Libraries and the Internet in Singapore

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Singapore government together with private and semi-government organizations has embarked on several projects to promote the use of IT and transform Singapore into an information hub. This is in line with attempts to transform Singapore economy from a labor intensive to a knowledge-based economy. The government has realized the vital role of libraries and the need to transform these libraries into more dynamic information centers. This involved upgrading and expanding the existing library facilities, encourage libraries to use IT in all aspects of their operations and finally upgrade the library professional skills. Some of the projects that have been realized include IT2000 Plan, Singapore One Network, Library 2000 initiative, TiARA (Timely information for All, Affordable and Relevant) Project and E-Commerce Business Plan. All major libraries in Singapore are trying to utilize and take advantage of the Internet technology. They are currently using the Internet for communication, surfing, publishing of local information, and e-commerce for acquisition.

The rapid deployment of the Internet in Singapore is the result of a concerted planning effort by the Government to develop a National Information Infrastructure (NII) and promote the use of information technology in all sectors of the society. Singapore Government has used information technology to stimulate economic growth and achieve national competitiveness. A comprehensive information technology plan called IT2000 was launched in 1991 as a framework to guide Singapore into an Intelligent Island [Reid, 1995; Seng, 1996; TiARA, 1998]. In line with the vision of the IT2000 plan, an advanced National Information Infrastructure (NII) has been developed to link computers and other information appliances in homes, offices, schools and factories across the country. To support the services envisioned in the national IT plan, a unique project called Singapore One has been undertaken for the development of a nationwide broadband infrastructure that will deliver multimedia services to end-users at high speed [NCB, 1998]. This network is expected to provide excellent communication support to exploit electronic information in the country. Recently, a plan has been introduced for e-commerce and business applications of the Internet.

With government support for Internet infrastructure, steps have also been taken to introduce network-based services in important sectors of economic and social activities including education and the library and information sector. A specific plan targeting the libraries called Library 2000 was implemented in 1994 for restructuring and revitalizing library and information services, emphasizing on enhancing electronic information collections through a network of borderless libraries. A number of initiatives have been taken under this plan to encourage innovative and creative uses of the Internet in the information sector. One visible example of such projects is the establishment of TiARA (Timely information for All, Relevant and Affordable), a collaborative effort led by the National Computer Board (NCB) and the National Library Board (NLB) to provide a comprehensive one-stop information service for students, researchers, and businessmen. These pioneering projects have been helpful in promoting the use of Internet by information institutions in the country.

This paper provides an overview of important plans and projects related to the development of Internet infrastructure in Singapore, reviews IT implementation strategies employed by Singapore Government and other institutions, and examines the utilization of Internet resources by libraries and information centers in the country.

Library 2000-Investing in a Learning Nation

Library 2000 Plan calls for the transformation of library services throughout the country with its mission of expanding the learning capacity of the nation (Library 2000 Review Committee, 1994). In line with the vision of the
**Figure 1: Scheme of Network of Borderless Libraries**

IT2000 Plan, it articulated the need to create a network of borderless libraries to provide more convenient and easy access to information resources in the network environment. The network of borderless libraries will be supported by the National Information Infrastructure, which is being developed under the IT2000 plan.

The NII includes the cable TV network that will evolve into a ubiquitous information utility for people to access information services virtually anytime anywhere. Libraries will become access points, switching nodes and mediating agents for information on the NII. The network of libraries will link all publicly funded libraries in Singapore, as well as provide linkages with leading libraries and information services worldwide. This will serve as a bridge linking local and international information providers and users. It has to provide users with access to any information repository in a cost-effective manner, as opposed to each user establishing and paying for his own separate links to overseas information providers. Library2000 also emphasizes the use of automation to reengineer library services and the need for developing an adaptive system of public libraries. Steps have already been taken to set up a three-tier system of national, regional, and community libraries equipped with latest technology and network facilities. A number of projects have already been implemented by NLB and many are in progress to provide services in line with the recommendation of the Library 2000 Review Committee.

**TiARA - Timely Information for All, Relevant and Affordable**

TiARA was established as a multi-agency collaborative effort led by the National Computer Board and the National Library Board as a comprehensive one-stop information service into an electronic librarian where staffs of the National Library Board can provide support and resources through appropriate policies. The same trend can be seen in the development of Internet infrastructure. Singapore came online through first Internet service provider Technet in 1991. A second ISP, Singnet, began in 1994 and as more Singaporeans demanded Internet access, the Telecommunication Authority of Singapore (TAS) decided to further open the market and allowed for more ISPs, bringing the total to three by 1998 [Tan and Wong, 1998]. The government sector has played a significant role in the development of the National Information Infrastructure, which is being developed under the IT2000 plan.

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**Implementation Strategies**

A key strategy for IT implementation in Singapore has been the gradual and sustained development of IT infrastructure and support services. The first phase of IT implementation (1980-85) was aimed at civil service computerization, the second phase (1986-90) paved the way for computerization of the private sector. These two phases prepared the country to implement the third phase that began with the introduction of an ambitious plan IT2000 undertaken in 1991 to extend the use of computers to homes, offices, and other places. The fourth phase has already started in the form of implementation of special projects in various sectors, Library2000 being an example from the information sector. Each phase was a step forward in the sustained development of infrastructure articulating goals for IT implementation and providing support and resources through appropriate policies. The same trend can be seen in the development of Internet infrastructure. Singapore came online through first Internet service provider Technet in 1991. A second ISP, Singnet, began in 1994 and as more Singaporeans demanded Internet access, the Telecommunication Authority of Singapore (TAS) decided to further open the market and allowed for more ISPs, bringing the total to three by 1998 [Tan and Wong, 1998]. The government sector has played a significant role in the development of the National Information Infrastructure, which is being developed under the IT2000 plan.

**Table 1: Major Services Provided by TiARA**

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Description</th>
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<tbody>
<tr>
<td>Information Services</td>
<td>Allows access to online information in online databases</td>
</tr>
<tr>
<td>Library Services</td>
<td>Allows access online catalogues of Singapore libraries</td>
</tr>
<tr>
<td>Internet Resources</td>
<td>Provides access to web sites</td>
</tr>
<tr>
<td>Events Calendar</td>
<td>Lists of seminars, conferences, exhibitions, etc.</td>
</tr>
<tr>
<td>Children Services</td>
<td>Provides information for students for their projects/homework</td>
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