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Singapore's Library System and Its Place in a Smart Nation

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ABSTRACT

Singapore's National Library Board (NLB) and its National Library, Public and Regional Libraries as well as the National Archives are considered one of the best library systems on a global scale. In this city-state, we are able to identify governmental master plans to consolidate and to develop a knowledge society and a knowledge-based economy since 1981. The current Smart Nation plan aims for comprehensive digital innovations in the country. Our research question is: What is the place of libraries in the ongoing development of the knowledge society and the smart nation Singapore? In this article, we are going to define "smartness" of a city or a state and describe Singapore's way towards a smart nation. We outline the tasks of NLB and its institutions, the physical as well as digital resources, NLB's services (for instance, OneSearch and the Singapore Memory Project), important programs (e.g., activities to foster digital literacy), NLB's social media activities, and, finally, user participation (following design thinking) in the development of NLB's services. We conclude the study with a list of assets of NLB regarding the country's way towards a knowledge society and smart nation. Likewise, we mention challenges as the underdeveloped level of information literacy of Singapore's people. In contrast to many other countries in the world, the libraries in Singapore play an important role on the way to knowledge society and smart nation as the NLB makes sense of community and is a vital part of Singapore's national identity.

Keywords: Singapore, Libraries, Smart Nation, Knowledge Society, National Library Board (NLB), Public Libraries, National Library, National Archives of Singapore, Library Resources, Services, Programs, Cultural Heritage, Reading, Digital Literacy, Information Literacy, Social Media, Citizen Participation

1. Introduction

"Readers for life, learning communities, knowledgeable nation ..." is the vision of National Library Board (NLB) Singapore. To realize this vision, NLB librarians "make knowledge come alive, spark imagination and create possibilities." On the

homepage of NLB we read, “NLB promotes reading, learning and information literacy by providing a trusted, accessible and globally-connected library and information service through the National Library and a comprehensive network of Public Libraries. By forging strategic partnerships to cultivate knowledge sharing, the libraries also encourage appreciation and awareness of Singapore’s history through their wide range of programmes and collection on Singapore and regional content. The National Archives of Singapore oversees the collection, preservation and management of public and private archival records, including government files, private memoirs, maps, photographs, oral history interviews and audio-visual materials” (NLB, 2018a). In order to fulfill all these tasks, NLB manages 26 Public Libraries, the National Archives, and the National Library.



Figure 1: Singapore is a Tropical Smart City-state at the Southernmost Tip of Continental Asia.

In several countries around the world we can observe that the role of libraries fundamentally changed from a quiet place to read or to borrow media (with only minimal influence on the country) into vital knowledge centers serving people, businesses, and administrations (Nicholson, 2017)—now with huge influence on “smart” cities (Barth et al., 2017; Mainka, 2018) and on entire countries of the knowledge society. Paramount examples are the Qatar National Library (Henkel et al., 2018; Gremm et al., 2017) and Dokk1 in Århus, Denmark (Bech-Petersen et al., 2016). In Singapore, there were huge transformations of the library system (Rajsic, Bucher, and Osei-Poku, 2012). NLB’s buzzword for all those developments is “journey” (e.g., Choh, 2014). What are the steps on this journey?

After a construction phase of about 40 years, the city-state of Singapore has realized its leading position in the emerging knowledge-based economy and in knowledge society (Luterek, 2018). The government of Singapore successfully finished its master plans from the first National Computerisation Plan (1981) to the Intelligent Nation plan (iN2015) (iDA, 2006) and now works on the implementation of the idea of a Smart Nation. Additionally, there were specialized master plans on Singapore's libraries: Library 2000 (1994), Library 2010 (2005) (Library 2000 Review Committee, 1994; NLB, 2005), and Libraries of the Future Masterplan (MCI, 2015). Smart Nation is about transforming Singapore through technology (Tan and Yimin, 2018). "We envision a Smart Nation that is a leading economy powered by digital innovation, and a world-class city with a Government that gives our citizens the best home possible and responds to their different and changing needs" (SNDGO, 2018a). Singapore's concept of a Smart Nation includes a digital government (SNDGO, 2018c), a digital economy (IMDA, 2017a), and the digital readiness of all people (MCI, 2017). Especially public libraries play an important role to guarantee the citizens' digital readiness (MCI, 2017, p. 34). Singapore has been chosen as the *Smart City of 2018* at the Smart City Expo World Congress "to recognize the most outstanding initiatives and projects in the urban innovation and transformation industry" (Smartcityexpo, 2018).

The Smart Nation program tends to be technologically oriented (it is mainly on digital innovations such as the national digital identity, e-payment, a sensor platform, urban mobility, cybersecurity, and digital inclusion). Already in 2015, NLB reacted to the challenges triggered by the Smart Nation program with its Libraries of the Future master plan. "Moving forward, libraries in Singapore must keep pace with the changing knowledge landscapes, technological advances, and the evolving demands and aspirations of our growing user population" (Kang and Koh, 2015, p. 2). One of the key principles of the Libraries of the Future master plan is capitalizing "on Singapore's Smart Nation programme to build more meaningful interactions with content and community" (Kang and Koh, 2015, p. 2). Which role did libraries play in the transition process towards knowledge society in Singapore? Which role do they play nowadays in the smart nation? Our leading research question is: Which place do libraries have in the ongoing development of the knowledge society and smart nation Singapore?

2. State of Research

Mahbubani (2017, p. 311) is not overmodest; for him Singapore is "the smartest city on our planet." For Khveshchanka, Mainka, and Peters (2011, p. 111), Singapore is definitely a knowledge city as there are many knowledge-intensive institutions (as, for

instance, world-class universities), a science park, business parks, and a network of libraries. Libraries, especially the libraries of the NLB, are vital building blocks of Singapore's development towards a knowledge society. Since about the millennium, "NLB has been frequently lauded as being a trailblazer of library innovations" (Gill and Siew, 2018, p. 36). For Mittermaier (2007, p. 7), there was even a "library tourism", because in Singapore there were the "most modern libraries in the world." Scholars from all over the world published papers or even books on Singapore's library system, for instance, from China (Li, 2014), Japan (Miyahara, 2014), France (Bosc, 2008), or Germany (Hornidge, 2007; Mittermeier, 2007). The two library master plans, Library 2000 and Library 2010, led to various publications discussing the plans and their outcomes (e.g., Choh, 2008; Choh, 2011; Choh, 2014; Chellapandi, Han, and Boon, 2010; Sharma, Lim, and Boon, 2009; Tan and Foo, 2006).

We found 45 documents on Singapore's libraries on Web of Science, 143 hits on LISTA, and 69 documents on Scopus (and, additionally, 131 secondary documents, i.e. documents from reference lists, which are not directly available in Scopus) (search argument: Singapore AND librar* in title; as of August 22, 2018). These are hints for strong international research activities on Singapore's library landscape.

Our study excludes academic libraries (Cribb, 2017; Sabaratnam and Ong, 2013) as they only rarely cooperate with the publicly accessible libraries (under NLB). The reason for this lack of cooperation is structural. Additionally, academic libraries (apart from professional relations) similarly interact infrequently with other academic libraries in the country. Their funding institutions, i.e. the universities and polytechnics, compete with each other, and their respective library and its information literacy instruction courses are firmly competitive factors contributing to the institutions' success.

As research methods, we applied case study research on-site and literature review; we analyzed official documents, especially from the Ministry of Communication and Information (MCI) and its statutory boards Infocomm Media Development Authority (IMDA) and National Library Board (NLB), and, most important, we systematically studied the institutions' web pages.

3. "Knowledge Society" and "Smart Nation"

What do "information society", "knowledge society" and "smart nation" mean? "Information society" is mainly technologically defined; it is based on information and communication technologies (ICTs). A "knowledge society" is an information society

as well; however, here knowledge will be available for everyone at any time and any place. The economy in a knowledge society is driven by knowledge, called “knowledge-based economy”.

Table 1: Singapore’s Master Plans towards Knowledge Society and Smart Nation.

<i>Plans</i>	<i>Years</i>	<i>Objectives</i>
The National Computerisation Plan	1980 – 1985	Computerization of the civil services; development of IT industry and IT manpower
The National IT Plan	1986 – 1991	Electronic networks for government and private sector
IT2000	1992 – 1999	Transforming Singapore to an Intelligent Island
Library2000	1994 – 2000	Public library system; NLB; digital catalog for public libraries
Infocomm 21	2000 – 2003	Domestic and international connectivity; e-government (first steps)
Connected Singapore	2003 – 2006	Information harnessed in key sectors; education; e-government
Library2010	2005 – 2010	New online platforms; digital library; public libraries as learning spaces
iN2015	2006 – 2015	Intelligent nation; Singapore as a global center for knowledge, talent, and business
Smart Nation	2014 – (ongoing)	Digital government, digital economy, people’s digital readiness

In a knowledge society or in a knowledge-based economy, knowledge itself is not an end-product. No one is able to live from knowledge alone. However, knowledge takes full effect if implemented in commercial or public products and services, in entire markets, and in industries. In such a way, “smart” products, “smart” services, “smart” industries, “smart” cities, and “smart” countries may emerge (Stock, 2011). For Mainka (2018), the “smart society” displays all characteristics of information and knowledge societies. Additionally, networks are growing and include the Internet of Things as well as open data; sustainability and health become important factors, and empowered citizens are engaged “in a more creative, innovative, and democratic future” (Mainka, 2018, p. 13). While the prototypical city of the fifth Kondratieff banks on ICT and especially the internet, the city of the emerging sixth Kondratieff cycle is guided by sustainability, the citizens, and their health (Mainka, 2018, p. 12).

