CHAPTER 1

INTRODUCTION

1.1   Background to the Study

Libraries had existed for more than 2,500 years (Witten and Bainbridge, 2003). The earliest libraries had orchestrated their role as custodians of the recorded human mind. However this role would need to be re-looked as the functions of traditional libraries characterized by the concepts of intermediary and ownership had been challenged by the new concepts of disintermediation and virtual access. Libraries' traditional roles and functions in the forms of acquisition, cataloging/indexing, information dissemination and preservation had given way preliminary to the provision of access to materials that they do not own. The progression and transformation of library functions and services that were brought by Information and Communication Technologies (ICT) had been tremendous and had enormously influenced those basic functions that the emergence of a new library type is inevitable.

1.1.1   Emergence of Digital Libraries

Digital libraries had been under development since the early 1990's (Fox, et.al 2005) and their emergence had opened up new horizons related to the design, implementation, development and evaluation (Ali, 2003), involving a number of social, cultural and behavioral, economic and legal issues (Chowdhury and Chowdhury, 2003). The idea of a "computerized library" was first invented by H.G. Wells, with writings about "world brains" (Saeed, 2006). Then in 1945 Vannevar Bush wrote about his imaginary machine *Memex*. Douglas Engelbart later developed what was to be called

hypertext and Ted Nelson coined the term hypertext in the mid 1960's. Finally it was Tim Berners-Lee who proposed the global hypertext called World Wide Web (WWW) (Tedd and Large, 2005). Deegan and Tanner (2002) regarded these developments as the greatest advancement in ICT and the widespread usage had revolutionized library operations (Cathro, 1999).

One of the early attempts towards digital library development was the 1971 Ohio Computer Library Center's WORLDCAT (Deegan and Tanner, 2002), now a union catalog of more than 1 billion items (Hickey and O'Neill, 2005). Others were Project Gutenberg 1971 at the University of Illinois, *Perseus*, a large hypertext collection of materials on the ancient Greek world (Chowdhury and Chowdhury, 2003) and the 1970's full-text document databases, supported by software called STAIRS (Cathro, 1999). Most of these early attempts involved the digitization of journal articles, such as the pre-digital Mercury Electronic Library project (1989-1992) at Carnegie Melon University in Pittsburgh and OCLC (Tedd and Large, 2005), TULIP (The University Licensing Project) 1993-1995 by Elsevier Science (Hickey, 2004), CORE (Chemistry Online Retrieval Experiment) a project involving OCLC, Cornell University, Bellcore and the American Chemistry Society. The American Abstract Service on the other hand had successfully digitized 400,000 pages from chemistry journals published by the American Chemistry Society (Tedd and Large, 2005).

In the United Kingdom, ELINOR (Electronic Library Information Online Retrieval) and the *eLib* were among the first electronic library projects in 1992-1996 (Chowdhury and Chowdhury, 2003). The New Zealand Digital Library project at the University of Waikato had developed the *Greenstone* software and the African Digital

Library was giving free access to e-books to anyone living in Africa (Tedd and Large, 2005). The Library of Congress completed the trial of the American Memory Project 1990-1994 (Cathro, 1999) and had digitized 9 million items as of June 2007 (http://memory.loc.gov/). In Spain, the first large-scale digitization experiment was the *Archivo General de Indias*, comprising the written heritage of Spain's 400 years in power in the Americas (Rutimann and Stuart, 1992). Those were some of the early important developments of traditional and electronic libraries derived from the advancement of ICT that would set libraries' future trend and the emergence of digital libraries storing digitized data made it possible to search more easily and conveniently (Chen and Chen, 2007).

1.1.2 Impact of Information and Communication Technology (ICT) on Libraries

The introduction of Online Public Access Catalog (OPAC) and later web OPAC was a proven fact that ICT had been vital in the development of digital libraries. According to Law (2006) information technologies had been growing at an explosive rate and the location and provision of information services had dramatically changed over the last 10 years (Chen, 2005). Information resources were now available online via digital libraries representing a new form of information technology in which content management, service delivery and social impact matter as much as technological advancement (Patra, 2006).

With ICT, data was available globally through communication networks while facilitating searches with speed (Sharma and Vishwanathan, 2001). Digitization and its derivatives - the Internet and hypertext, propelled information access and exchange into

the era of cyberspace, the cyber library or '*cybrary*' i.e. an electronic gateway for clients located anywhere to access information located everywhere (Kapitzke, 2001). Digital information could be represented as digital text, image, audio, video (Patra, 2006), and thus reducing the need for physical space; allowed concurrent use and provided access to materials that they do not own, presupposed the absence of human intermediaries or disintermediation, allowing better retrieval facilities, besides able to handle multilingual information resources (Chowdhury and Chowdhury, 2003). Digital library conjures up an image of a paperless, networked and ultimately limitless information heaven, bound by neither place nor time and available to all at the click of a mouse (Mc Guiness, 2000). However Gorman (2000) cautioned librarians not to be overwhelmed with digital technologies to the extent that the unique librarians' skills – bibliographic control, collection development and reference work – would not apply any longer.

