2020
VISION

Summary of Research into the 2020 Landscape

Advancing the world's knowledge
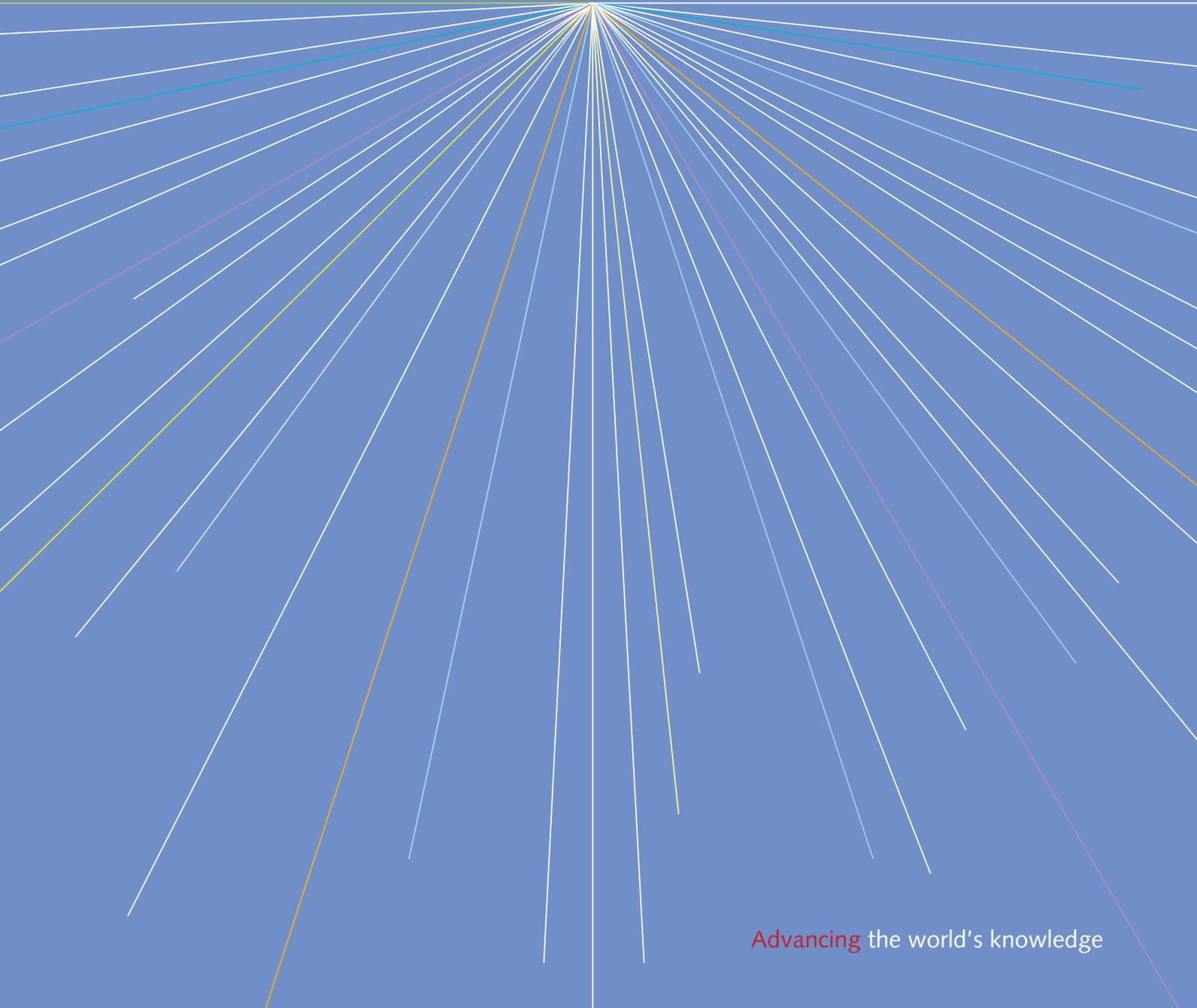
Context of this document

This document was written as an informal, internal working paper and was completed in May 2010. Additional information may have subsequently emerged (especially information relating to the funding environment) which this paper does not take into account. It is not an academic article and is therefore not formally cited and referenced.

