termly   ❑ Other.........................

2. What library services do you use? *Please check appropriate answers.*

❑ Reference materials	❑ Book/material borrowing	❑ Interlibrary loan
❑ Microfiche	❑ Videocassette viewing	❑ Audiocassette/CDs
❑ CD-ROM searching	❑ Online catalogue searching	❑ Online journal index searching
❑ Internet searching	❑ Online full-text database searching	❑ Periodicals/journals/ newspaper
❑ Government documents	❑ Union catalogue searching	❑ Other (please specify) ....

3. What types of information sources do you often use and in which format do you prefer? *Please check appropriate answers.*

	Paper-based format	*Electronic-based format*
❑ References	❑	❑
❑ Books	❑	❑
❑ Periodicals/journals/ newspaper	❑	❑
❑ Conference proceedings	❑	❑
❑ Technical reports	❑	❑
❑ Statistics	❑	❑
❑ Standards	❑	❑
❑ Government documents	❑	❑
❑ Other (please specify)..............................	❑	❑

4. How frequently do you use print and electronic formats of information

	At least once a year	*At least once a month*	*At least once a week*	*Several times a week*
Print format	❑	❑	❑	❑
Electronic format	❑	❑	❑	❑

5. Regarding your preference of electronic or print formats, at what level would you rate your agreement with the following statements?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
Printed materials are more convenient to search	❑	❑	❑	❑	❑
I am used to searching through library card catalogues and printed bibliography	❑	❑	❑	❑	❑
I am not used to searching by computer	❑	❑	❑	❑	❑

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
In general, I can't find what I am looking for from electronic information resources	❏	❏	❏	❏	❏
The searching system through electronic information in the library is complicated	❏	❏	❏	❏	❏
Searching through computer is more convenient	❏	❏	❏	❏	❏
Searching for electronic format is faster	❏	❏	❏	❏	❏
Equipment provided in the library facilitates me in searching for electronic format	❏	❏	❏	❏	❏
The library has a useful collection of electronic resources available	❏	❏	❏	❏	❏
Searching through traditional library services consumes much more time	❏	❏	❏	❏	❏
Electronic materials are generally more up-to-date than print materials	❏	❏	❏	❏	❏
I can do the searching off-campus	❏	❏	❏	❏	❏

	Yes	No
7. Are you aware if the library provide an induction course to users?	❏	❏
8. Are you aware if the library provide ICT training to users?	❏	❏

9. Please prioritise the skills you need to be trained by the library. *(Please rank each item with a "1" for mostly needed, "2" for second mostly needed, "3" for third mostly needed and so on.)*

	Rank
• Online library catalogue (OPAC)	
• Online journal index searching	
• Online database searching	
• Online full-text database searching	
• Internet searching	
• E-mail using	
• Other (please specify) …………..	

10. At what level would you rate your agreement with the following statements in relation to convenience of access?

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
The library provides adequate computers for users	❏	❏	❏	❏	❏
The ICT support staff are adequate to deal with my ICT enquiries effectively	❏	❏	❏	❏	❏

11. How would you rate your agreement with the   following statements in relation to information literacy?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
When doing research/assignment, you always look for various kinds of information resources	❏	❏	❏	❏	❏
You usually know how to phrase your search	❏	❏	❏	❏	❏
You usually ask for help when you have difficulties in locating a particular piece of information	❏	❏	❏	❏	❏
You use search engines on the Internet	❏	❏	❏	❏	❏
You usually evaluate the information you find in terms of currency, authority and appropriateness	❏	❏	❏	❏	❏
It is important to evaluate information on the Internet	❏	❏	❏	❏	❏

12. At what level would you rate your attitude   with the following statements?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The range of books held by the library is adequate	❏	❏	❏	❏	❏
The range of printed journals held by the library is adequate	❏	❏	❏	❏	❏
The range of electronic journals held by the library is adequate	❏	❏	❏	❏	❏
The library provides an effective interlibrary loan service	❏	❏	❏	❏	❏
Communication media used by the library is satisfactory	❏	❏	❏	❏	❏
Staff deal with my enquiries effectively	❏	❏	❏	❏	❏
The layout of the library makes it easy for me to use	❏	❏	❏	❏	❏
The library always use the results from user surveys to improve services	❏	❏	❏	❏	❏
Overall I am satisfied with the quality of service provided by the library	❏	❏	❏	❏	❏
I don't mind paying reasonable service fees if it provides me with more variety of authenticity of information sources	❏	❏	❏	❏	❏

13. Please indicate which type of the library you are using :

❑ Traditional library   ❑ Electronic/digital library   ❑ Hybrid library (traditional and electronic)

14. Any comments or ideas about an improvement of S&T information service provision?

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Background Information

15. What is your age?   ❑ 21-30   ❑ 31-40   ❑ 41-50   ❑ 51-60   ❑ over 60

16. What is your gender?   ❑ Male   ❑ Female

17. You are   ❑ Research staff   ❑ Research student   ❑ Post-graduate students   ❑ Academic   ❑ Researcher

18. If you are not a student, how long have you been working in your present institution?
❑ Less than 5 years   ❑ 5 to 10 years   ❑ More than 10 years

19. If you are not a student, what type of institution are you   working in?
❑ University   ❑ Public Organisation   ❑ Private Organisation
❑ Other (Please specify)...