Digital libraries of the 21st century could be searched and their contents transmitted around the world (Crane, 2006), characterized by online services, multidisciplinary and multimedia collections, decentralized and distributed information resources, networked environment and information was available globally within seconds. As Anderson and Maxwell (2004) put it, one of the great boons of the web was the online availability of the treasures of the world's libraries and museums, as exemplified by Australia's Treasures from the *World's Great Libraries*, where collections located in 24 countries were accessible via http://www.nla.gov.au/worldtreasures (Tedd and Large, 2005). Even UNESCO recognizes that digital libraries were radically reforming how information was acquired and disseminated (Witten, 2005).

The library of the future was where all texts could be summoned, assembled and read not only on a computer screen, but a Personal Digital Assistant had also enabled reading e-books through a screen (Louis, 2002). Digital library encompasses a new set of information storage and retrieval systems where universal access was of prime important. Arms (2002) stressed that a digital library was where the information was stored in digital formats and accessible over a network. It was the outcome of digitization process (Deegan and Tanner, 2002), associated with the concept of virtual reality and described as the 'ultimate multimedia experience' or 'telepresence' (Barker, 1994). Digital library was an information system that offers a coherent view of organized, selected and managed body of information (Lynch, 2003) and Chen (2005) consolidated this by saying that it was electronically accessible from a wide variety of globally distributed information repositories.

The development of digital library saw the information profession becoming more 'open' and information professionals in a digital world should be concerned mainly with resource discovery, resource provision, and resource delivery. They would now be knowledge preserver by ensuring that digital preservation a success (Deegan and Tanner, 2002), should be information architects (Veen, 2001) and libraries acting as gateways (Kochtanek and Hein, 1999). Increasingly, information was likely to come from servers at publishers, societies and bigger libraries (Lesk, 2004) and some libraries had already undertaken large scale organizational reconfigurations to meet the challenges of the digital environment (Cuesta, 2005). The concept of a digital library was "library without walls" and libraries must reached out more towards the sources of information

(Lindquist, 1997), i.e. the ability to browse a library system without actually having to go to it physically (Barker, 1994).

The impact of technology had been so great that the most important element encompassing digital libraries had been the provision of global access, as Jaswal (2006) said library pays for access but none became owner of the content. Whether digital library or virtual library or electronic library or library without walls, the underlying concept was universal access through the digitization of library materials, linking the information provider and information seeker directly via the Internet.

1.1.3   Definitions of Digital Library

The term digital library emerged around 1990 (Saunders and Mitchell, 1996) and the Digital Library Initiatives (DLIs) was the result of a community-based process which began in the late 1980's (Griffin, 1998). Several terms had been used interchangeably with digital libraries, viz electronic library, virtual library, library without walls and digital library (Raitt, 1999), besides cyberlibrary, cybrary and ebrary (Tedd and Large, 2005). However the National Digital Library of Korea, launched in May 2009 is using the term dibrary (www.dibrary.net) and the National Digital Library of Norway is called NBdigital (Takle, 2009).

The University of Central England defined a digital library as a system that provides a means of integrating digitized text, image, audio and video resources, delivered across a networked to authorized users wherever they were located, whenever they needed them (Dodd and Andrews, 2004). The National Science, Technology, Engineering, and Mathematics, US defined a digital library as a managed environment of

multimedia materials in digital form, designed for the benefits of its user population, structured to facilitate access to its contents, and equipped with aids to navigate the global network, with users and holdings totally distributed but managed as a coherent whole (Mischo, 2004). Meanwhile, the Digital Library Federation (www.diglib.org/) proposed this definition: "Digital Libraries were organizations that provided the resources, including the special staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they were readily and economically available for use by a defined community" (Greenstein, 2000).

The Association of Research Libraries in 1995 signifies digital library broad diversity. According to ARL, the digital library was not a single entity as it requires technology to link the resources of many (technology driven) and universal access to a digital library and information services was the goal and that digital library collections were not limited to document surrogates as they extend to digital artifacts that could not be represented or distributed in printed formats (Borgman, 2000). Deegan and Tanner (2002) on the other hand defined it as a managed collection of digital objects, created according to the principles of collection development, made available in a cohesive manner and allowed user to retrieve just as they would any other library materials.

