Information technology – hardware, software, networks and other technologies enabling processing, management and access to information - continues to have a fundamental impact on the library sector. ICT products that automate traditional library processes continue to change and evolve (see, for example, the annual *Library Systems Reports* by M. Breeding).[1] Alongside traditional library functions, distinct ICT-enabled library services have become quite widespread – from public access to computer workstations and the internet to 3D printers, makerspaces or data visualisation.[2] Some libraries are introducing advanced and emerging technologies – for example, AI and robotics – to their workflows or services.[3]

Both patrons' and policy-makers' expectations of library services have shifted accordingly. A 2017 White Paper by the Urban Libraries Council, for example, points out that many local officials and general public representatives (in a sample from the United States) think that public libraries should offer such services as internet access, digital skills training and/or online privacy and security training.[4]

The strategic role of ICT-enabled library services is also referenced, for example, in the Irish government's *Public Libraries 2022* strategy. The strategy sets out to "establish the library as an important enabler of digital services and facilitator of digital skills development", and points out that "investment in ICT, equipment and software is essential if the public library is to support the growing digital and technological demands of a modern society."[5]

To make sure libraries are able to deliver on these tasks, suitable and fit-for-purpose library ICT infrastructure equipment and skills are crucial. Naturally, with libraries coming from different starting points and working to meet different user needs, libraries' technology priorities, needs and current capabilities differ. One way to conceptualise this is their **'tech readiness'** – how the equipment, infrastructure and other resources available to libraries match with the sort of services or uses it would like to offer.

Assessing library technology needs: existing frameworks and practices

This work of course builds on an extensive tradition of library assessment and evaluation in the field. Understanding what a library already has in terms of ICT equipment, infrastructure and other resources is integral to identifying possible services around available resources, prioritising investment and interventions where these are needed[6], and contributing to top-level strategic planning (including broader library and government/municipality strategies).

Technology plans, for example, were a part of the US *E-rate* subsidy program for libraries. Until the 2014 FCC *Modernisation Order*, the federal E-Rate program in the US required libraries to submit a technology plan to receive subsidies for certain services.[7]

Such a technology plan would typically include the following sections: library goals and objectives in relation to ICT and connectivity, professional development for library staff, a technology inventory

[1] E.g. as summarized in https://americanlibrariesmagazine.org/2019/05/01/library-systems-report-2019/
[2] https://www.tandfonline.com/doi/abs/10.1080/01616846.2019.1637222
[3] See, for example, http://library.ifla.org/2695/1/s08-2019-harada-en.pdf
[4] https://www.urbanlibraries.org/files/ULC_White-Papers_LIBRARIES%E2%80%99-SECOND-DIGITAL-TRANSFORMATION.pdf
[5] https://www.gov.ie/en/publication/56d1d4-our-public-libraries-2022-inspiring-connecting-and-empowering-commun/
[6] See e.g. https://opencommons.uconn.edu/cgi/viewcontent.cgi?article=1059&context=libr_pubs
[7] https://www.fcc.gov/general/summary-e-rate-modernization-order

and needs assessment, evaluation and budget.[8] Over the years, many libraries and library organisations assembled guides and sample plan templates to help other libraries prepare their technology plans.[9]

Outside of formal reporting requirements, libraries can prepare their own high-level **ICT/Digital strategic plans, policies, roadmaps or assessments** to reflect on key emerging trends and outline an approach tailored to their circumstances and priorities (see, for example, the continuously updated Strategic Plan of the National Library of Australia; or the Library and Archives Canada Digital Strategy 2015 and Beyond). ICT and digital transformation can also be explicitly included or draw on a library's overarching strategy (e.g. the Strategic Plan of the State Library of Western Australia).

Drawing on the available literature on library technology planning, evaluation and assessment, this briefing highlights some common recurring themes and key considerations for assessing library 'tech readiness': inventory and stock-taking, factors to consider beyond infrastructure and equipment, and matching tech service offering to community needs.

A first step – taking stock of the equipment and infrastructure essentials

Naturally, libraries around the world can come from dramatically different starting points when it comes to their levels of access to ICT. Access to basic equipment is becoming more widespread, but far from all libraries are equipped with ICT essentials. Drawing on the Library Map of the World, for example, we see that nearly 2/3 of public libraries across 30 countries where data is available offer public internet access. In some countries this number is as high as 100% (Mongolia), 99% (Thailand), 92% (Kenya), 89% (Saint Lucia),[10] while in other countries it can be below 20%.[11]

As such, a logical first step is to take stock of the library equipment a library has – to understand and familiarise yourself with the available infrastructure. This can help function as a baseline to help decide if a library needs more equipment (or different equipment).[12]

Alongside sample inventory templates for Technology Plans mentioned earlier, there are also of course, other available technical guides to connectivity and ICT assessment. For example, Internet2's *Toward Gigabit Libraries Toolkit* includes a *technology inventory* section that helps take stock of library's connection, network and end-user devices, wired and wireless network, and power. As a helpful self-diagnostic tool, it guides a library through key stocktaking questions (e.g. "What is the download and upload speed of your Internet connection", "How many WiFi routers and / or access points does your library have", number of public and staff-only computers, etc) as well as relevant question that help evaluate and assess the infrastructure (e.g. regarding the reliability of library WiFi, average ages of library computers, and so on). The toolkit also helps examine the situation with technical support and funding, and sets out best practices and additional resources for further reading.