2020 Landscape

Within a ten year horizon, we expect extensive and game-changing modifications to the environment in which the British Library operates. We present below the key changes that will significantly impact us over the next decade, and also highlight areas of uncertainty against which our vision must be robust.

a) Political and economic drivers of change

Market commentators expect a gradual recovery from the recession over several years. As public spending tends to lag GDP growth, public sector bodies will operate within a significantly constrained financial environment in the short- to medium-term and face large funding reductions. The widespread impact of the recession will lead to sweeping reforms in the Non-Departmental Public Body (NDPB) sector, driven by the need to ensure better value for money, greater public accountability and less reliance on the public purse.

In the light of slow recovery in Europe and the United States, global growth will be driven by the developing economies of the BRIC nations (Brazil, Russia, India and China). Economic growth will grow hand-in-hand with the increases in each country's academic output as well as growth in demand for information and education services, especially in the emerging economies' HE sectors.

Significant uncertainty exists around the extent to which changes in the balance between public/private/voluntary/community sector service delivery, devolution of responsibility away from central government, and social innovation will impact on government expectations and levels of funding within the public sector. Public sector involvement in service delivery will impact free- and paid-for service delivery models.

Forecasts from the Office of Budget Responsibility of UK GDP suggest that the UK will begin to recover from the recession with growth of 1.3% in 2010 followed by growth of between 2.6–2.8% p.a. until 2014.

Source: 'Pre-Budget forecast', Office of Budget Responsibility; June 2010

b) User needs and expectations

People expect a sophisticated user experience in their research lives that matches the experience they receive in their consumer lives. Searching a static library catalogue in isolation is no longer attractive. As access to mobile devices (iPhone, iPad, Kindle etc.) become ubiquitous, users will expect seamless access to information and services, provided anywhere, in real-time. Developments in augmented reality technology, through existing devices such as mobile handsets or advanced head-mounted and virtual retinal displays, will begin to merge the digital and physical landscape, increase the demand for real time information, and fundamentally change the way people interact with their environments and potentially each other.

Information consumption will become increasingly 'intelligent'. Search and discovery capabilities will include smart subject linking, with users demanding searches that identify sources of quality information and expecting prompts for new information based on previous patterns of activity. Similarly, over the course of the next ten years, the online landscape will increasingly resemble what has been termed the semantic web – in which computers become capable of extracting, classifying, categorising, and analysing data to create new uses for old content. The Internet of Things (IoT), where all objects are identified, self-configured and networked together, will transform the flow of information, increasing the touch-points between cyberspace and physical reality.

Users will expect to interact and be involved with content rather than be passive recipients of information. They want to participate in the generation of new information, and are willing to spend their own time and resources in doing so. Such current examples of "crowd-sourcing" include Galaxy Zoo's use of citizen scientists to classify millions of galaxies, and the National Library of Australia's collaborative text correction initiative for digitised newspapers.

Participation and mass self-expression have led to the emergence of what Charles Leadbeater refers to as "cloud culture"; an ever changing cultural exchange formed by our thirst to make and share culture in images, sounds and text and enabled through continuous and seamless access to information. Technology will encourage and enable the development of cultural discourse in a more diverse, open, participative and collaborative way.

Augmented reality (AR) refers to a view of the physical world whose elements are augmented by virtual computer-generated imagery. A Dutch mobile AR developer has recently launched a mobile marketplace for AR content which allows developers to provide a host of AR content that can be accessed by users for free or via micro-payments.