The Joint Conference on Digital Libraries (JCDL, 2007) encompasses the many meanings of the term including (but not limited to) new forms of information institutions; operational information systems with all types of digital content; new means of selecting, collecting, organizing, retrieving and distributing digital content; digital preservation and

archiving; and theoretical models of information media, including document genres and electronic publishing (http://www.jcdl2007.org/).

The popular definition of library would certainly continue to change from one focused on place to one focused on service and function (Koehler, 2004). The elements that really matter, as pointed out by Ali (2003) was that it involved 3 key components: people, information resources, and technology and users were provided the effect of a library i.e. a synergy created by bringing together technologically the resources of many libraries and information services (Saunders and Mitchell, 1996).

Definitions that users readily understood were too broad and imprecise, and definitions with more technical precision quickly grew too obscure for common use (Seadle and Greifeneder, 2007). Borgman (2000) believed that one reason for the confusion was that research and practice in digital libraries were being conducted concurrently at each stage of the continuum from basic research to implementation. The differences could be due to the fact that digital libraries had been defined differently by computer scientists and the information professionals (Chowdhury and Chowdhury, 2003).

The term digital library was widespread in the United States, and although electronic library was more often used in the United Kingdom, digital library was becoming increasingly common (Secker, 2004). Despite the differences in definitions and terminologies, the extensive research and rapid developments in many parts of the world were a manifestation that digital libraries were gaining wide acceptance and the importance of which could not be disputed.

1.1.4   Importance of Digital Libraries

The keywords were remote and instant online access, availability to unlimited resources worldwide, through a single interface that merges the distributed resources into one seamless information resource. Information professionals appreciated service enhancement, bigger collections, wider accessibility, reduced storage costs and more powerful retrieval capabilities (Tedd and Large, 2005). It could be linked to a whole web of other contents via the Internet (Hughes, 2004), supporting distance education initiatives and benefits as equitable access, reduced barriers of distance, timeliness, shared resources and content delivery (Kranich, 1999). Global resource sharing and democratization of information had been greatly enhanced, with wider user based and helped solved the problem of library limited physical space.

Digital libraries helped to preserve rare and fragile objects (Lesk, 1997). As an example the British Library (http://www.bl.uk/onlinegallery) that holds the only medieval manuscript of Beowulf in London put up the images for anyone to peruse (Secker, 2004). Tokyo's National Diet Library (http://www.ndl.go.jp/en/data/endl/html) digitized woodblock prints, scrolls it considered national treasures. Taiwan's National Palace Digital Museum's collections were enamels from the Ming and Ch'ing dynasties, the famous Leaves of the Sung Dynasty and Buddhists scriptures (Hsueh-hua, 2006). With digital library, people might cherish the value and beauty of culture more than ever (Ke and Hwang, 2000) and making older and rarer document available to a wider audience (Raitt, 1999). The conversion of cultural contents opened up new dimension of reaching traditional and new audiences by providing access to cultural heritage in ways unimaginable a decade ago (Mulrenin and Geser, 2001). With digital libraries, virtual

reunification i.e. allowing dispersed collection to be accessed from a single entity was viable (Deegan and Tanner, 2002). Libraries were set to metamorphose into 'libratories', an imaginary word to express their combined functions of library, repository and collaboratory (Waaijers, 2005).

1.1.5 Digital Library Developments in Malaysia

Historically, the first initial preliminary attempt of digital library initiatives in Malaysia was spearheaded by the National Library of Malaysia in 1978 with the *MALMARC* Project, followed by the *Jaringan Ilmu* in 1994, Connected Learning House in 1999, the *PERDANA* Project ∕ Mylib in 1999–2000 and the International Islamic Digital Library project launched in 2003. Several local content websites had since been developed, inclined towards documenting the national culture and heritage such as *Sireh Pinang, Portal Raja Kita, Citra Wanita, Setem, Denggi, Tsunami, I-Baca, Warisan Budaya* and *Sejarah Malaysia* (http://www.pnm.gov.my). The use of Internet technology in Malaysian libraries began with university libraries creating static websites containing general information about its collections, services and facilities (Kiran, 2006) while state, public and special libraries too had started digitizing to create institutional memories.

The National Library of Malaysia through the *PERDANA* Project had initiated the platform and the research would like to find out if these initial digital library projects had been the platform for Malaysian libraries to move forward and initiated any other digital library initiatives. Were they too dependent on the National Library of Malaysia to start any other digitization program because the direction was somehow set by digital library developments worldwide to migrate from print to digital.

World digital library initiatives had been actively taking shape and many published literature had been found reporting on these progresses and developments. However not much had been reported on such a development in Malaysia and the lack of local literature on the matter had given rise to a need that a study be done, so that information on the state of the art of Malaysian library automation and subsequently digital library developments and voices from the library community could be heard and made available to national planners to charter its future growth in a more coherent manner.