In Singapore, the smart nation initiative is a “whole-of-nation approach to enhance the quality of living for the country” including government efforts to “co-create innovative people-centric solutions with the industry and citizens” (Hoe, 2016, p. 327). Co-creation does not only mean the adaption of, for instance, ICT in the citizens’ “smart homes”, but also the “smart participation” in the construction of city-related smart products and smart services, e.g. by attending hackathons (which, in turn, means that the citizens are able to code or at least to understand software development) (Ho, 2017). What is the development status towards a smart nation in Singapore?

4. Singapore’s Way Towards a “Smart Nation”

Singapore is a tropical city-state located at the southernmost tip of continental Asia just about 100 km north of the equator (Figure 1). It is an independent country since 1965. In the 2016 ranking of world cities of the Globalization and World Cities Research Network (GaWC), Singapore is an Alpha+ city and is ranged in the third place behind London and New York City and ahead of the other Alpha+ cities Hong Kong, Paris, Beijing, Tokyo, Dubai and Shanghai (GaWC, 2016).

Singapore exhibits special conditions (Kiang, 2017): it is an island with limited land areas and very limited natural resources (there is not even potable water), it is simultaneously a city and a state, and it is entirely administered by a centralized and stable government (sometimes called a “soft authoritarianism”; Ho, 2017, p. 3112). “Singapore’s small geographic size and unique political landscape allow for a highly sophisticated and efficient public infrastructure network (including the libraries, a/n) that supports the daily lives of its residents,” Chellapandi et al. (2010, p. 40) emphasize.

Singapore’s government focused on the development of a knowledge society and a knowledge-based economy since about 1980. As a country without natural resources and without a strong manufacturing sector, Singapore has no other choice as to concentrate on trade (especially with its port) and on knowledge-based economy. From 1980 until today there is an uninterrupted sequence of plans towards a knowledge society (Table 1). “Singapore appears to be a KBE (knowledge-based economy, a/n) in a perennial hurry,” Sharma, Lim, and Boon (2009, p. 92) state. From the very beginning of these development plans, libraries played a crucial role, as they manage knowledge (explicit knowledge in documents as well as implicit knowledge in bringing people together). “The Government of Singapore has strongly acknowledged the crucial role played by libraries in a KBE” (Sharma et al., 2009, p. 100). Consequently, Singapore’s government drew up the two library programs (Library 2000, Library 2010).



Figure 2: The National Library Building in Singapore.

As a very young state, Singapore is still looking to establish a national identity. For instance, it is not clear who the “real” Singaporeans are: Foreign talents count as Singaporeans, do they (Ortmann, 2009)? Education reforms in Singapore will foster economic competitiveness, social equity, and national identity (Lee and Gopinathan, 2018). For Lin and Luyt (2014), the National Library of Singapore creates a sense of community and forms a building block of the national identity of this city state. A “sense of community” includes members’ feelings of belonging, feelings that members matter to one another as well as to the group, and that members’ needs will be met by the group (McMillan and Chavis, 1986). Indeed, there are close ties between NLB and Singapore’s citizens. “Many individuals or organizations were actively involved in the transformation of the National Library of Singapore. Equally important, many individuals were deeply influenced by the National Library of Singapore” (Lin and Luyt, 2014, p. 665). Additionally, NLB provided Singaporeans “with a place of interpersonal contacts” (Lin and Luyt, 2014, p. 669). Singapore has a population of about 5.6m, thereof about 4m residents; NLB has about 2.4m members. Consequential, 61 per cent of all Singapore’s residents are NLB members. Mean values for visits per member and year are 10.5 for physical visits and 32.3 for digital “visits” (i.e., downloads) (all figures from 2017). In international comparison, these values are very high and impressive. Using a “reach index”, aggregating different indicators as unique

physical visitors, active members, participants of programs, users of digital platforms, and volunteers (Lee, 2018), NLB is able to determine population segments that are well-reached and under-reached. Using marketing activities (e.g., Dresel and Kaur, 2010) deficits in awareness can be avoided. To conclude, NLB successfully created a sense of community.

One task of a library is the provision of information to help its community to transform this information into knowledge (Stock and Stock, 2015, p. 36). However, additionally a community space is needed, a so-called “third place”, a (physical as well as digital) space besides home and work or school (Choy, 2007). The concept of a “third place” was introduced by Oldenburg and Brissett in 1982. “Third places are characterized in terms of sociability and nondiscursive symbolism” (Oldenburg and Brissett, 1982, p. 265), they are places outside the home and the workplace as, for instance, coffee houses and neighborhood taverns (Oldenburg and Brissett, 1982, pp. 268 and 281). Referring to Harris (2007, p. 145), “public libraries are in a unique position to become the next great good places, places where people can freely gather and interact.” Not only books and other media are important for a library, but additionally the provision of spaces for its community (Mainka et al., 2013; Born et al., 2018). NLB actually offers such third places. Considering the physical third place, the new environmental green designed building of the National Library of Singapore opened in the year 2005 integrating a reference library and the central public library (Sabaratnam and Ong, 2013). It is called a “knowledge icon located in the heart of the arts, cultural, entertainment and civic district of Singapore” (Hornidge and Kurfürst, 2011, p. 360). Since 2013, the National Library building hosts “My Tree House” being a green library for children “built with environmental sustainability in mind” (NLB labs, 2013). In the national library as well as in the regional and branch public libraries “the envisioned spaces for collaborative learning, brainstorming sessions and free discussion have systematically been created (i.e. cafes, group learning spaces, discussion corners, etc.)” (Hornidge and Kurfürst, 2011, p. 363). The libraries are located at frequently visited places in Singapore; 13 (out of the 26 public and regional libraries) are in shopping malls, and further five are integrated in community centers hosting sports centers, polyclinics, and retailers besides the library (Ho, 2018). Practical experiences at a shopping mall library indicate fostering community engagement and nurturing life-long learning (Abdullah, 2013).

Digital third places are realized via social media, e.g. library blogs or posts on Facebook; for example, the library@esplanade blog and Facebook page support information and discussion on performing arts (the Esplanade is a theater) or the li-

brary@orchard runs a blog about the design and lifestyle public library at Orchard Road (which is the major shopping belt and tourist attraction in Singapore). However, Hornidge and Kurfürst (2011, p. 360) critically mention that for cultural and legal reasons self-censored rather than open discussions are promoted.

NLB is engaging people from its community as volunteers at Singapore's public libraries (Siew, 2006). The "Friends of the Library", i.e., the volunteers, support several small libraries, organize some programs, or participate in the kidsREAD program (helping to develop the reading habit among children from less well-to-do families between the ages of four and eight).

The process of forming one of the best library systems of the world fostered not only a sense of community among Singaporeans, but "the library also facilitated the formation of a Singaporean national identity" (Lin and Luyt, 2014, p. 670). In the same way, the successful construction of a knowledge society, wherein the libraries are fully integrated, is mentioned as a focal point of Singapore's identity (Hornidge, 2010). However, what is the present state of this library system and how will it develop further?

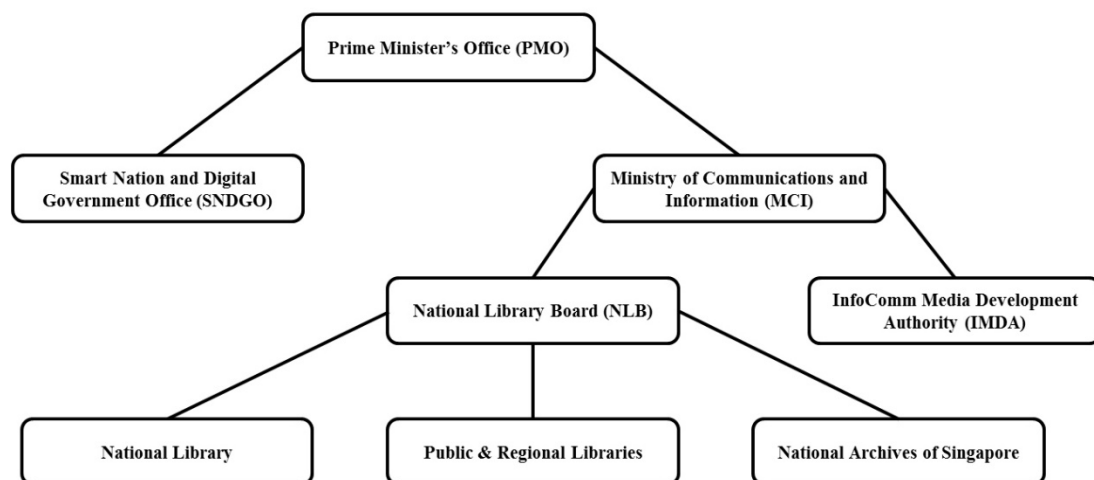


Figure 3: Singapore's Libraries in the Country's Political Organization.