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[8] https://lam.alaska.gov/c.php?g=214640&p=1416351

[9] E.g. https://guides.masslibsystem.org/c.php?g=570308&p=3930777, https://guides.masslibsystem.org/ld.php?content_id=25623518;; https://www.statelibraryofiowa.org/ld/e/e-rate/TechPlans/writing, and many more.

[10] https://blogs.ifla.org/lpa/2020/02/20/library-stat-of-the-week-6-almost-23-of-public-libraries-offer-internet-access-globally-in-russia-over-27-000-public-libraries-do-so/

[11] https://blogs.ifla.org/lpa/2020/02/26/library-stat-of-the-week-7-high-rates-of-library-connectivity-in-kenya-thailand-and-mongolia-offer-potential-for-digital-skills-programming/

[12] E.g. "Toward Gigabit Libraries Toolkit (Explainer Video)" - https://youtu.be/PXWv3-HYm-I

Other options for taking stock of a library's readiness focus on whether it is possible to meet essential/baseline library needs. For example, there are some existing frameworks and guidelines that seek to offer guidance on what these baseline library needs are:

- The 7th edition of the "Standards and Guidelines for New South Wales", for example, includes Information Technology Standards (e.g. regarding the number and age of PC workstations, availability of printing facilities and WiFi provision, age of software, etc). It also includes General Guidelines for library technology, which cover broader systems infrastructure requirements, covering such aspects as ICT strategy, the kinds of software and peripheral equipment that needs to be available to library users, adaptive technologies, library website functions and characteristics, integrated library management system, and more.[13]
- Similarly, the "Technology" section of "Best Practices for Public Libraries in Alberta" suggests best practices regarding infrastructure (public and staff equipment connectivity and network) depending on the size of the population a library is serving.[14]

In short, a useful first step towards assessing library tech readiness is taking stock of available equipment and infrastructure. Where applicable, these can be compared to minimal requirements or good practices regarding library ICT infrastructure and equipment set out in relevant Guidelines, Standards or policies.

A broader perspective – tech needs beyond infrastructure and equipment

The availability of suitable technical equipment and infrastructure alone, naturally, would not necessarily reflect the entire picture. To use Public Access as an example: drawing on the experience of *Beyond Access* with Georgian libraries, staff skills, their willingness to introduce ICT-based services, adapting workflows and library services are all crucial: human capacity determines libraries' tech readiness alongside equipment availability.[15]

Among the sources discussed in the previous section, we can already see references to important library technology needs beyond networks, infrastructure and equipment – e.g. library policies for internet and workstation use, ICT support, or budgets. To systematise further our understanding of key factors beyond equipment availability, we can turn to broader scholarship on digital transformation and digital maturity of organisations in the GLAM, educational, cultural, and public sectors.

A 2016 report by Fundação Telefônica Vivo and UNESCO, for example, examines the transformation of education through technologies and digital devices. It notes that adoption and continued development of digital trends in schools depends on several dimensions – and alongside physical/structural conditions (e.g. existing equipment, power supply, internet access, etc.) it is impacted by the abilities of teachers, administrative staff and students – as well as broader political circumstances (e.g. intentions and desires of staff, etc).[16] Some of these considerations (e.g. skills, management) would similarly be relevant for libraries.

In the arts and heritage sector, one influential assessment model is the *Digital Culture Compass* commissioned by Arts Council England and the Heritage Fund in the UK. The Compass highlights

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[13] https://www.sl.nsw.gov.au/sites/default/files/living_learning_libraries_2018.pdf

[14] https://open.alberta.ca/dataset/d424e091-e381-4dc4-b03f-a5a8b51a80fb/resource/bb49bd6b-7ba8-4fd1-85b4-d33f514279f0/download/best-practices-for-alberta-public-libraries-2018.pdf

[15] https://beyondaccess.net/2016/11/21/library-modernization-in-georgia-tech-based-human-centered/

[16] https://unesdoc.unesco.org/ark:/48223/pf0000247330

12 overall areas for evaluating an organisation's use of digital – and offers the opportunity to select areas applicable to a particular organisation to see additional indicators.

For a library, for example, some of the core areas to consider could be *Strategy/Governance, Programmes, Places/Spaces, Collections* and others – as well as the more broad supporting areas such as *HR, IT* or *Finance*. These areas related to skills and practices include such activities as:

- digital aspects of collection access and development,
- collection information, development and care;
- visitor experience and participation,
- accessibility,
- facilities management,
- measurement and reporting;
- skills and capacity development for people outside of the organisation; and others.

