THE LINKS EFFECT: THE LAWS OF ATTRACTION, LINKED DATA, AND THE NATIONAL UNION CATALOGUES OF FRANCE AND BRITAIN

ABSTRACT

Collection data locked in library catalogues can be released into the semantic web by transforming it into linked data thereby making it discoverable by anyone, anywhere.

National bibliographies, comprising millions of bibliographic records and typically built over decades, contain a prime dataset ripe for transformation and exposure on the web. However, releasing a national union catalogue as linked data opens up a range of policy, procedure, organisational, infrastructure, training, financial, ownership and capacity questions that need to be addressed in order to create a sustainable data future for the national collection.

The British and French national libraries released their bibliographies as linked data in 2011, and their experiences provide valuable lessons for libraries considering adopting linked data for national collections. This paper adopts a comparative approach in identifying the strategic and organisational drivers to be considered in transforming a national bibliography into linked data.

The study utilised a case analysis framework, with site visits, semi-structured interviews, informal discussions and document analysis employed in identifying and examining the key concepts and challenges involved in converting traditional national bibliographies into linked data platforms. A comparative analysis of the French and British experiences was undertaken, with specific consideration given to the organisational aspects of the process.

This paper outlines the key findings in relation to the differences and similarities of the French and British cases, positions the National Library of Australia in the continuum of linked data implementation, and suggests a best practice for implementing a linked data bibliographical release.

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PAPER

Making metadata accessible

Bibliographic metadata is an asset created, collected, managed, and disseminated by libraries. The dissemination of bibliographic data supports user tasks to Find, Identify, Select, Obtain, Explore, according to the FRBR -Library Reference Model (Riva, Le Bœuf, Žumer 2016). In the bibliographic context, linked data is a mechanism that unlocks data from the constraints of the bibliographic record enabling it to move beyond its original context (the library catalogue) be more visible on the web, and connect with other data.

The British Library (BL) and Bibliothèque nationale de France (BnF) both released their national bibliographies as linked data in 2011. Both organisations have promoted the technical aspects of their work via conferences and their websites. However, the internal organisational issues, business modelling, and policy questions are less evident and under-reported in the public domain.

For libraries, linked data is about improving the visibility of content, attracting users, and embedding metadata in the semantic web. The purpose and general benefits of linked data are clearly outlined in the literature on the topic, often outlining the 'why' and the 'how' of implementation. However, libraries often need to articulate a specific local business case for implementation before their organisation is prepared to invest in new technologies. A governing body or library director will want to know why they should upgrade or re-focus their investment in their metadata strategy and

tactics when it appears existing ways of delivering information about their collections (e.g. via discovery layers, data syndication to aggregating sites) are functioning. What would the business case be to invest in a data strategy involving linked data? There are a number of organisational, political cultural, policy, financial, and training, skills, etc. issues that need to be addressed for any individual library to make linked data happen. There is a dearth of literature outlining the organisational rationale to adopt linked data. It would be instructive to prospective implementers to gain insights into the motivation and local business cases that have led libraries to adopt linked data. It is time to move beyond a use case to articulate a business case, to move beyond the question of 'why' and 'how' to answer the questions "why us?" and "why us now?"

This paper observes the internal business drivers and use cases for creating linked data from the national union catalogues of the BL and the BnF with a focus on the technical, practical, policy, and organisational considerations of converting traditional national bibliographies into linked data platforms. This paper asks: What were the reasons that made these two national institutions choose linked data as their metadata dissemination and aggregation strategy, and what conditions made it possible?

Methodology

The following case studies of these institutions' implementation of linked data provide insights into the business, organisational, and political conditions that

created a fertile environment conducive to metadata experimentation and investment. The case studies were conducted in June 2016 through site visits, semi-structured interviews, and informal discussions with key personnel at the BL and BnF, supplemented by document analysis relating to project implementations.

Interviews were conducted with Emmanuelle Bermès (Assistant Scientific and Technical Officer to the Director of Services and Networks, Services and Networks Directorate, BnF) and Neil Wilson (Head of Collection Metadata, BL), based on a set of 16 open questions relating to their respective implementations of linked data. Further interviews were conducted with Vincent Boulet (Expert in Personal Name Authorities, BnF) and Anila Angjeli (Expert in Documentary Modelling, BnF) and their British counterpart Andrew McEwan (Head of Content & Metadata Processing, BL) in relation to the role of ISNI and VIAF in the linked data landscape and data supply chain. Group discussions were held with the Metadata and CCFr teams at BnF and provided additional organisational context and operational experience of project implementation.