5. National Library, Public & Regional Libraries, and the National Archives

With the National Library Board Act (NLB Act, 2018), NLB is regulated by the government since 1995; it is by law the umbrella organization for three institutions, namely the National Library, the system of Regional and Public Libraries, and the National Archives of Singapore (Figure 3). In turn, NLB is (with its sister organization, Infocomm Media Development Authority, IMDA) an agency of the Ministry of

Communication and Information (MCI). IMDA develops and regulates the converging ICT and media sectors, while NLB promotes library, information, and archival services. In order to include all Singaporeans in the knowledge society and the smart nation MCI oversees all activities concerning digital readiness (including digital skills, media literacy, cyber wellness, information literacy, and code for fun enrichment) (MCI, 2018).

Table 2: NLB's Tasks by Law. *Source:* NLB Act, 2018 (excerpt, modified).

<i>Task</i>	<i>Legal foundation</i>
Establishing and maintaining libraries; provision of library information services	§6(a)
Promotion of reading, encouraging learning	§6(b)
Provision of a repository for library materials published in Singapore	§6(c)
Acquiring and maintaining a comprehensive collection of library materials relating to Singapore and its people	§6(d)
Establishment of standards for the training of library personnel	§6(e)
Provision of advisory and consultancy services concerning libraries and information services	§6(f)
Compilation of a national union catalog and a national bibliography	§6(g)
Advising the government in library-related aspects	§6(h)
Provision of a repository of records of national or historical significance	§6(i)
Conduct of records management programs for the government	§6(j)
Conduct of oral history interviews, production of transcripts, preservation of the interviews	§6(k), §14J(2)
Examination of public records in any public office, classification of the records	§14A(2)(a)(b)
Conduct of archive-related publications, exhibitions and promotions	§14A(2)(c)
Establishment of a NLB endowment fund (for the provision of training programs for librarians, delivery of lectures, sponsorship for promotional programs, and financing of research on reading and librarianship)	§23

The Smart Nation and Digital Government Office (SNDGO) as well as the Government Technology Agency (GovTech) work directly under the Prime Minister's Office (PMO). SNDGO plans the Smart Nation projects, drives the digital transformation of government, builds long-term capabilities for the public sector, and promotes adoption and participation from the public and industry. GovTech is the implementing agency of SNDGO.

All institutions, which are concerned with Singapore's development towards a knowledge-based economy and smart nation, are organizationally located at the top of the country's government. This clearly shows the importance of this development path and its institutions for the nation. All major tasks of NLB's institutions are regulated by law (Table 2).

In the fiscal year 2016/17, NLB and its subsidiaries (the "group") have had expenditures of SG-\$271m (about US-\$ 196m) and income from investments, rents, consultancy, professional library services, etc. of SG-\$38m (US-\$27.5m), and, additionally, grants of SG-\$236m (US-\$171m) (NLB, 2017, Financial Report, p. 11). As New York City is the world city just in front of Singapore (GaWC, 2016), we are going to compare NLB's financial situation with the statement of the New York Public Library (NYPL); however—in contrast to NLB—NYPL does not run the city archives. Also in 2016/17, NYPL have had expenses of US-\$319m, self-generated income of US-\$102.5m, and grants of US-\$195.5m (NYPL, 2017). NLB Singapore has less self-generated income (only about 27% of NYPL's figures), less grants (88% of NYPL's grants); however, also considerably less expenses (only 61%).

NLB's activities are guided by the smart application of technologies and standards. This includes physical techniques as the optimization of the library distribution network through pre-sorting of media at individual libraries and searching for the shortest vehicle routes (Li et al., 2013). As it became clear that the Resource Description and Access (RDA) rule book became a standard on a global scale, NLB quickly decided to implement RDA (Choi, Yusof, and Ibrahim, 2014). Singapore's libraries started early using digital technologies as, for instance, the application of radio frequency identification (RFID) for the location of books (Ramchand, Devadoss, and Pan, 2005). NLB experiments with shelf-reading robots (equipped with an RFID reader) in order to identify books located in the wrong place (Basu, 2016). To connect documents from different sources (e.g., from the library catalog and one of the image databases), NLB banks on RDF (Resource Description Framework), URI (Unique Resource Identifier), and linked data (Hussein, 2015). Heok and Luyt (2010) report about early on-site internet access in Singapore's public libraries.

Often public sector organizations are called dysfunctional, bureaucratic, and inert. NLB is a public organization. However, in contrast to many public services, Heracleous and Johnston (2009) call NLB an inspiring example for private businesses. They praise the internal organization (human resources practices, the reward system, customer feedback, and the performance management system) as well as the offered

services (for instance, digital reference, called “cybrarian service”, and assistance in the library, called “concierge service”). Over the years NLB has received a number of prestigious awards in customer service, innovation and human resources, benchmarking against international world class leaders as a testament to continuous excellence. The Public Libraries have changed into a “lifestyle library” system equipped with cafes, music, multimedia, concerts, and is located in central urban spaces as well as in shopping malls. There are three lessons private companies can learn from NLB, namely (1) technology use: “With regard to re-invention, the NLB has leapfrogged competing offerings and re-defined what the public library industry should be about (using RFID, multi-media offerings, SMS service, self-service libraries, etc.);” (2) strategic change: “The NLB has redefined both librarians’ as well as citizens’ view of libraries should be about; no places where librarians safeguard books and tell everyone to keep quiet, but welcoming places for the public facilitating knowledge exploration in an engaging way and for businesses helping create and share knowledge through ‘knowledge communities’;” and, finally, (3) sense of competition: NLB “knew that citizens have choices about how to spend their leisure time, and it wanted to be near the top of the list of these choices; even where no direct competition was apparent” (Heracleous and Johnston, 2009, p. 376 f.). What is the reason for such a success story? What are NLB’s resources? What services and programs does NLB provide?

6. Services

Using most of NLB’s services and programs requires a membership. However, basic membership (with loan quotes of eight library items, including three audio-visual materials, in a loan period of 21 days) is free for Singaporeans and permanent residents. The Premium Plus membership with a fee of SG-\$42 (about US-\$30) p.a. permits higher loan privileges.

In our article, we distinguish between services and programs. We understand “Services” as activities in the long run, which are strongly associated with the institution, its vision and its tasks. We are going to briefly describe the following services of NLB:

- OneSearch and the NLB App,
- Reference and Information Services of the National Library,
- Singapore Memory Project,
- Oral History Interviews (@Archives Online),
- Other (e.g., Newspaper SG, Singapore Infopedia, MusicSG).

Physical and Digital Resources at a Glance

However, in the first place we should describe NLB's resources. In 2017, the physical collections contain about 7.5m books and other media; in the digital collection there are 0.7m e-books. Additionally, NLB hosts 1.3m Singapore-related materials. The digital collections include fiction and non-fiction books, e-magazines, e-newspapers, and databases from online aggregators (as, for instance, ABI/INFORM, EBSCOhost, JSTOR, ProQuest, and—especially relevant for circles of interested people in LIS—the full text database Library Literature & Information Science). Most important resources in the public libraries are Overdrive (e-books) and PressReader (newspapers and magazines).

All NLB members are able to return borrowed materials at any library in Singapore. The digital resources can be accessed from home or work place and—of course—at all libraries. There is additional access to local e-newspapers and further databases inside the libraries, for instance, Factiva or Bloomberg professional service (the latter only in one library).

For NLB, their users are prosumers, they may consume services and programs provided by NLB, and they may contribute to the services by own material (for instance, photos or music pieces for the digital archives) (Wah and Choh, 2008). All self-created digital resources are packaged on an own microsite, but also available on Google (Wah, Davasagayam, and Choh, 2009), which was a great success: “From a small number of 400 accesses a month in Nov 2006 when the content was only accessible through the NLB's digital library, we now get 150,000 accesses a month in Mar 2008” (Chow, 2008, p. 7).

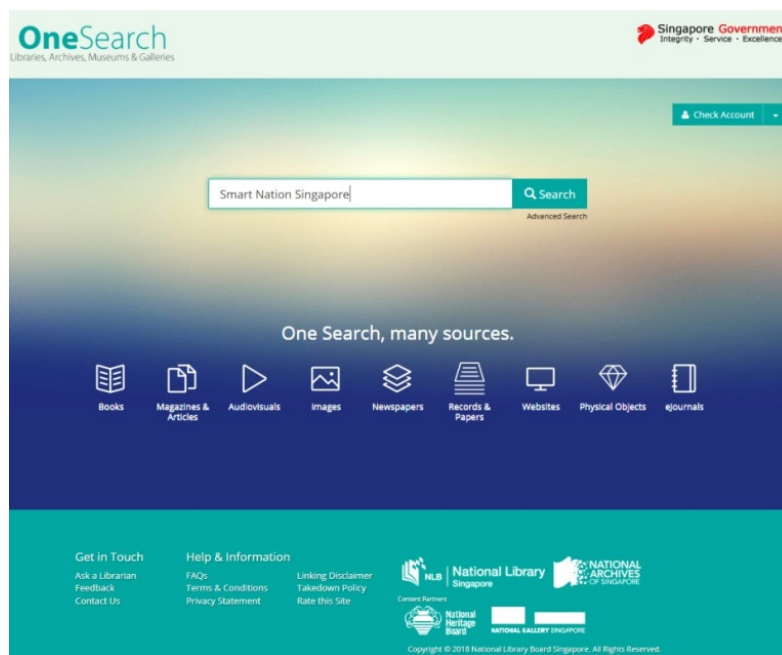
OneSearch and the NLB App

OneSearch is a retrieval system that allows searching for all (physical and digital) resources of the National Library Board (NLB), the digital collection of the National Archives of Singapore (NAS), and further public libraries as well as online archives and databases (Tang, 2015).