After completion, please return the questionnaire in the stamped addressed envelope provided. Thank you very much for your co-operation.

**Science and Technology Information in Thailand:
Policies, Strategies and Provision**

Respondent: *Decision makers in funding agencies*

Organisational roles and policies

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1. At what level would you rate your agreement with the following statements?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
My institution has set vision in promoting scientific R&D	❑	❑	❑	❑	❑
My institution has clear mission in promoting scientific R&D	❑	❑	❑	❑	❑
My institution has clear policies in promoting scientific R&D	❑	❑	❑	❑	❑
My institution has set strategies in promoting scientific R&D	❑	❑	❑	❑	❑
S&T information service is also included in those strategies	❑	❑	❑	❑	❑
The information service is considered important by my institution when promoting R&D	❑	❑	❑	❑	❑
My institution actively promotes S&T information service	❑	❑	❑	❑	❑
My institution considers library system development to be important	❑	❑	❑	❑	❑

National information policy and Information network in Thailand

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2. How familiar are you with the following?

	Unfamiliar	*Familiar*	*Very familiar*
Thailand's national information policy	❑	❑	❑
The S&T information proclamation within the National Information policy	❑	❑	❑
The S&T Information Network in Thailand	❑	❑	❑

3. If familiar or very familiar with Thailand's information policy, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The policy is well known by my institution	❑	❑	❑	❑	❑
The policy has increased awareness to an importance of S&T information	❑	❑	❑	❑	❑

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The policy has shaped funding activities of my institution	❑	❑	❑	❑	❑
My institution has funded projects related to information system development	❑	❑	❑	❑	❑
The policy has had no effect on my institution	❑	❑	❑	❑	❑

4. If familiar or very familiar with the S&T Information Network in Thailand, please rate your agreement with the following statements.

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
The network has increased collaboration between institutions generally	❑	❑	❑	❑	❑
The network has increased the demand for S&T information	❑	❑	❑	❑	❑
My institution has funded projects of the network	❑	❑	❑	❑	❑

Funding criteria

5. At what level would you agree with these following statements?

	Totally disagree	*Disagree*	*Neither agree nor disagree*	*Agree*	*Totally agree*
	❑	❑	❑	❑	❑
My institution has its own funding criteria	❑	❑	❑	❑	❑
My institution has specific criteria in funding development projects of S&T information sector	❑	❑	❑	❑	❑
My institution has announced publicly funding criteria	❑	❑	❑	❑	❑

6. What are the funding criteria of your institution? *(Please specify in details)*

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7. From these following projects, please prioritise activities of information system development of Thailand which have a potential to receive funding. *(Please rank each item with a "1" for mostly needed, "2" for second most needed, "3" for third mostly needed and so on.)*

	Rank
• Collection	
• Access	
• Archiving/preservation	
• Marketability of information products (e.g. databases, e-journals, etc.)	
• Library resources	
• User training	
• Library staff training	
• Library staff educating	
• Conferencing on specific topics of information system development	
• Electronic/digital library	
• Resource sharing	
• Other *(please specify)*	

8. Any comments or suggestions.

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....
....
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Background Information

1. What is your age?   ❏ 21-30   ❏ 31-40   ❏ 41-50   ❏ 51-60   ❏ over 60

2. What is your gender?   ❏ Male   ❏ Female

3. What is your highest academic qualification?
❏ PhD   ❏ MSc/M. Eng   ❏ MA/MBA   ❏ BSc/BA   ❏ Other (Please specify)
………………………………

4. How long have you been working in your present institution?
❏ Less than 5 years   ❏ 5 to 10 years   ❏ More than 10 years

5. What type of institution are you working in?
❏ University   ❏ Public Organisation   ❏ Private Organisation
❏ Other (Please specify) ....

After completion, please return the questionnaire in the stamped addressed envelope provided. Thank you very much for your co-operation.

> **Would you be prepared to have an interview or discuss in more details, which would be very useful, the development of S&T information service provision in Thailand?**
>
> ❏ **Yes**   ❏ **No**
>
> If yes, your contact telephone number is…………………………
> Your name …………………………………………………………
> Email address ………………………………………………………

563

Appendix IV

Interview questions: Funding agencies

Science and Technology Information in Thailand: Policies, Strategies and Provision		
Participant: ………………………… Gender: ……………Age ……… Education: ………………………… Duration of work experience: ………	Position: ………………… Institution: ……………… …………………………...	Interviewing date : …………….. Time: ……………………
Interview questions	**Key concept**	**Remark**
1. What are the funding policies of your institution? 2. What is current role of your institution? 3. What are criteria in funding? 4. Does your institution provide funding to any project in the area of information service/system or library development? If any, what are those projects about? 5. Are you familiar with Thailand information policy? Could you please say what it is about?	Policies in funding scientific R&D Information development projects	
6. Any other questions?		