Case studies of the British Library and Bibliothèque nationale de France

Unlocking the value: The British National Bibliography as Linked Open Data

The BL was established in 1973, and the British National Bibliography (BNB) became part of the BL in 1974. From 1950 the BNB had been run as a commercial company producing and publishing a weekly listing of all British publications and to

develop a computer based system for storing and handling bibliographic information for the use of libraries and the book trade (British Library Board 2016a).

The BL has made (and continues to make) its data available to a range of audiences in a variety of ways:

- Free access to MARC records via Z39.50 for non-commercial use
- Free access to datasets in a variety of formats
- CSV files (e.g. for Developers or Researchers), BNB New Titles
- Priced services designed to complement and enrich commercial services.

The impetus: Being Open

Since 2009 there had been an increasing commitment from the UK Government to the principle of opening up public data for broader reuse. In 2010 the BL embraced an Open Data strategy, developed within the framework of their strategic vision of 2008-2011, "to provide both physical and digital access to world-class information where and when people need it." (British Library Board 2016b)

The BL was seeking ways to engage in the government funded open data agenda which would promote transparency, allow scrutiny, and encourage economic growth. The Open agenda relates to accessibility, licensing, and format and standards (i.e. not MARC). In short, data must be open and useable by a range of communities. For the BL, the Open agenda led to the Linked Open Data agenda. Understanding 'open' was a large factor in driving the BL towards Open and Linked data. The BL was seeking to move away from library specific formats (e.g. MARC) and adopt standards that would reach audiences outside the library world. The BL was looking

at alternative ways to ‘get data out’. The BL saw linked data as a useful service enabling people to query the system themselves rather than rely on the BL to send out data in large file dumps. In the world of open data, people do not want MARC format. Linked data is meant to be queried by machines: it is an engine or a factory for the exposure of data exchange to reach people it has not reached before.

Another motivation was to enrich professional practice: “We wanted to be part of the Linked Data conversation. We wanted to experiment and see what it meant to publish bibliographic data as Linked Data; there were many claims made about the benefits of Linked Data and we were hoping to see them tested.” (Deliot, 2014 p. 1)

In response to these factors, the BL released the BNB as linked open data in July 2011. The Linked Open BNB is a subset of the full BNB and includes published books and serial publications, representing approximately 3.1 million records. The BNB was selected as it constituted a sizeable, re-usable set of metadata, a stable trusted set of metadata in place for over 30 years, and contained a broad range of topics useful to a range of audiences. Anyone interested in UK publishing over time could investigate cultural patterns emerging. As a bibliographic resource, “it was a Swiss army knife” (Neil Wilson, personal communication June 13, 2016). The BL recognised the value of making this unique metadata asset, the BNB, open and accessible for reuse (Mason, Brownlee 2016).

Implementation

Prior to release as linked open data, BL engaged in a data normalisation exercise. Any database containing over 3 million records will have anomalies requiring

correction. This work was performed in-house, using desktop applications and utilities already in place for existing data management and data output activities.

BL leveraged staff familiarity and skills in scripting languages (alongside training in using .xslt scripting), data conversion acquired in previous projects, and previous investments made in developing a suite of tools relating to command line utilities (known internally as “Catalogue Bridge”). A primary goal was to continue to do the work ‘in-house’ and not have to rely on the IT department. The BL had established an internal working culture of continuous development, constantly developing contemporary and relevant ways to manipulate data and make metadata available. BL looked beyond traditional cataloguing skills and focused on a practical application of skills needed to manage and convert data to and from formats other than MARC (e.g. ability to work with ONIX data, and DBX format for sound). They conducted a skills survey to identify skills within the team which also identified scope for wider digital re-skilling. In this way, the BL worked within its staff base and did not buy in expertise.

It is one thing to publish linked data, and another thing to put it somewhere to get usage. The BL’s impetus for openness and accessibility is reflected in its promotional approach to ensure use of the data. The BL developed a communication strategy to promote genuine usage of the data offering examples of usage, and sought feedback from people who had used the dataset. The BL noted that using internal examples could limit the organisation to its own view of data therefore it was important to keep an open mind to new and unexpected uses of the data set.

The project was managed by the Collection Metadata Branch led by Neil Wilson (Head of Collection Metadata). Reporting through the Head of Collection Management to the Chief Librarian, Collections, the project had free reign to implement the metadata strategy as long as the project operated within the branch's existing budget. The aim was to "see how far we could go with what we had" (Neil Wilson, personal communication June 13, 2016). Following a presentation to the British Library Board, and a test phase that monitored usage, coverage, and impact, the project was endorsed to proceed.