The system supports “Exact Phrases”, via placing quotation marks around the search phrase, and Boolean operators like “OR” to expand a search or “NOT” to narrow a search. Furthermore, there is an option to use the advanced search. On the advanced search one can search for terms in exact search fields: keyword, title, creator, publisher, subject, or categories of content. The content is divided into nine different categories, namely books, magazines as well as articles, audiovisuals, images, newspapers,

records and papers, websites, physical objects, and e-journals (Figure 4a). After searching for the query terms one may use refine filters (e.g., type, collection, subject, language, publisher, etc.) to modify and reduce search results. The filters are shown in a list on the left side and are applied by simply clicking on it. Also, one may sort the search results by relevance, date, title, or creator (Figure 4b). Everyone is able to search for resources without being logged in. But, for access of some content (home access is limited) users have to be logged in.

(a)



(b)

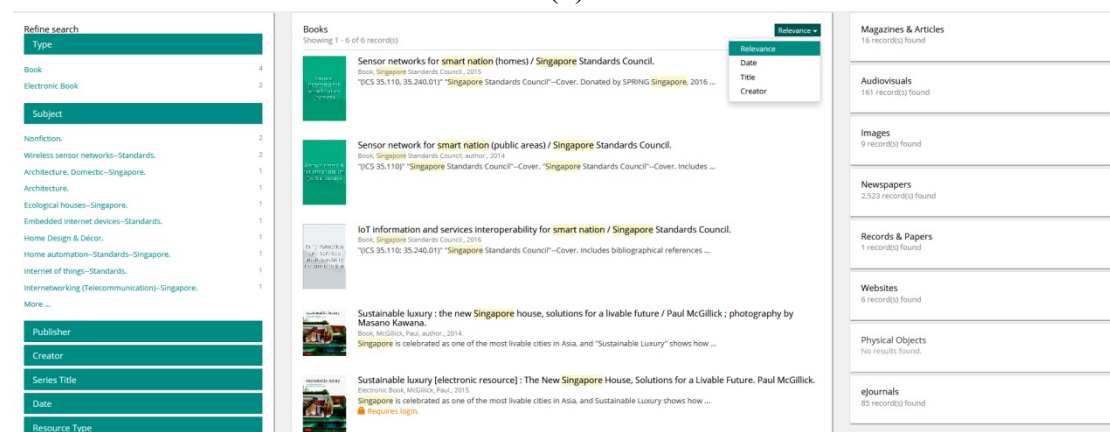


Figure 4: OneSearch: (a) Search Interface, (b) Results Presentation (Excerpt).

As Singapore is a multi-lingual country and names (of persons, organizations, and places) are spelled differently in the respective languages, NLB runs a controlled vocabulary for all named entities (Tang, Hong, and Jailani, 2018). Since 2016,

OneSearch supports Named Entity Recognition (NER). To detect the names besides intellectual efforts, automatic NER is applied on unstructured data (from, for instance, Singapore Infopedia) and metadata (from digital catalogs) (Goh, 2018). Additionally, NLB applies linked data technology to bring different data sets together (Hussein, 2015).

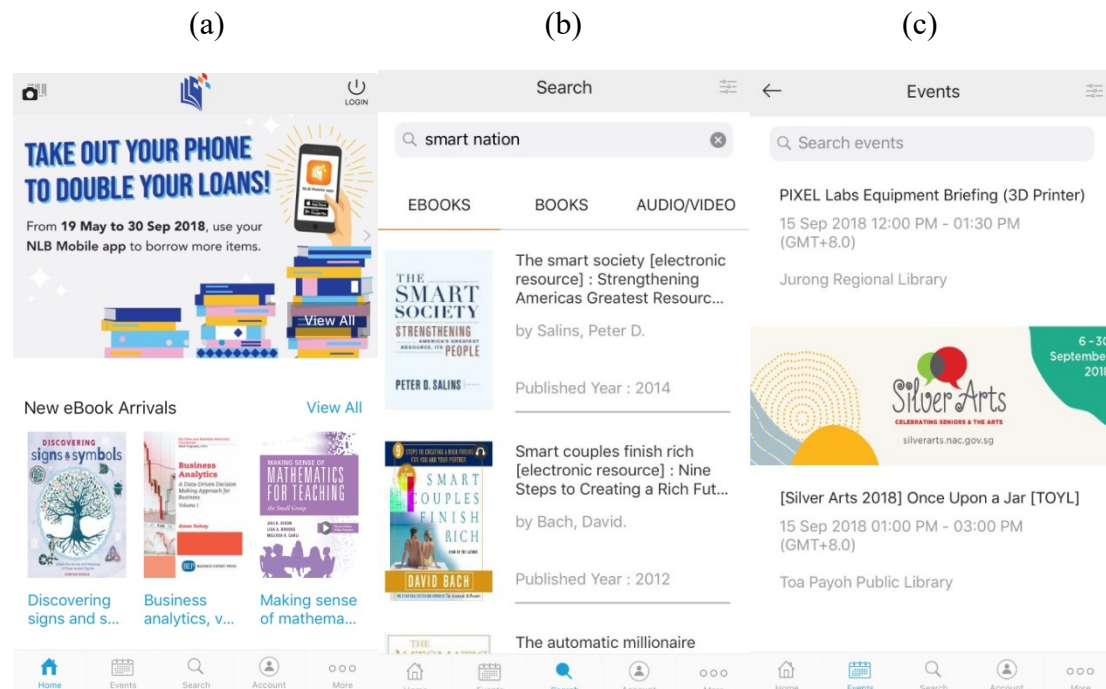


Figure 5: NLB Mobile App: a) Home, b) Search Results, c) Events.

NLB provides a mobile application, called “NLB Mobile” (Figure 5a), which is available for iOS as well as Android systems. Following Lee (2018), 4.1 per cent of Singapore’s residents are using the NLB mobile app. Through the app users are able to get access to digital resources as well as library and account information. Everyone can search for resources of the NLB (Figure 5b) and check their availability in all supported libraries. The retrieval system supports advanced search to search for specific kinds of terms (title, author, subject, language, or e-book type). An important feature of the app is the barcode scanner that allows customers to scan and borrow library materials on the spot, skipping the step of having to queue up to use a borrowing station. Furthermore, one may browse through and search for events (Figure 5c). It is possible to refine the search for an event through several filters, like date, venue, or category (e.g. arts, business, children, heritage, etc.). Also, users are able to view a map or a list of all supported libraries and their corresponding information, for instance opening hours or the distance from the user’s actual position. Registered users have an account with the opportunity to create additional profiles for family members.

They have an overview about their transactions, loans, and reservations. Also, users have the opportunity to pay fees in-app. The NLB has additionally its own prepaid system which is called “NLB Prepaid”.

One may borrow audiobooks and e-books in the app to read on the go, too. The e-books are automatically “returned” after 21 days. Additional functions are a book-marking system by tagging resources as favorites or sharing a resource on a social networking service (SNS) as Facebook or Twitter, or with the help of a messaging service as WhatsApp. Furthermore, the app supports the function to recommend a resource’s title for new acquisitions, to give feedback, and to view frequently asked questions.

Reference and Information Services of the National Library

The Lee Kong Chiang Reference Library is a resource for works on or about Singapore and the region; it is part of the National Library and is located on seven levels in the National Library building (Law, Gao, and Ng, 2009). The users may browse through more than 600k books and non-print materials. Additionally, they find access to databases, a document delivery service, reprography, microfilm, other audio-visual media, and—of course—professional reference assistance. In contrast to NLB’s public libraries, the reference library primarily addresses users with information needs concerning research or self-improvement. The reference library runs a call center, called “Reference Point” (Chaudhry and Jeanne, 2004). Reference Point is a local hotline for information (especially about Singapore) and provides reference services via e-mail. The National Library offers a training program for its reference librarians (Loo et al., 2014) including topics as reference work, knowledge in a subject area, collection politics, and social engagement.

Singapore Memory Project

The Singapore Memory Project is a nation-wide initiative “to enable the cultural and intellectual memory of Singapore to be collected, organized, preserved and promoted for research and discovery” (Chellapandi et al., 2010, p. 47; see also Foo, Tang, and Ng, 2010). The project gets its documents through crowdsourcing. “Personal memories are crowdsourced from the public on a national scale in both physical and digital formats. SMP is interested in acquiring all personal memories that relate to Singapore, be they past or present memories, and whether they are contributed by citizens or non-Singaporeans” (Tang, 2013, p. 5). In 2018, more than 1m memories (i.e., Singapore-related stories, images, videos, or drawings) were added by citizens and (in some cases) by the National Archives themselves.