For each activity (e.g. collections care and conservation), the Compass sets out types of practice to take into account (e.g. storing born-digital content, digitising physical objects, etc) and offers descriptions of different 'maturity' levels to help assess where you stand. (E.g. "...activities in this area are not currently happening" – "we plan and periodically review the digital elements of collections care and conservation..." – "we systematically gather and analyse evidence of the effectiveness of the digital and non-digital elements of collections care and conservation..." – "we are using digital elements in our collections care and conservation to support significant innovation or substantial strategic change...", etc.)

More broadly, literature on digital maturity and digital transformation suggests a number of similar factors to consider when assessing an organisation's tech readiness. For example, among non-sector specific assessment models, a systematic literature review by Teichert (2019) suggests that the most common top-level maturity indicators are: digital culture, technology, operation and processes, digital strategy, organisation, digital skills, and innovation.[17]

A related set of indicators have been put forward through the Government of South Australia's Digital Maturity Assessment tool. Their indicators are clustered around the following areas: governance and leadership, people and culture, capacity and capability, innovation, and technology.

Beyond library equipment, the technology readiness of a library can be impacted by staff skills, access to IT support, budgetary constraints, and relevant library policies and practices. There is also a range of broader institutional factors which may be relevant for a library, depending on the context and organisational culture – such as management practices and goals, 'appetite' for tech integration and innovation among the staff – as well as capacities required for distinct activities and functions.

The context: user needs and library services

Any reflection on whether there is adequate access to digital infrastructure and equipment, and whether other key needs (like staff skills and budget availability) are met, will need to address the reality that libraries in different circumstances may not have the same technology needs. For example, the results of the *13th International Survey of Library Automation* (as laid out in *Library Perceptions 2020*) suggest that, across different types of libraries, larger organisations have different and more complex requirements when it comes to their integrated library system (ILS)

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[17] https://acta.mendelu.cz/67/6/1673/

products. As such, products designed for and favoured by small libraries are different from those that best suit larger institutions.[18]

As such library technology needs are largely dependent on the services libraries seek to offer. For example, it has long been advised that, to prepare a library Technology Plan, it is important to explicitly set out the goals and objectives library seeks to achieve with it;[19] as well as to consult with patrons and other community members who would use the library's tech services.[20] [21]

As such, a tech needs assessment would therefore dovetail with community needs assessments. The *New Service Development Model* developed by EIFL-PLIP, for example, sees selection of appropriate technologies as a crucial step in planning new services following a community needs assessment.[22]

Furthermore, the community needs assessment itself can suggest what tech infrastructure, services or offerings should be prioritised. For example, a student survey and focus group discussions launched as a part of a 2015-2016 Columbus State University Library Assessment yielded a lot of valuable feedback regarding user preferences for the development of library facilities and technology.[23] The 2017 "Technology Access in Public Libraries: Outcomes and Impacts for Ontario Communities" Discussion Paper/ Interim Report explicitly examines the alignments between Ontario Public Libraries' technology services and evolving community needs.[24]

Of course, library patron surveys are one of the possible ways to evaluate community tech needs and use of library technology;[25] but libraries can also draw valuable information based on library technology use statistics, more in-depth qualitative data, and other sources.

If an evaluation of community needs points to a demand for specific library services or offerings, it is also possible to focus on the assessment and evaluation of a single service or service area. The Government of South Australia's Digital Maturity Assessment Tool mentioned earlier, for example, suggests that organisations with diverse services offerings and/or audiences may want to score and evaluate these areas separately.

In short, library tech readiness is not only a question of the availability of essential digital infrastructure and equipment, as well as staff skills, relevant policies, practices and procedures, but also of community needs which can be met through technology in libraries. Through an assessment of both, it is possible to establish a degree of readiness, and identify steps that need to be taken next.

This briefing offers an overview of some of the key common recurring themes and considerations for assessing library 'tech readiness', and a basis for further reflection. An immediate next step, drawing on the structure set out above, will be to identify sets of factors to bear in mind when reflecting on how libraries can offer a service that will respond to an identified community need.

IFLA is currently working on determining such sets of factors and looks forward to sharing examples in the coming months.

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[18] https://librarytechnology.org/document/24957
[19] http://publiclibrariesonline.org/2015/10/tech-planning-tips-for-libraries-of-all-sizes/
[20] https://www.webjunction.org/documents/webjunction/Checklist_for_a_Library_Technology_Plan.html
[21] https://litablog.org/2019/04/author-interview-library-technology-planning-for-today-and-tomorrow/
[22] https://www.eifl.net/resources/paper-about-importance-community-needs-assessment-designing-public-library-service
[23] https://library.columbusstate.edu/about_us/library_survey/2015_2016_Library_Assessment_Report_FINAL.pdf
[24] https://www.torontopubliclibrary.ca/content/about-the-library/pdfs/access-to-technology-discussion.pdf
[25] See e.g. https://www.webjunction.org/content/dam/WebJunction/Documents/webJunction/slides.Impact.Survey.pdf