Science and Technology Information in Thailand: Policies, Strategies and Provision		
Participant: ………………………… Gender: ……………Age ……… Education: ………………………… Duration of work experience: ………	Position: ………………… Institution: ……………… …………………………...	Interviewing date : …………….. Time: ……………………
Interview questions	**Key concept**	**Remark**
1. Policies and strategic management **Policies** • What is your opinion of the development of S&T information services in Thailand? • Do you agree that our S&T information service sector has not been developed much? Why or Why not? • In your opinion, what is the most serious barrier to the development that should be solved first? And how? • Are you familiar with the national information policy? Does it say some interesting points about S&T information provision? • Do you think the national information policy is important to the development of S&T information service in our country? Why? • Does your institution have an institutional policy? What is it about?		
• Does your institution have an information policy? What is it about? Does it correspond to the national information policy? How?	• Does it say anything about R&D promotion, information or knowledge management, and information system development?	
• Who get involved in writing both policies?		
• Does the policy has short-term and long-term goal?		
• What is your opinion about an implementation of the policies? Is it meaningful?		
• Do the policies cover all levels of implementation?	• Are there hierarchical policies? How to make it well known by staff?	
• Is there any penalty involved if the implementation doesn't meet the goals?	• With or without the policies, what are significant differences in implementing?	

Interview questions	Key concept	Remark
Strategic plan for information management and services		
• Who get involved in writing the strategic plan? • What issues are included in your institution's strategic plan?	• Participatory roles/well known by staff • End-user oriented?/ICT plan/ transition to an electronic library/ professional development of library staff/collaborative activities for resource sharing	
• Do you have any plan to develop the S&T information service provided by your institution?		
2. Resource sharing		
1. Are you familiar with the concept of resource sharing in information service provision? • What is your opinion about the concept of resource sharing in Thailand environment?		
• Do you agree that resource sharing can give more benefits to users, for example, researchers, academics, or students? Why or why not?		
• Does resource sharing fit into the institutional or information policy?		
• What is your opinion about S&T information network in Thailand?		
• How do you boost cooperation between institutions? • What do you think are the most important barriers to resource sharing in Thailand? How to solve?		
3. Any other comments?		

Science and Technology Information in Thailand: Policies, Strategies and Provision		
Participant: ………………………… Gender: ……………Age ……… Education: ………………………… Duration of work experience: ………	Position: ………………… Institution: ……………… …………………………...	Interviewing date : …………….. Time: ……………………
Interview questions	**Key concept**	**Remark**
1. S&T information service provision • Who are the key users? • Are they information literate? • What are service goals? • Does the library always provide potential or new resources to users? • How are user survey results? • How can you describe about the current state of services of your library in terms of budget/quantity and quality of ICT/ effectiveness of service/ satisfaction	Users-oriented strategy? How to operate? Have services been improved responding to survey results? Sufficiency/problems and solutions/future plans	
2. Policies and strategic management **Policies** • Does your institution have an information policy? What is it about? • Does resource sharing fit into the institutional or information policy? • What is your opinion of an implementation of the policies? Is it useful in your working? How? • Do the policies cover all levels of implementation? • Do you have any idea about the national information policy?	Both policies: Does it say anything about R&D promotion, information or knowledge management, and information system development? With or without the policies, what are significant differences in implementing? Are there hierarchical policies? How to make it well known by staff? Awareness	
Strategic plan • How do you and library staff participate in the formulating strategic plan? • What issues are included in your institution's strategic plan? • Can you say about advantages or disadvantages of having strategic plan?	Participatory roles/well known by staff End-user oriented?/ICT plan/ transition to an electronic library/ professional development of library staff/collaborative activities for resource sharing	

Interview questions	Key concept	Remark
• What is your plan for personnel management? Future plan?	Staff vs. workload, skills in ICT and librarianship, problems and solutions	
3. Resource sharing • Could you explain about the resource sharing scheme in your library? • In what way do you operate the sharing? • Do you have any development plan for the resources? What does it say? • What is your opinion of the concept of resource sharing in Thailand environment? • What is your opinion of S&T information network in Thailand? • What is your expectation of the network? • What are the problems you have encountered so far? How to solve?	Types of resources shared Practices and mechanisms Future plan Advantages and disadvantages e.g. cost, workload, service quality Effectiveness, frequency of use, cost Purchasing consortia, organisational structure, governance, more shared resourced	
4. Any other questions?		