(a)

The screenshot shows the Singapore Memory Project search results for 'singapore sling'. The page has a dark header with navigation links: Highlights, Collections, Browse, Contributors, Discover, Sign In / Register. A red button says 'ADD YOUR MEMORY'. The search bar shows 'singapore sling' and the result count is '1,076,758 memories added'. Below the header, the search results are displayed in a grid. Each result includes a thumbnail image, a title, and a brief description. The results include:

- Singapore Sling close-up** by Singapore Tourism Board: A glass of Singapore Sling, a cocktail that was created by a bartender working at the Long Bar in the Raffles Hotel. Title devised by catalogue.
- Singapore Sling at the Raffles...** by Singapore Tourism Board: A close up view of two Singapore Slings served at the Raffles Hotel. It is a cocktail that was developed sometime before 1915 by Ngiam Tong Boon, a b...
- A glass of the Singapore Sling...** by Singapore Tourism Board: A close up of the Singapore Sling served at the Raffles Hotel. It is a cocktail that was developed sometime before 1915 by Ngiam Tong Boon, a bartender...
- Its Singapore Sling baby! #mystorysg #littlereddotsingaporeling** by Terence Wong: (Collected from My Story - a MediaCorp initiative to collect Singaporeans' memor...
- Long Bar, Raffles Hotel a co...** by Singapore Tourism Board: A couple toasting each other with a glass of Singapore Sling at the Long Bar, located in the Raffles Hotel. The famous cocktail Singapore Sling origi...
- Long Bar in the Raffles Hotel...** by Singapore Tourism Board: Three guests are enjoying a drink of the Singapore Sling cocktail. They are in the Long Bar, located in the Raffles Hotel. Title devised by catalogue...
- Capt's got some serious skills...** by Anonymous: Capt's got some serious skills. Playing a Singapore sling! #SEAGamesMoments (Collected from My Story - a MediaCorp initiative to collect Singapore...
- Long Bar, Raffles Hotel clos...** by Singapore Tourism Board: A close-up view of a couple toasting each other with a glass of Singapore Sling at the Long Bar, located in the Raffles Hotel. The famous cocktail Si...


(b)

The screenshot shows the document display page for 'Its Singapore Sling baby'. The page has a light gray background. On the left, there is a sidebar titled 'Browse Related Memories' with a list of related memories, each with a thumbnail and a title. The main content area shows the document details:

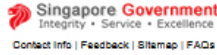
- Its Singapore Sling baby! #mystorysg #littlereddotsingaporeling** (Back to list)
- 1 views**
- Report Abuse** (with a flag icon)
- ADDED BY** Singapore Memory, **MEMORY OF** Terence Wong, **DATE** 6/08/2015
- Its Singapore Sling baby! #mystorysg #littlereddotsingaporeling**
- (Collected from "My Story" - a MediaCorp initiative to collect Singaporeans' memories of the broadcast media and related experiences as part of national heritage in collaboration with the Singapore Memory Project.)
- Engage** (with icons for Email, Tweet, and G+)
- cocktail** (with a search bar and tags: #mystorysg, My Story, mediaCorp)
- Click here to collapse conversations**
- Join the conversation**
- Add Your comment here...**
- SUBMIT** (button)

Figure 6: Singapore Memory Project: (a) Results List, (b) Document Display.

For Rickum (2016, p. 34), the Singapore Memory Project is an impressive example of inter-cultural memory and metropolitan library work. Following Gonzaga (2018), the archival project is a sign for certain nostalgia, epitomized by the longing of life in the *kampong*, the (now non-existent) traditional Malay village in Singapore's early days, and the nowadays lost *kampong* spirit.



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Maps and Building Plans

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FAQs
CONTACT US

Type of Item: BLD

Source: [Swan and Maclaren](#)

Accession Number: 18(14)/1928

Title: R.C. CHURCH AT KAMPONG BAHRU ROAD

Covering Date: JAN 1928

Scope and Content: PROPOSED BALDACHIN OF THE NEW R.C. CHURCH AT KAMPONG BAHRU ROAD FOR THE REVEREND FATHER MARIETTE, SINGAPORE

Media - Image Number: NAHD0003 - NA0309_0221

Microfilm Number: NA309

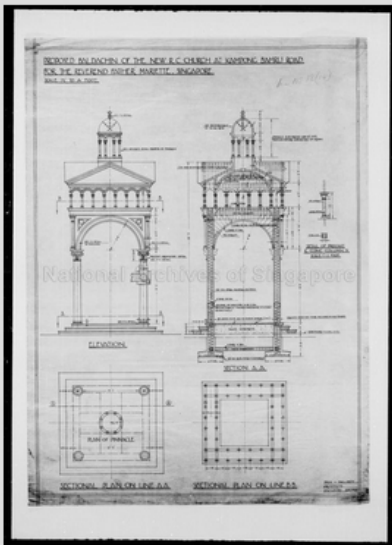
Source Reference Number: 18(14)

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Related records within Maps and Building Plans

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No related records found.

Figure 7: Exemplary Map from the Online Service of the National Archives of Singapore.

Figure 6 exhibits an example of a search process on the Singapore Memory Project. We looked for “Singapore Sling”, a cocktail originated in this country. We arrived at 13 hits (Figure 6a) and took a look to one of the documents (Figure 6b). The photo is result of crowdsourcing; however, also the user may contribute to the further development of the database by work on tags (we added the tag “cocktail”) and comments—crowdsourcing again.

Collections of the National Archives and Oral History Interviews

Founded in the year 1968, the National Archives of Singapore (NAS) is an institution under the umbrella of NLB since 2013. The archive collects Singapore-related video and sound recordings, government records, maps (for an example see Figure 7), photographs, posters, speeches, and private records. The NAS is going to digitize their collections of audio and video documents in order to foster their (online) use (Phang and Soh, 2017).

One of NAS’s tasks—even by law (Table 2)—is the conduct of oral history interviews (NLB, 2017b). The archive offers a remarkable collection of such interviews, presenting Singapore’s history, politics, trade and culture from the individual perspectives of the interviewees. All in all, the National Archives collected about 23,000 hours of recordings with personal recollections from more than 4,100 people. From those about 17,000 hours of interviews are available online, all other only in the National Archives’ building. As only a quarter of all audio or video clips are transcribed, volunteers may contribute to the Citizen Archivist Project by transcribing speech to written text. If available, the transcript will be presented to the user as a (non-printable) e-book.

Other Services

Arisen from the project Flickr SNAP (Singapore National Album of Pictures) (Hoon and Pwee, 2009), *PictureSG* is a collection of photographs and artworks on Singapore. It includes complete collections as, for instance, from Lee Kip Lin (about 18,000 photographs) or from the Singapore Children’s Playhouse (1,500 images). *Singapore Infopedia* (Chellapandi et al., 2010, pp. 44 f.) is a collection of articles on Singapore, its history, culture, people, and events, edited by reference librarians of NLB. *NewspaperSG* (Chellapandi et al., 2010, pp. 45 f.) is a historically oriented bibliographical database of articles published in Singaporean newspapers as “The Straits Times”, “The Singapore Free Press and Mercantile Adviser” (published between 1884 and 1942), “The Business Times”, and “Malayan Tribune”. Only articles from selected sources and the time between 1831 and 2009 can be read online from home. As all

24m documents are stored on microfilm, the facsimile of all newspaper articles is available on reels at the Lee Kong Chian Reference Library. *MusicSG* is a digital archive of music composed by Singaporeans (Loh, 2014). It covers all musical genres. For all music pieces, there are 30 second previews, lyrics (insofar applicable), and metadata. For copyrighted material, the full form of the music piece is only available onsite in one of the libraries. There are lots of further services as, for instance, *PublicationSG*, a catalog of Singapore-related material on NLB, or *BookSG* being an online collection of digitized books (including rare and historical imprints) on Singapore and Southeast Asia.

7. Programs

“Programs” are short-range activities (only for some years) with a specific thematic orientation. NLB runs a lot of programs; we will mention only two important ones:

- READ! Singapore, and
- Digital literacy instruction programs (e.g., S.U.R.E.)

READ! Singapore

Besides activities of school libraries (Loh, 2016; Loh et al., 2017), there are further projects to improve the literacy of all Singaporeans. Having in mind that Singapore has an excellent education system leading to top scores in, for instance, the Program for International Student Assessment (PISA), for *READ! Singapore* “reading” means a culture of dealing with fiction among Singaporeans. There is a long tradition of NLB to engage people for reading, e.g. the *Readers for Life* strategy with specialized initiatives for preschoolers (kidsREAD) and older children (Young Read! Singapore) (Rajaratnam, 2013). “Promoting lifelong reading and learning remains the core of the National Library Board’s mission. It lies at the heart of the many programmes, events and content that the National Library, Public Libraries and National Archives of Singapore have created over the past year” (NLB, 2017a, p. 3). Presented in Singapore’s official languages (i.e., English, Chinese, Malay, and Tamil), READ! Singapore features book discussions, meet-the-author sessions, book clubs, writing workshops, storytelling sessions, and book-derived workshops. Additionally, there are specialized programs to foster the reading competency especially for students (Read@School) and for the elderly (Luyt and Ann, 2011).