1.2   Statement of the Problem

The role of traditional libraries as the intermediary between information centers and users had been greatly challenged by the development of digital libraries that were embracing the world library community at an exponential rate. Libraries had been digitizing portions of their collections for more than 20 years (Kaufman and Ubois, 2007) and the role of traditional library as the primary provider of information to its community was becoming less and less unique (Saeed, 2006). These developments could pose as a threat to the profession if not responded accordingly by the traditional libraries. The rise of digital libraries as manifested by the launching of *World Digital Library* in April 2009 is a sign of progress and the extent of digitization works worldwide.

An extensive literature search was done utilizing Malaysian Theses Online website, journals, national bibliographies, indexes and the local newspapers, however there had not been many published information, research or official statistics on digital library initiatives and the extent of digitization works that had been carried out by Malaysian libraries, other than those spearheaded by the National Library of Malaysia and Malaysian

University Libraries and National Library Network (PERPUN). Research on Malaysian library automation and digital library progress including digital library related problems and the conditions for future growth could not be located. The lack of published literature might be attributed to the lack of digital library activities and the low level of development in library sectors that were servicing the community, including those in the public library sectors (Ahmad Bakeri, 2007). But the then Selangor Chief Minister had directed Selangor Local Council to establish electronic libraries within their own respective areas (Utusan Malaysia, 8 May 2002, p. 2).

Based on the researcher's professional experience as a practicing librarian of more than 20 years in various types of libraries, analyzing the various local library websites and talking to as many librarians as possible at any chance and opportunities at the initial stage of the study, it seemed that Malaysian digital library initiatives had initially emerged from the automation program way back in 1978. The *MALMARC* project was the root and starting point when libraries first began to automate and turned electronic, steadily installing library systems to begin offering online services and started utilizing e-mail facilities for some of the new online services. It is reasonable to assume that it was unlikely that a library would start digitization program without first becoming an electronic library. Hence the call for the establishment of electronic libraries by the then Selangor Chief Minister as reported above. The subsequent projects *Jaringan Ilmu* 1994 and *Connected Learning House* 1999 were the first few attempts toward creating a national networking environment, one of the many features of a digital library, followed by *PERDANA/MyLib* in 1999-2000 and the International Islamic Digital Library projects in 2003.

Even though *PERDANA,* the national digital library initiative project was launched in 1999, but there had been no official report to enable us to know its status, as the researcher was informed by a senior officer from the National Library of Malaysia that *PERDANA's* revision paper had not been made public, thus there was no way of knowing its success or failure. These situations need to be addressed to enable us to know our standing compared to the western countries and specifically to know the problems and the perceived conditions required to rectify the conditions. Unlike in the United States and United Kingdom, where digital library programs had been actively pursued over the past ten years (Ying, 2003) and increasingly serving a worldwide audience (Smith, 2006) and websites were seen as an increasingly important reading source (Nor Shahriza and Amelia, 2007). However, research on Malaysian university library websites had been scarce as they were only just embarking on the journey to the digital world (Kiran, 2006).

As more resources were being made available electronically and digitization was increasingly gaining significance, Malaysian libraries had begun to create digital libraries and it was timely to examine these libraries as providers of value added information (Kiran, 2006). Having embraced library automation, therefore there was a need to examine the readiness of Malaysian libraries in becoming digital in terms of staff professionalism, the changes from print, electronic and to digital collections, including the availability of budget and training, and how far *MALMARC* automation project had initially brought the culmination of the digital library development in Malaysian libraries.

Therefore it was crucial to ascertain their readiness through the extent of library automation, online services and digitization works that had so far been carried out by

Malaysian libraries. What were the areas of library operations and services that had been automated and rendered in a digital form and how much had Malaysian digital library project went beyond the local boundaries? These were important to help the relevant authorities for a more coherent national digital library planning. Thus this study would explore the extent of library automation, online services and digital library initiatives that they had done and the problems that they faced in progressing to a greater height and also to explore and solicit the perceived conditions for digital library future growth.

1.3   Objectives of Study

The objectives were to identify the extent of the Malaysian libraries in providing digital library operations and services, having embraced library automation, including problems faced and the perceived conditions for digital library future growth. The specific objectives were:

a) To develop a demographic profile of Malaysian libraries on education level, grade, designation and working experience of head of libraries as background information.

b) To gauge their readiness through the extent of library automation in terms of library holdings, media for information storage, installation of integrated library systems, provision of digital library operations and services, digitization works and online subscription of databases. Library general problems and the provision of budget and training would also be identified.

c) To identify digital library issues and related problems and to explore their digital library planning and implementation.

d) To obtain and analyze the opinions of Head of Libraries on users' readiness, format

change, collection development policy, blueprint, PERDANA Project, hybrid library,
print vs. online services, information professionals and the future of traditional
libraries.

e) To solicit and examine the perceived conditions for digital library future growth.