Source: http: //www.readwriteweb.com/archives/layar_launches_ its_augmented_reality_content_marketplace.php', accessed 05/05/10

c) Content and context; dealing with the data deluge

The volume of content and data will continue to expand exponentially. This is due in part to the impact of user generated content, self-publishing trends as well as the significant level of replicated content and data. Increased computing power allows for the generation of significant data outputs for scientific research. Data itself will become a published commodity; as demonstrated by Nature providing access to data in parallel with print publications.

To create meaning of increased data output, sophisticated data manipulation, mining and sharing technologies are already required. Increasingly people will demand context to the increasing deluge of data and content. Web filtering services will be increasingly important. The future will offer "intelligent" search functionality that will make decisions, translate foreign language, find related items from all media types and will rank not by popularity but by quality. Arising from the data deluge will be the need to create unique identifiers (UIDs) for knowledge that are traceable, identifiable and attributed, which can be used to assemble different ideas together in new patterns to create new ideas and knowledge.

The Large Hadron Collider in CERN will produce data output of 15 petabytes per year or c.500 Mb per second.

d) Social dynamics and the changing user base

The UK's ageing population will impact the demand for public services, flexible working policies, workforce motivation and expectation planning, and will increase the demand for life-long learning. Similarly, it will increase the digital divide. There are dramatic differentials in internet usage between the oldest and youngest and this may hamper attempts to modify public service delivery for more than the next decade.

Young people between the ages of 8-18 (the library users of tomorrow) consume more media than they did five years ago; approximately 10 hours per day if we include parallel use of media types. They are more likely to use a range of different media channels, and they consume media day and night, seven days a week.

In 2008, 70% of those aged 65 or over had never used the internet, compared to 33% of 45–54 year olds, and less than 1% of 16-24 year olds.

e) Changing research funding priorities

The majority of research funding is targeted to the disciplines of Science, Technology and Medicine (STM). This will remain a focus for both the private and public sector going forward. Within a constrained public and private funding environment, all R&D spending will be impacted, meaning that only research that clearly demonstrates economic and social value will be prioritised. Within the social sciences, more emphasis will be placed on the re-use of administrative data. For arts and cultural organisations to attract significant funding, the challenge will be to generate R&D outcomes that are explicable, communicable and applicable.

Within the research community, there is an increased drive for inter- and multi-disciplinary research across institutions and national borders. Research is becoming interconnected as traditional subject classifications break down. Facilitated by a host of online tools, researchers can collaborate with external experts in other disciplines to complement their own research strengths. Funding will be based on finding solutions to problems, and will be channelled across disciplines.

f) The changing nature of scholarly communication

There is a large trend towards free, open-access scholarly works to enable access, remove barriers to participation and serve the public good. Support for open access publishing models is being driven by a number of institutional mandates. For example, the US National Institute of Health (which distributes US$29 billion of grants resulting in 80,000 articles annually) has insisted on articles being available to all within a year of publication. A range of models including author-pays, hybrid open access (where authors pay to have their articles made freely available immediately) and time-delayed open access exist. Public and third sector funded research will drive research increasingly towards open access models.

Bidirectional forms of discussion through blogs and Wikis are breaking down the role of creator, editor and peer reviewer, and leading to scientific articles being released in a state of constant beta testing. Research collaboration will also be driven by the increased cost of experimentation, leading groups of scientists and research institutions to share facilities and datasets.

Libraries and other public knowledge institutions will increasingly make non personal, public-domain data readily available for re-use at no charge, in line with Public Sector Information (PSI) initiatives. This will encourage reuse of information with potential economic benefits to the information industry.

g) Pay barriers, 'open' environment and changing business models

In recent times, online content has increasingly been made available free to the end user, partly as a result of social networks, inexpensive digital distribution channels, as a response to piracy and due to a desire for individuals to express themselves. A 'democratisation of content' has resulted in the research world; in the movement to provide creative commons licenses and open access to content. As online consumption of media begins to replace traditional print

formats, a number of dynamic publishing models have emerged in a renewed attempt to monetise content. They include subscription models, rental models, print-on-demand services and streaming services. The key to success in any of the models will be to match price points with the customer's willingness to pay.