Digital Literacy Instruction

In June 2018, Singapore published the Digital Government Blueprint (GovTech Singapore, 2018) stating to aim for 90-95 per cent of government transactions to go digital by 2023. The goal is an adaptable and effective government that is “Digital to the

Core, and Serves with a Heart” (GovTech, 2018). This phase of government digitalization is in tune with Singapore’s vision of a smart nation. But for Singapore to become a smart nation, smart citizens are needed. A digital government can only function if all citizens really want and are able to participate. Therefore, Singapore has to prepare its citizens by not only providing access but also equipping them with the skills necessary to utilize digital (government) services and fully participate in this transformed, digital society. Two terms often mentioned in this context, are *digital readiness* and *digital inclusion*.

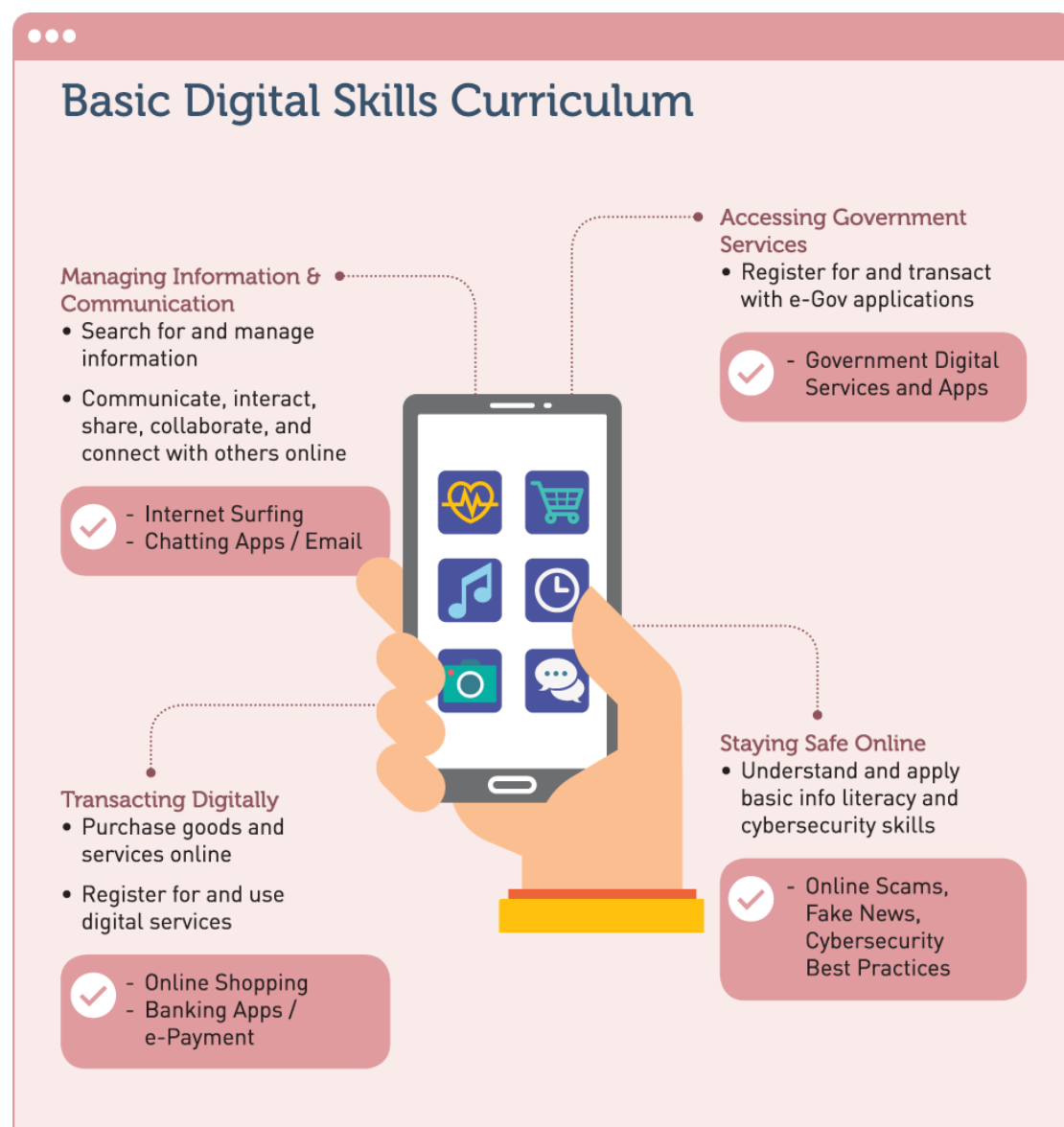


Figure 8: Basic Digital Skills Curriculum from the Digital Readiness Blueprint 2018
(Source: MCI, 2018b).

In this matter, the Ministry of Communications and Information (MCI) has established the Digital Readiness Workgroup in 2017 to collaborate and formulate strategies. They launched the Digital Readiness Blueprint to give (MCI, 2017a) recommendations on how Singaporeans can become “digitally ready” to build a smart nation. Digital readiness is defined as: “a) having access to digital technology, b) having the literacy and know-how to use this technology, and c) being able to participate in and create with this technology” (MCI, 2017a, p. 10). The Digital Readiness Workgroup recommends ensuring that all citizens have access to digital technology, the necessary digital skills, and the ability to participate in digital life. Regarding digital skills, they identified a set of basic skills (e.g., internet surfing, e-mails, e-payment, cybersecurity) that should be promoted among citizens (see Figure 8) but also emphasize the importance to “focus on information and media literacy, to build resilience in an era of online falsehoods” (MCIa, 2017). Here, it should be noted that the Info-communications Media Development Authority of Singapore (IMDA) defines digital literacy as “the ability to use, create and share digital content safely and responsibly” (IMDA, 2017b) which includes technology competency, information literacy, and media literacy.

Furthermore, the Blueprint stresses the value of the digital by design principle, and designing digital government services to be as easy to use as possible, which ensures that all government services support digital inclusion. The goal is for every single citizen to be able to participate. In his speech during the MCI Workplan Seminar 2018, S. Iswaran, Minister for Communications and Information, explains why it is that important: “While MCI can do much to create exciting opportunities in the digital economy, it will be meaningful only if all Singaporeans are able to share in this progress. (...) Ultimately, our progress as a nation must be measured not just by our economic achievements, but also by how well we ensure that all Singaporeans are able to partake of the benefits” (MCI, 2018b, par. 28-29). He also emphasizes the crucial role libraries play in an inclusive digital transformation of Singapore: “Our libraries are social levellers—they provide access to lifelong learning opportunities to keep up with changes in the digital economy and society” (MCI, 2018b, par. 40). The public libraries of Singapore provide not only access to information but are also perfectly positioned to provide the necessary support and education for using it. And, although they have evolved into “community institutions” meeting many and important community needs, Thomson et al. (2015, p. 133) state, that for a public library “digital literacy and digital inclusion remain at the center of all of initiatives.”

Singapore on the one hand identifies “having a digitally literate population” as one of their strengths in regards to building a successful smart nation (SNDGO, 2018b) but on the other hand admits “a pressing need for greater awareness of media and information literacy skills so that Singaporeans are able to discern, evaluate, and manage information in an increasingly complex digital environment” (MCI, 2017a).

What is the actual state of information literacy (IL) in Singapore? Mokhtar et al. (2013) and Foo et al. (2014) found there are still problems with the information literacy level of Singaporean people (as elsewhere in the world as well). Foo, Majid, and Chang (2017) investigated the information literacy skills of Grade 5 students in Singapore. Out of a maximum of 100, the overall mean score was only 53.39, i.e. a little bit more than the half. Girls (mean: 55.38) scored slightly but significantly better than boys (mean: 51.50); students with internet access at home (mean: 53.67) scored significantly better than students without access (mean: 45.81). “Having internet access appeared to be distinctly advantageous for such students as they have more opportunities in engaging in information seeking activities, reading, researching and using information” (Foo et al., 2017, p. 346). However, also the value of students with internet access is not that high (scores above 60 or 70 are seen as adequate). The authors conclude, “the overall weak score signals a need to reassess all IL-related initiatives” (Foo et al., 2017, p. 348)—be it at Singapore’s schools, its universities and polytechnics, or at its libraries.

Information literacy education is one of NLB’s main goals. Over the last years, and in tandem with many other initiatives, NLB has established several services and programs to raise awareness and competence among their patrons. As early as 1997, NLB conceptualized an information literacy program (Choh and Munoo, 2005) because “information literacy has emerged as a critical skill in the Internet-based knowledge economy” (Narayanan and Munoo, 2003, p. 1). In this year, Singapore’s Ministry of Education published the Information Literacy Guidelines as well as the Masterplan for ICT in Education. Singapore’s first information literacy program was announced in 2001. The National IT Literacy Programme (NITLP) was launched with the goal to equip 350,000 Singaporeans with basic computer and internet skills. The National Library Board belonged to the 22 Authorised Trainings Centres (ATCs) (IMDA, 2001). In September 2002, the Infocomm Development Authority of Singapore (iDA) organized “the Great Singapore Surf”. At this mass IT training event 10,000 citizens attended to learn basic computing and internet skills. After that, during Infocomm Literacy Month, an island-wide training program was available at 13 ATCs (IMDA, 2002).