1.4   Research Questions

To achieve the above objectives, the following research questions were used:

a)   What was the background information of heads of libraries?

b)   What made up the library holdings/collections and what were the general problems faced. What library systems had been installed and the extent of library online services and digital library initiatives that had been introduced, including the provision of budget and training.

c)   What were the digital libraries issues/related problems and what kinds of digital library planning were in store?

d)   What were the library heads' opinions on Malaysian digital library development?

e)   What were the perceived conditions for digital library future growth from Malaysian perspectives? This would be done by means of qualitative data, through 1 of the total of 12 questions asked during the interview sessions.

1.5   Significance and Contributions of Study

This study would contribute in term of new knowledge on Malaysian library automation and subsequently on digital library initiatives, enabling conclusions to be made with respect to digitization and the degree of online services and operations that

had been introduced. As the outcome and continuation of the *MALMARC* project, having done library automation, it would be pertinent to gauge their readiness through the progresses that had been achieved by Malaysian libraries especially in terms of digitization works. The research findings would be able to serve partly as a review of national library development. When world libraries were undertaking large scale digital library initiatives and digital libraries were becoming more international, open and universal access becoming the most fundamental element, and with Google producing more e-books than we could imagine, not much published literature had been found on the same topic from Malaysian libraries. Library of Congress had digitized 7 million items through its American Memory Project. What about *PERDANA* Project? Has digital library development taken a center stage in Malaysia?

The findings from the research would tell some answers to the above and the amount of digitization works that Malaysian libraries had done. The new gathered knowledge would nurture and arouse more digital library interests within the information professionals and also the community at large. The findings would spark off new public awareness and this could serve as an avenue for the exchange of ideas, create more rooms for discussions and intellectual discourse and allows sharing of the same problems that libraries were facing in the process of digital library implementation. Subsequently these would lead to a more coherent national digital library planning.

The study came in to fill in the vacuum and to increase awareness among information professionals on the level of e-library and digital library development in Malaysia. It could also lead to a beneficial collaborative and cooperative projects or the forming of digital library consortia to deal with the matter effectively and collectively on

a stronger basis. It was clear from the literature review in Chapter 2 that most of the successful foreign digital library projects were done on a collaborative basis and none as a single adventure.

Information was needed to avoid redundancy and duplication of efforts and to streamline that appropriate digital library initiatives were drawn that suits Malaysian atmosphere. With new information, planning at national level would make a difference because resources, be it human or materials could be deployed in the best possible manner. Sharing of expertise would also be possible thus exploring a true sense of resource sharing among Malaysian libraries. The availability of information on digital library related problems and the perceived conditions for future growth would enable solutions be thought of in the right path, catering for the right needs, consolidating and prioritizing certain relevant areas for the planning of national digital library development.

The study would portray some form of common patterns or approaches that libraries had adopted in going digital. It would reveal whether Malaysian libraries were adopting a full fledge digital library or the hybrid concept. Therefore librarians were more aware of the local scenario and would be able to make subjective comparisons with the many foreign digital library initiatives.

The development of digital library depended to a large extent on the people handling it. The opinions of Malaysian librarians would add to the much needed information on what was needed to further influence digital library growth and would be useful to the relevant authorities overseeing this subject matter such as the National Library of Malaysia and other national information agencies. The National Library of Malaysia had been the prime mover of library development in Malaysia. In fact library

development had been synonymous with it. Had it been doing enough to execute its enormous responsibilities with respect to digital library development? Had Malaysian libraries been over dependent on the National Library of Malaysia for growth? Was there a need for another body to spearhead digital library development? Information collected from the research would help answers some of the above questions.

The study would ascertain the degree of dependency of the library profession on other professions especially the computer scientists. This was crucial to the library profession as a matter of survival. This factor co-relates to the need for the information professionals to acquire IT skills, to be self dependent and to be IT savvy to enable them to plan for more digital library initiatives. The study would see if staff training was adequate to help them with the transformation process; to deal by themselves for the digitization program or would it had to be privatized, due to lack of technical competency.

By exposing their digital library plans, more concrete programs toward digitization and digital library development could be planned in a more systematic and coherent manner, bringing the library community on a single platform. The key findings as to what were lacking in the process would enable a more collective approach kinds of solutions. As proposed by the library heads during the interview sessions, a central body on digital library could be set up by the government and national solutions pertaining to those factors could be thought of, suggested, drawn, proposed and implemented. Information on the extent of digital library development would help the relevant authorities in planning the right digital library initiatives for Malaysia, with the right elements, components and the perceived conditions for digital

library future growth. Being the key players in the field definitely they knew best what would possibly be the perceived conditions for future growth.