Publishing Model	Example
Subscription model	Financial Times Metering system Bloomsbury Public Library Online
Rental model	DeepDyve journal article access
Print-on-demand	Amazon Booksurge
Streaming services	Spotify Last.fm

There exists considerable uncertainty around the extent to which open access models for content and scholarly communication will develop, versus "closed" access to content (content being provided behind pay walls and hosted via proprietary platforms). The music industry provides an example of where some consumers seem unwilling to pay for digital content, which is instead being monetised in new ways such as micro-payment and streaming services paid for via advertising or subscriptions. However subscription models like the Financial Times metering system indicate that consumers are willing to pay for content they value. Paid-for and free content will co-exist in the future, the balance of which will be dependent on the success of the various models.

h) Impact of digital technologies on research and learning

Multi-touch interfaces will enable users to directly manipulate digital content in a naturally transparent way; enabling digital objects to behave like enhanced, real-world objects. Interfaces will move away from traditional flat mouse and icon based displays to reflect a more realistic 3-dimensional environment where gesture, facial and voice recognition become standard interaction techniques; dramatically changing the way people interact with computer systems and digital content.

A number of trends will impact the IT infrastructure that supports research and learning. The emergence of cloud computing means that instead of buying dedicated processors, storage, or network capacity to provide a specific new service, it is possible to buy them on demand by the minute or the hour. Similarly, cloud storage provides scalable, on-demand storage capacity. Cloud computing is set to be a game-changing enabler to commoditising IT costs. Green computing will play a larger role in all public institutions and is likely to place pressure on libraries to consider the impact of digital storage and energy efficiency. Power management and the use of shared storage facilities will be key agenda items.

The movement to digital production of content will affect publication formats in different ways; trade and consumer magazines as well as newspapers are expected to move to digital-only more quickly than traditional monographs. By 2020 a significant portion of all published data will be printed in both digital and analogue formats and in many cases publications will be released in digital format only.

i) The evolving nature of library services and library space

In a digital landscape, the need to visit a library to obtain access to reference material is no longer necessary. Library spaces are increasingly used as public areas to work, discuss, present and share information and research.

The separation of building and information services means that library physical space will need to accommodate usage flexibly. Research libraries will want to find the right mix of space that meets the needs of researchers who need to collaborate and discuss, alongside the needs of those who require traditional quiet space, and casual researchers who may only require access to electronic resources via WiFi. Design and management of space can no longer be separated. Space must be engaging and exciting, but also practical.

j) The changing role of the information professional

Librarians and curators form the bridge between readers and research materials, helping to discover information and providing authoritative and organised descriptive metadata for collections. This mediation role will be challenged and augmented in a number of ways; by the growth in sophistication and power of search engines and citation indexes; users' expectations and their role in interpretation and the creation of context; and the provision of metadata from external organisations. Digital collections will undermine the notion of a discrete collection, making the concept of linking more important than the practice of holding information.

Librarians and curators will increasingly be directed away from their traditional roles, to a more complex negotiation of open access and copyright-controlled content, paid and free and distributed relationships. They will work more closely with inter-disciplinary and multi-disciplinary user groups on specialised projects. Their role will thus become that of a bespoke supplier of informational goods involved in the end-to-end research process, offering advice from data collection to archiving.

Another key change to the role of the librarian is the need for transferable general management and business skills. In a rapidly changing digital landscape, the ability to write business cases, negotiate funding agreements, manage budgets and forecasts, and lead major projects and organisational change will be key skills.

At the same time, the move to digital will increase the value of heritage and legacy collections. Users are likely to lack sufficient skills required to negotiate digital as well as analogue content. Thus, by 2020 librarians and curators will still require their traditional collection development and stewardship skills.