The Silver Infocomm Initiative was launched in 2007 to “to promote IT awareness and literacy among seniors so that they can be actively engaged in the digital age” (iDA, 2015). Today, NLB has partnered with IMDA and offers basic computer and internet classes, e-entertainment and social communications sessions (NLB, 2018b). There is also the Seniors Tech and Read (STAR) program at public libraries in Singapore since 2017. Here, participants of ages 50 and above get one-to-one assistance with library-related technology problems (e.g., using the NLB Mobile app) from a volunteer (MCI, 2018). For other questions, for example using WhatsApp and Facebook on the smartphone, or connecting to a Wifi hotspot, seniors can visit the libraries’ Digital Clinics (IMDA, 2018). Indeed, senior citizens are often mentioned when discussing the digital divide or digital inclusion. But social and digital exclusion are complex and multi-layered problems, and there are more influencing factors than age—such as education, disability, employment status, or motivation (Helsper, 2008). Therefore, digital literacy and inclusion programs should not only focus on older generations.

Singapore’s National Information Literacy Programme (NILP) “aims to raise public awareness on information literacy skills in today’s complex information landscape” (MCI, 2017b). They launched S.U.R.E. in 2013 to “encourage Singaporeans to adopt good information literacy practices.” S.U.R.E. is an acronym for “Source – Understand – Research – Evaluate” and is NLB’s state-wide initiative to foster people’s information literacy (Tan, Pin, and Ten, 2014). “The mastery of information literacy (IL) skills hence becomes extremely critical to the current generation of information users, as IL capacity affects users’ lifelong competency to reason, to think critically, and to take in varied information from numerous sources to synthesize it for their own needs” (Tan et al., 2014, p. 2). The four steps of a “simplified” IL include

- Check whether the information source is reliable,
- Understand the context of the information,
- Research into other sources to verify the accuracy of information, and
- Evaluate the best way to use the information (Tan et al., 2014, p. 3).

Goals of this program are, for instance, to increase public awareness of IL, the production of learning resources for teachers, and to groom expert information seekers (via S.U.R.E. club activities). Additionally, S.U.R.E. provides guides for NLB services as NLB e-resources, NLB mobile app, NewspaperSG, or Singapore Infopedia.

Furthermore, NLB plans to introduce almost 6,000 digital readiness and future skills programs over the next five years, to “to infuse digital literacy into Singaporeans’

everyday life—to build interest, confidence and capability in digital adoption and creation with tech” (MCI, 2018b).

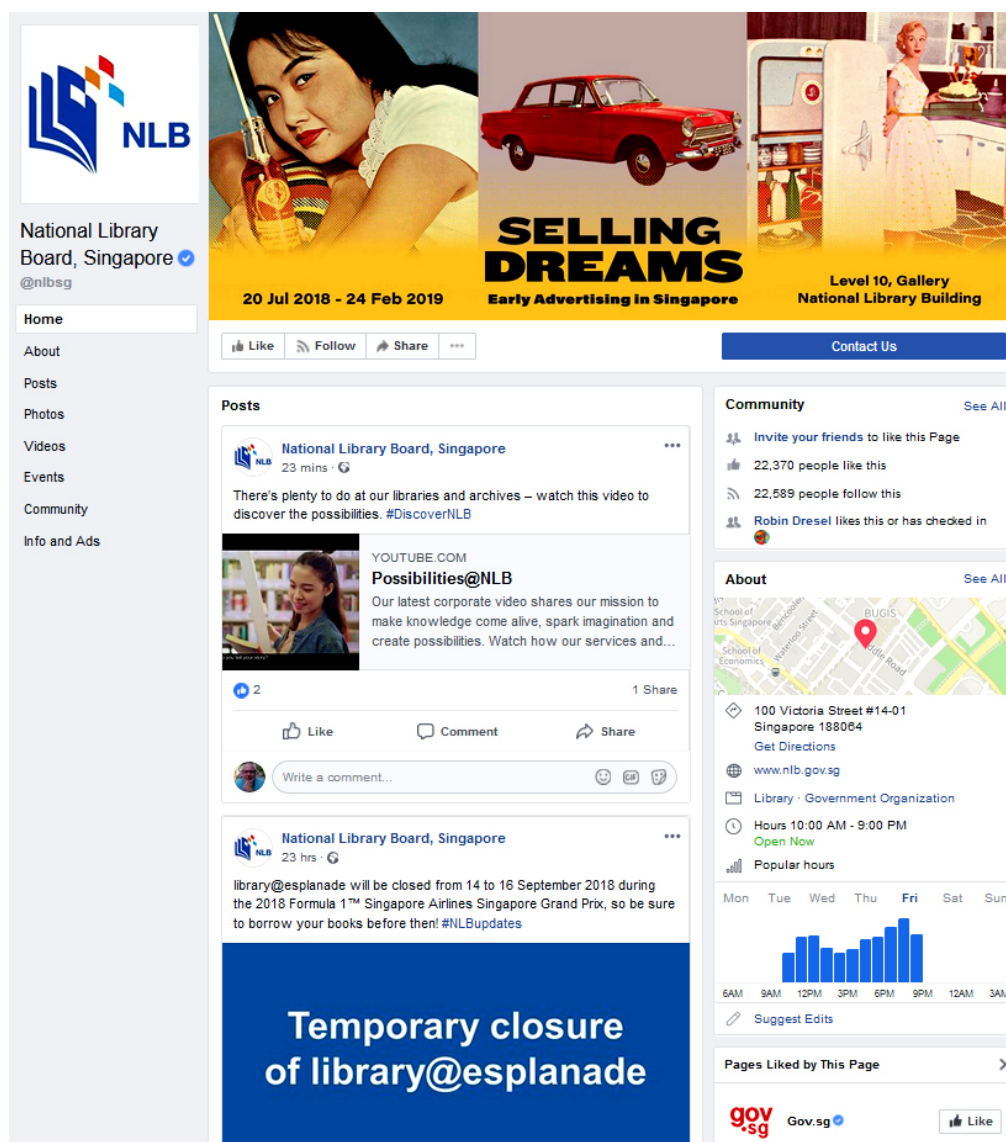


Figure 9: Screenshot of the NLB Facebook Page.

8. Social Media Services

In a country where social media is a part of everyone’s daily life, as 96 per cent of Singaporeans own at least one social media account and spend a daily average of 2 hours 27 minutes on them (Lee, 2018), NLB utilizes social media platforms to a great extent.

NLB adopted social media early on. The first entry on its blog titled High-BrowseOnline (now inactive), which focused on book reviews is dated on the 22nd October 2005 (Dresel, 2012). At the end of 2011 the libraries handled eight blogs,

four Facebook sites, one picture platform, and a Twitter account. Some of the former blogs were, for example, Read And Reap, where interesting small parts of a book are published to start discussions. Y.O! was a blog focused on teenagers, with the themes ranging from music to sports and of course, reading. The most popular blog was ASK!, on which people could ask all sorts of questions, for example “how can I get the best airplane seat?” (Dresel, 2012).

NLB’s Facebook page (Figure 9), @nlb, which publishes the latest news about the NLB, is still active, as well as their Twitter account @NLB. The libraries at Esplanade and Orchard have active blogs (library@esplanade, library@orchard) as well as their own Facebook accounts. A blog called Librarian’s Blog dedicated to the younger readers on the website discoverRead updates on the latest events for children in the library, tackles social issues like cyberbullying, or gives book recommendations.

Furthermore, the National Library, additionally to their Facebook account @NationalLibrarySG, handles an Instagram account, @nationallibrarysg, and even has its own YouTube channel, launched in April 2017, called National Library Singapore. On the National Library’s YouTube channel one can find (140, as of October 2018) educational videos teaching how to use academic databases or how cross-referencing and citations work, show interviews with experts, as well as information on current exhibitions and book collections. On its Instagram page historic pictures of Singapore and information on current exhibitions or books are shared.

The Public Library also has their own Facebook page (@publiclibrarysg), Twitter account (@PublicLibrarySG) as well as Instagram account (@publiclibrarysg), where book recommendations are shared. The Twitter account also focusses on interactions with the readers and encourages them to participate in polls, for example.

The NLB programs are also represented on social media. For example, the Singapore Memory Project (irememberSG) even has six accounts (Facebook, Twitter, YouTube, Instagram, Pinterest, and a blog). There are also Facebook and Twitter accounts for READ! Singapore and S.U.R.E., as well as a YouTube channel for READ! Singapore.