Digital library development was indeed important to the formation of a networked, informed and information rich society. Economic development needed much information as much as all levels of education from primary to tertiary. Therefore digital library development should never be left out from the government's master economic and social national plans. It was pertinent that data and information were available at hand for the authorities to charter the growth of digital library development in Malaysia thus increasing the much needed budget provision for its development.

The scope of Malaysian libraries was big ranging from the national, state, public, special, ministerial, departmental, local council, academic and school libraries. The social impact could be tremendous if digital library developments were given due recognition. In fact one of the contributing factors to the formation of an advance society would be through digital library development because the spillover i.e. reading, research, distance education, information rich society and networking would be enormous. International library community might have a glimpse of what's happening here and might attract some form of regional and international digital library collaborations in the near future.

The study had contributed greatly in exposing the voices of the library community with respect to the perceived conditions for digital library future growth in Malaysia. Being at the forefront of library development, they knew what were needed to charter the growth and especially of the need to have a leading or central agency through the proposed digital library framework for Malaysian libraries. The proposed framework

had been suggested as the final outcome of all experiences that they had gone through and what they thought would be the best way to help boost national digital library planning and development.

This study would set a precedent for further research in digital library development in Malaysia because interests in the subject would have to be sustained by many more research by other scholars. The research findings would reveal the situations of Malaysian digital libraries as a continuation of the electronic library efforts, with respect to demography, automation, problems faced, ICT training, budget, digital library planning and digitization programs, and heads of libraries' opinions, so that the right mechanisms could be taken to accelerate further the growth of digital library development in Malaysia.

1.6   Scope of Study

The study covers all library types in Malaysia except school libraries. Although school libraries outnumber the other types of libraries but due to the low level of developments within school libraries, it was decided that they would be excluded. It might justify a study on its own if school libraries were to be covered. Public and private sector libraries - national, special, ministerial, departmental, academic, public, state, council and municipal libraries, located nationwide were covered, even though majority of them were in the Klang Valley area. The main source of the population sample was taken from the *Directories of Libraries in Malaysia*, 2002 published by the National Library of Malaysia. Upon checking, as of June 2006, this was still the latest edition.

Questionnaires were sent to the person in charge of the library, who could be professional, semi professional or non-professional.

As reflected in the research topic, the main concerned of the study was to see Malaysian libraries' digital library readiness through the extent of library automation and digital library initiatives that they had done, irrespective of types to derive at more general conclusions. It was beyond the scope of this study for any kinds of comparisons whatsoever. The other focus of the study would be to examine the general and digital library related problems and the perceived conditions that might influence Malaysian digital library future growth. Therefore these were the areas covered: demographic information, general and digital library related problems, library holdings, automation and online services, digitization programs, digital library planning, budget and opinions of library heads with respect to the future of digital library, users readiness, print vs. digital collections, collection development policy, blueprint, *PERDANA* Project, hybrid type, information professionals and traditional libraries.

To substantiate and consolidate the data collected through the questionnaire, qualitative data were also obtained through the interview sessions conducted with 38 librarians, including a preliminary interview with a senior librarian from Multimedia Development Corporation (MDC) and were concluded with an interview with the Director of *PERDANA* Service Division of the National Library of Malaysia. The purpose was to get some general ideas, input, feedback, opinions, outlook and an overview from those who had been directly involved in the initial implementation of the *PERDANA* project. MDC was one of the strategic partners directly involved with the National Library of Malaysia in the overall planning for *PERDANA,* while the National

Library of Malaysia had been the major player of national digital library planning. Being at the helm of national digital library planning, she was assumed to be the best person to talk to about digital library development in Malaysia, and in the position to know the actual phenomena. The other reason was to probe deeper into *PERDANA*'s problems and to get information on National Library of Malaysia's latest digital library planning and also the perceived conditions for digital library future growth.

These were the areas covered: digital library planning, budget for digitization projects, online services and operations, human resource/staffing, management support, external support, digital library collaborative efforts, digital library related problems, digital library training, facilities, personal opinion on digital library development and the perceived conditions for digital library future growth.

Hardware configuration was totally excluded because it was beyond the scope of the study. This topic by itself was already huge that could call for a separate research on its own.