In terms of an implementation strategy, BL separated the data modelling and strategy aspects from the technical implementation (hosting) of the data set. The BL procured hosting services from a third party, simplifying the internal implementation and delivery aspect and reducing risk. The BL sought a turnkey solution to publish the data and contracted TSO (The Stationery Office) as the publishing platform for Linked Open BNB, and negotiated this first platform free of cost.

Post-implementation: benefits and demonstrating value

BL noted that it can be challenging to identify exactly how linked data has been used and by whom. While system logs capture basic information and anecdotal usage may be reported via social media, conference events or help desk feedback, the lack of independent tools similar to web analytics has made it difficult to gain understanding of how the service is used in order to justify and target investment. The BL partnered with Fujitsu Research, Ireland to examine the potential of development and application of BL's linked data analytics. Results indicated that analytics offer linked data publishers the ability to assess the impact of their data in

order to more effectively target their resources (Deliot, Wilson, Costabello, Vandenbussche 2016). This demonstrates the value and impact of linked data beyond the library walls.

The BL affirms that the utility of what has been achieved is greater than the effort expended. Previously, BNB metadata was only of use to libraries. Now, every £ spent on creating and managing the data can be useful to multiple, wider communities: developers, researchers, applications and commercial organisations, schools, as well as libraries and the broader knowledge creation and dissemination environment. The value of library data is no longer locked into a library band of systems but exposed to a broader audience, and is available for re-use/re-purposing to create new knowledge. The program has influenced Google rankings for unique material and improved exposure of BNB data to search engines.

BL staff gained familiarisation with linked data principles, data modelling, and format translation. Additionally, the BL has built a library infrastructure that can be shared with other libraries (e.g. BnF, GND) and engaged with organisations in other sectors the BL would not necessarily have talked to (e.g. Fujitsu) outside of this project.

The low cost/no cost approach to the project allowed the BL to justify future expenditure when the time came to move to a new platform. Linked Open BNB was scheduled to migrate to a new platform in late 2016. Although this would incur costs, it was justified in terms of return on investment resulting from good publicity, usage metrics, feedback and increased organisational capacity. The role of the BL has

been enhanced through this project as it has become a recognised leader in the field of metadata exposure and management.

Making connections: Linked open data at the Bibliothèque nationale de France

The French National Bibliography was founded in 1811, and is considered the oldest national bibliography. The French national union catalogue is built differently and functions differently to its British and Australian counterparts. The French national union catalogue environment is bifurcated between BnF and ABES (Agence Bibliographique de L'Enseignement Supérieur). The BnF collects and aggregates metadata from the BnF's general catalogue, and public libraries across the country into the Catalogue Collectif de France (CCfr). ABES was created in 1994 to implement Sudoc (Système Universitaire de Documentation or University Documentation System), the union catalogue of France's higher education libraries. While ABES have also implemented linked data to expose and deliver national research metadata, this paper focuses on the activities based at the national libraries of Britain and France.

The impetus: Being visible

The BnF's journey towards linked data started in 2008 with an attempt to map their digital environment and a prospective vision: to create an entry point on the web to the BnF world; a kind of 'BnF Wikipedia'. The aim was to create a product that would be referenced by search engines using the (then) latest wiki technology. Initially, it was thought that this could be achieved in an 'editorial' way, to craft information into a wiki space. However, Emmanuelle Bermès advocated for another

way to push data to the web using web standards and building BnF data into the semantic web. Linked data was the means to achieve this end.

In the French union catalogue, the data was not centralised. Users had to create and re-create synchronous enquiries to a variety of databases in order to query the breadth of French information. The BnF needed to solve the problem of how to connect the separate catalogues maintained by the BnF: CCFr, Digital resources in Gallica, and BnF Catalogue général, as well as how to interrogate French resources in Sudoc, Europeana, and Wikipedia.

Like many libraries across the globe the BnF was facing issues of visibility on the web: “Users always access the BnF catalogues (mainly, the Main catalogue and the Archive and manuscript catalogue) through library portals, which they often simply don’t know. As a matter of fact, …users are very unlikely to find any of our resources directly from a search engine interface, unless they already know about us. (Bibliothèque nationale de France 2011).”

The impetus for change at the BnF was to break down the silos between their collection datasets to enhance discovery across collections, improve visibility, and bring more traffic to their service. BnF wanted to build something that could be interrogated by people and machines at the same time, that is, an interface where

people could search, while the data residing within was machine accessible and actionable. Furthermore, the BnF was looking at ways to disseminate data to the library community and beyond, and to enrich and improve data quality and consistency.