All in all, NLB puts great emphasis on realizing the digital third places by using social media accounts that are accessible to everyone. The wide range of different social media forms, e.g. Instagram and YouTube (584 videos of NLB, and, as mentioned, additional 140 videos of the National Library), which are generally more popular with younger users, as well as more traditional services as Facebook and Twitter, makes

sure to reach all generations in Singapore. However, the number of users of the social media accounts is rather low (Table 3). In comparison to the New York Public Library (NYPL), only the Singapore Memory Project on Facebook makes a good score. Here is still room for improvement for all NLB institutions to reach (much) more people in Singapore via social media.

Table 3: Social Media Outreach of NLB Institutions (as of Sept 7, 2018).

	Facebook Likes	Instagram followers	Twitter followers
NLB	22,370	---	33,800
National Library	46,946	4,530	---
Public Libraries	29,844	9,628	7,886
National Archives	---	---	---
library@esplanade	3,303	---	---
library@orchard	3,135	---	---
irememberSG	241,608	17,800	10,100
<i>For comparison: NYPL</i>	<i>280,000</i>	<i>277,000</i>	<i>2.5m</i>

9. Open Innovation, User Participation, and Design Thinking

Open innovation considers both, importing external ideas into an institution's knowledge and innovation processes as well as exporting its experiences to others. Chesbrough (2003) was the first who introduced open innovation into research. In library environments, open innovation is often called "design thinking." One crucial aspect of librarian design thinking is the active participation of the library's stakeholders, primarily its users.

Henkel et al. (2018) distinguish between user participation on a large scale (for instance, planning new library buildings) and on a small scale (e.g., slightly modifying an existing library service). In Singapore, small scale user participation for information inflow can be found in the NLB's crowdsourcing projects. For the Singapore Memory Project citizens may archive all kinds of Singapore-related documents, for PictureSG images on Singapore. For MusicSG, composers and musicians may contribute with their own musical artworks. In the Citizen Archivist Project (Ming and Masramli, 2016) volunteers act as citizen researchers as they transliterate newspapers, transcribe and translate record labels, transcribe audios, describe photographs, and transcribe handwritten documents. NLB cooperates not only with its users, but also with other libraries (e.g., in the ASEAN digital library) and with private companies

(as, for instance, with Singapore Press Holdings for NewspaperSG or with various vendors for eReads) (Pak and Kia, 2015).

Concerning successful information outflow, NLB offers data and services for open access, enabling external parties to create innovative applications and mash-ups. This service was first conceptualized based on feedback and interest expressed by information service providers. For Web developers, data are accessible via API (Henkel et al., 2018).

User participation on a large scale takes place on large single projects. The Libray@Orchard has been planned with the help of people who worked or lived at Orchard Road (including over 100 in-depth interviews) as well as of (more than 1,000) users who attended at a prototype exhibition (See, 2015). Additionally, co-creation sessions with identified stakeholders were conducted and the designs were further refined and developed (Koh, Kang, and Chan, 2015). Before starting the planning of re-opening the Sembawang Public Library, a total of 70 people were interviewed in the library. “The comments received formed the basis of key ideas in the library’s design” (Koh et al., 2015, p. 7). NLB plans to revamp its public libraries progressively, and will continue to design the new libraries in a way that they are responsive to the community and to the user needs. With each newly designed library, NLB is going to learn from the experiences from each library in order to improve the design and the services of the next library (Koh et al., 2015).

In our informed estimation, design thinking can be very successful, but it requires a lot of training in advance and, above all, a lot of time to understand the users, and additionally a lot of the users’ time to collaborate with the librarians. Indeed, time is the sticking point, because librarians as well as users have to be able to afford the time. Without sufficient time, the design process can quickly end in an exercise that serves only to justify some old ideas. Furthermore, it takes courage on the part of the management to get involved in new insights and to test out the corresponding suggestions.

NLB designs open innovation projects for a win-situation for all partners, including the NLB itself, organizational partners, and citizens. It is essential for NLB’s libraries to ensure “that stakeholders support the library” (Choh, 2014, p. 156).

10. Conclusion

Now we are prepared to answer our research question. NLB is politically recognized as an essential building block of Singapore's knowledge society and smart nation. "Libraries that are better structured to contribute towards the nation's development come from countries where governments are aware of the importance and contribution that libraries can make to their countries' development. In these instances (and Singapore is definitely such a country; a/n), investing in libraries, as the nation's informal arm of education, is tied to the need to improve the literacy levels of their people" (Gill and Siew, 2018, p. 37). Singapore's politics and government strongly supports NLB through two important pillars, namely (1) the legal pillar (NLB act) and (2) the organizational pillar (NLB's prominent position in the hierarchy of political and governmental institutions).

Are there any serious prognoses for the future development of NLB? There are political statements and visions. Taj (2016) mentions one major asset of NLB's longevity: "It's that libraries are not just about books. If anything, they're about communities. Spaces for people to meet, share ideas, and form memories." "We are part of their (the Singaporeans, a/n) lives," Elaine Ng, NLB's CEO, adds (in Taj, 2016). The then Minister for Communication and Information counts the merits of Singapore's libraries—today and in future:

- Libraries as exemplars of digital transformation,
- Libraries as community spaces for lifelong learning,
- Libraries as facilitators of digital readiness, and, finally,
- Libraries as anchors of the heritage (Ibrahim, 2018).

Singapore's libraries fill physical as well as digital spaces for the acquisition of knowledge, for learning, entertainment, and community development and maintenance. In a highly aggregated indicator of public libraries' services in informational (i.e., smart) world cities (Born et al., 2018, p. 192), Singapore is ranked in the fifth place (out of 29 analyzed libraries) only slightly behind the North American libraries in Toronto, San Francisco, Chicago, and Vancouver. In comparison to an older ranking by similar criteria (Mainka et al., 2013, p. 312), Singapore climbed up two ranks in the international comparison. The study of Born et al. (2018) was conducted in early 2017, as there were no self-produced maker spaces in NLB's libraries (which was one of the main criteria of the indicator). However, the first maker space in an NLB library (PIXEL labs@Jurong Regional Library) was introduced in 2015, conducted by Infocomm Development Authority (IDA) as a component of IDA's partnership with NLB. And, in the meanwhile, in Tampines Regional Library we could identify addi-

tional maker spaces (equipped with, for instance, 3D printers and green screen technology), meaning that Singapore's libraries now would receive more or less the same scores as the top North American libraries.

In addition to formal education in schools, NLB provides informal learning spaces for the entire population of Singapore. There is access to knowledge resources from the homes or work places (via the digital space) and physically onsite in the library buildings. Most of the public libraries are integrated in shopping malls or community centers, which is of great advantage of the users as they may combine shopping and other activities with library visits. Some of NLB's institutions work with social media in order to strengthen their outreach and user participation. NLB's libraries fulfill the tasks of being a third place next to home and work.

We have to highlight that resources of different institutions (National Library, Public Libraries, and—which is exceptional in comparison to other library systems—the National Archives) are combined in one single metasearch engine (OneSearch as well as NLB app). We were able to identify high-class Singapore-related services as, for instance, the Singapore Memory Project, the Infopedia, NewspaperSG, PictureSG, MusicSG, Oral History Interviews as well as the collections of the national archive. With those projects, cultural heritage of Singapore is guaranteed from multiple points of view. NLB's programs try to foster the reading culture among Singaporeans and their digital literacy.

Nowadays, open innovation and design thinking are becoming more and more important for the (re-)construction of library services as well as of library buildings and their layout. Abraham Lincoln's famous description of government holds true for libraries, too: "Libraries of the people, by the people, for the people" (Henkel et al., 2018, p. 4151). NLB fosters user participation both on a small scale (user participation in single services, e.g. the Memory Project) as well as on a large scale (co-designing or co-redesigning of entire libraries).

NLB's applies smart technologies not only for its users, but for its internal workflows, too. Since years, the libraries work with RFID; recently, they introduced shelf-reading robots. To realize OneSearch, NLB banks on automatic named entity recognition and linked data.

With its very large member base, its services and programs, design thinking and its establishment as a third (physical as well as digital) place, NLB indeed makes sense of community and is a part of Singapore's national identity (Lin and Luyt, 2014).

Table 4: Main Assets of Singapore's NLB on the Country's Way towards Knowledge Society and Smart Nation.

<i>NLB's assets</i>
Strong political support and a strong legal base
Establishment of a third place next to home and work, also as (partly) "lifestyle libraries"
Ubiquitous offer of knowledge resources (anywhere and anytime)
Provision of learning spaces
Location of libraries in frequently visited places
Offer of prestigious services (long-term activities) and programs (short-term activities)
Realizing cultural heritage; extensive offer of Singapore-related activities
Fostering of reading habits; instruction of digital literacy
Fostering citizen participation (by social media, design thinking, and cooperation on projects)
Working with elaborated technology; optimizing internal workflows
Making sense of community; being part of Singapore's national identity

In Table 4, we summarize the main assets of the NLB and its institutions concerning the country's *journeys* towards knowledge society and smart nation. We cannot ignore challenges, for instance, the level of digital readiness of the citizens of Singapore (including information literacy, media literacy, digital literacy, and critical literacy) and the rather low citizen participation in social media (besides the successful Memory Project); however, NLB proves to be an important travelling companion and—even more—a tour guide on these journeys into the 21st century society.

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