1.7   Operational Definition of Digital Library and Definitions of Selected Terms

Terminology proved to be a barrier in describing a digital library (Arms, 1995) as there had been much confusion surrounding this phrase (Cleveland, 1998). Digital library territory was so vast, diverse, disperse, interdisciplinary and complex that there was not even a generally agreed upon definition (Barnes, 2004). To some people the term simply suggests computerization of library catalogs and the carrying out of library functions in a new way (Fletcher and Bertot, 2000). Several terms had been used interchangeably to encapsulate the concept of a library full of digitized data that included the electronic

library, the virtual library and library without walls (Raitt, 2000). The perceptions of selected LIS professionals in Pakistan revealed that digital library was a confused term which could be defined in different ways (Hussain, Mahmood and Shafique, 2008). Some of their findings on the concept of digital library included electronic documents, accessible through personal desktop, collection of uniformed electronic artifacts, online collection of scanned items, using electronic devices to disseminate information and a fully or partially automated collection is a digital library.

In this study, based on the Malaysian perspective, as defined by the Director General of the National Library of Malaysia at the 5th Digital Library Conference 2009: – *A digital library is a library that keeps all or part of its collections in digital form as an alternative, additional or to supplement the present collections that are normally found in printed or microfilm form including the multimedia. (Perpustakaan Digital adalah sebuah perpustakaan yang menyimpan kesemua atau sebahagian daripada koleksinya dalam bentuk digital sebagai alternatif, tambahan atau pelengkap kepada koleksinya yang pada masa kini biasanya terdapat dalam bentuk bercetak atau microfilm termasuk multimedia).* Here, a traditional library was developing separately a new concept of online library services through digitization, where some materials were no longer confined within the library premise, emphasizing in providing virtual access to online databases, e-journals, hypertext linkages and websites development, while maintaining their original collections. The enhancement of the traditional library in the form of digital library acts alternatively as to supplement the existing library services, in tandem with DELOS (2006) definition that considered the concept of digital libraries as an advanced

extension of traditional libraries, using a library science approach within a continuative perspective.

In this respect, Malaysian digital libraries were meant to act as an alternative, additional and to complement the traditional library set up, portraying the hybrid concept. Supported by Allard (2002) that digital libraries could be viewed as extensions and augmentations of traditional library by extending the resources that could be offered and augmenting how people could seek and express information, and making available electronically as much heritage and information as possible (McKinney, 2006). Some selected services had been rendered virtually, maintaining at the same time any other information media of print and the microform formats, thus the concept of hybrid library.

In Malaysia the term digital library or virtual library first began to be used by university libraries to refer to services such as the provision of online databases and electronic journals and lately the term hybrid library was being widely used by Malaysian libraries (Kiran, 2006). Some prefer digital while some prefer virtual as exemplified by MIMOS Digital Library, IMU Medical Virtual Library and Tan Sri Lim Goh Tong Medical Virtual Library (UKM). She further reiterated that a true digital library delivers knowledge, resources and services that libraries had traditionally provided from within the physical walls of a library but now in an electronic format. But again in the Malaysian context and from the researcher's experience, there were still libraries that had only the print collection in their holdings, thus considered as purely print based libraries.

Cleveland (1998) asked a question as to what was the working definition of a digital library, to which he said that digital libraries were libraries with the same purpose, functions and goals as traditional libraries. Chowdhury and Chowdhury (1999) went

further by saying that a characteristic of digital libraries was that a large percentage of materials were still to be found in non-digital form. Digital collections and other non-digital media co-existed (Levy and Marshall, 1995). Hunter and Mardis (2001) defined it as a collection of information i.e. both in digital (electronic form) and was organized. But certainly a large part of the movement to digital libraries involved making physical things digital and then re-rendering them in physical form as need be (Bishop, Van House and Bitterfield, 2003) and today many libraries were going digital by subscribing to online databases (Law, 2004). The connection between electronic and digital libraries was quite clear with the significant growth in institutional repositories, as in the United Kingdom, where there had been gradual moves towards mandating the deposit of electronic versions of theses (Russell, 2007).

In relation to this, Borgman (2000) pointed out that we would have hybrid libraries, archives and other information institutions for the indefinite future and new media would continue to be invented and would supplement, rather than supplant, the old. Millions of documents would be digitized, so digital libraries must be hybrid, including digital materials and pointers to other formats (Barnes, 2004). The British eLibrary program exemplified this hybrid model recognizing that paper and electronic access would continue for the foreseeable future through the Hybrid Library Toolkit (Hylife, 2002).

Digitization process was the conversion of any physical or analogue item into a digital representation or facsimile (Deegan and Tanner, 2002). Digital library initiatives were digital library projects or digitization programs as exemplified by EU's digital library initiatives - to make Europe's cultural, audiovisual and scientific heritage

accessible to all (i2010: Digital Libraries). These could be done at institutional, local, national, regional and international levels.

The extent of digital library initiatives refers to the amount of projects and the amount of digitization works that had been done by libraries. The degrees of changes in terms of library services and operations that had been transformed from manual to digital systems were the manifestations of the said digital library Initiatives that could further be used as an indicator of digital library development. These developments include an electronic access information system (Lynch, 2003), from centralized to decentralize library system and a managed collections of digital objects (Deegan and Tanner, 2002), distributed information repositories (Chen, 2005), interoperability (Secker, 2004), openly accessible (Ellermann, 2006) and accessible over a network (Arms, 2002). The Joint Conference on Digital Libraries (JCDL, 2007) had even included electronic publishing.

Perceived conditions for future growth in this study include any supportive elements or platforms or circumstances or situations that should exist to expedite and accelerate digital library growth in Malaysia.

1.8   Assumptions

As a normal practice for any research works, the researcher had made various assumptions in relations to information sources, the research questions, the respondents and the answers derived from both qualitative and quantitative data. Firstly, the directory from where the respondents' names and addresses obtained was assumed to be the most comprehensive and authoritative since it was published by the National Library of Malaysia. The formulation of research questions was justifiable at the time of research

and was in accordance with the then levels of local digital library developments. Further assumptions were that all responses and answers were given voluntarily, reflecting the true picture and knowledge levels of the topics covered and discussed. It was fervently hoped that answers were representative of the respective aspects.

The thirty-eight (38) professional librarians interviewed were senior and experienced heads of libraries and their views, suggestions and proposals were assumed to be of substance and representatives of the library community. Being at the frontline of library and information services, the assumptions were that they knew well of the subject matter at hand and the questions asked and had done so without any fear, favor or threat. What matters most were that they wanted to rectify the situations and by exposing the real scenario would help the national planners in taking the right solutions.

In the beginning of the research and interview sessions, it had been made clear that the findings, data, comments or verbatim statements included would be treated with the strictest confidentiality and would be used only for academic purposes. As such respondents were assured that there would be no consequences whatsoever that might result from their responses and statements especially from the interview sessions. Due to these preliminary pre-conditions environments, it would be safe to assume that answers given were valid, authoritative and representative of the topic being researched.

1.9   Summary

Digital library developments worldwide were tremendously taking shape, covering many aspects of the library operations and services. Acquisition, processing, cataloging and information dissemination were taking on new perspectives and many

library services were now technology driven. Digital materials and digitization programs were concurrently being planned, produced and developed. The emergence, importance and acceptance of digital libraries had resulted in many foreign literatures reporting on digital library initiatives at local, national, regional and international levels, thus consolidating global resource sharing through online services and universal access.

Traditional libraries that were originally print based could no longer sustained what they used to be and were slowly being challenged by the distributed information resources through digital library concept that unified information virtually and available anytime, anywhere at one's desktop. In Malaysia the development could be seen through the establishment of either digital or virtual or hybrid libraries. The question now was to gauge the extent Malaysian libraries in embracing electronic and digital operations and services as their western counterparts so that we would be able to know the extent of our progress amidst world digital library development. More importantly, to examine Malaysian digital library related problems and to solicit the perceived conditions for digital library future growth.

1.10   Outline of Thesis

The research report is divided into 6 chapters. **Chapter 1** consists of the introduction that includes the background information and a brief description on digital library development in Malaysia. It contains the problem statement, objectives, research questions, significance and scope of the research, definitions of selected terms, assumptions and summary. **Chapter 2** covers literature review and elaborated on digital library initiatives worldwide including local digital library initiatives spearheaded by the

National Library of Malaysia. It has been organized into three main sections namely Introduction, Development of Digital Libraries and Factors Influencing Growth of Digital Libraries. The chapter ends with Summary from Literature, Framework of Study and Conclusion. **Chapter 3** consists of research methodology, covering research design, population sampling, sample size, data collection methods, questionnaire development, pre-test, interviews, validity test, pilot study, research general guidelines, data analysis and summary. **Chapter 4** presents the findings from the quantitative method focusing on the analysis of the digital libraries initiatives' readiness aspects. The quantitative data were tabulated using the SPSS (Statistical Package for Social Science) software. Every question was tabled and followed by a description of the results, outcomes and possibilities. **Chapter 5** presents the findings of the qualitative data, focusing on the analysis of the digital libraries initiatives' perceived conditions for future growth. Thematic analysis had been applied and was done mainly based on typology and quasi statistics i.e. classified, grouped, themed or patterned and the number of times or frequencies a subject/topic was mentioned in the interview process. **Chapter 5** consists of the introduction, summary of findings on both qualitative and quantitative data, implications of the study, recommendations and the limitations of the study, directions for future research and the conclusion. Lastly, having introduced the research topic, with some background information and determining the objectives, significance and scope of the study, what follows in Chapter 2 were the related literature reviews on digital library initiatives and development, taking into consideration the variables, in an attempt to consolidate the research topic at hand. Digital library initiatives in 8 selected countries had been included, highlighting their success and growth factors.