BnF had a clear vision for their collections: “Our resources should be as visible on the web as the library building in the town” (Bibliothèque nationale de France 2011).

Like the BL, some of the drivers to implement linked open data project were philosophical and professional. The BnF has a close and robust interaction with the BL, IFLA Semantic Web Working Group, and Standards groups. The BnF is one of the founding and governing members of VIAF (Virtual International Authority File) and ISNI (International Standard Name Identifiers) and has a deep engagement with identifier management and identities, the building blocks of linked data that also assist in globalising data. The BnF stated clearly that they sought engagement with the linked data conversation and expanding professional practice, which could be perceived as one of the organisational drivers allowing for a high level of experimentation and innovation.

At the time of these deliberations (2008-2010) there was no French government strategy on data. Data strategy ideas were filtering through from the UK (from data.gov.uk) and the US. Ultimately, from this vision and discussion and from

observing other jurisdictions, data.bnf.fr project was born. The BnF made a policy decision to become part of the web of data and adopt semantic web standards.

Implementation

A critical question posed at this stage was: ‘what do we want the next generation catalogue to look like?’ The BnF started by modelling their data to define and analyse data requirements needed to support a new entry point to the BnF world. Data.bnf.fr started as an experimental service that also invoked the question: “how can we best manage data?”

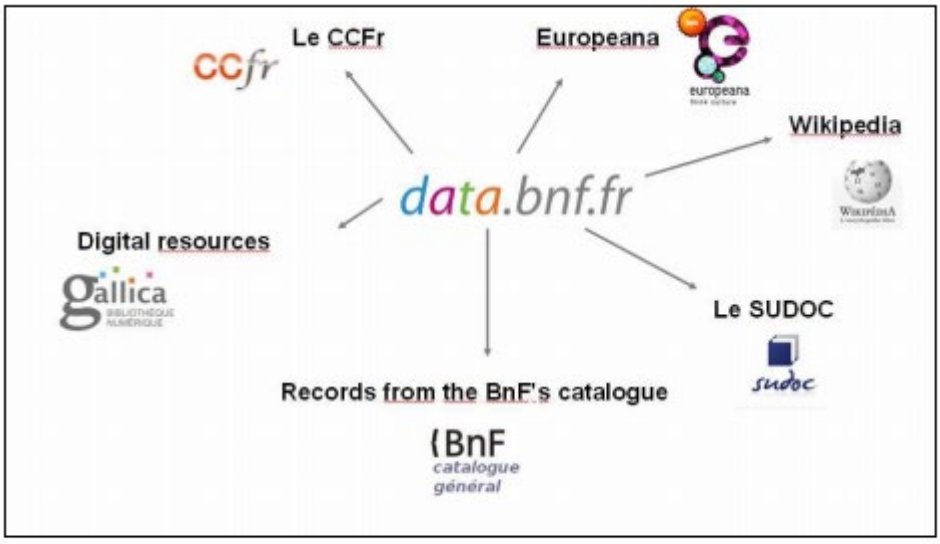
The BnF commenced a data cleaning and data enrichment programme to FRBRise the general catalogue of the BnF. The data.bnf.fr project involved transforming existing data, enriching and interlinking datasets with internal and external resources, and publishing HTML pages for browsing by users and search engines. This was the first time BnF had engaged in a massive automatic data management outside their own (locally built) systems.

Data.bnf.fr is founded on authority and bibliographic data. All data is linked to authority data as opposed to content data. The aim is to link to other sources to create a bibliographic hub.

The project worked closely with staff in the cataloguing areas with strong collection knowledge and cataloguing/vocabulary knowledge, and engaged their interest,

enthusiasm, and skills to convert and transform MARC data into non-MARC formats. The internal “core back-office” data quality activities and data transformation activities were performed in MARC, the first language of cataloguers. Colleagues in collection areas became involved in the project and a working group was established. These staff with collection expertise became advocates for the project providing advice on what data should be included in data.bnf.fr.

Data.bnf.fr was conceived as a prototype for using linked data, and BnF considered the project a sandbox where it could experiment with linked data and the FRBR data model. Not all BnF content was automatically incorporated into the data project: the BnF started with authority data and continued to experiment with managing data. Data.bnf.fr now enables the insertion of new information achieved through the data quality improvement and transformation process back into the catalogue.



Some links from data.bnf.fr

(Bibliothèque nationale de France 2011)

There was an internal incentive to publish the data as open. However, as there was no specific 'open' licence at the time, the BnF used a French version of CC BY. The licence applies to all data included: bibliographic products distributed to libraries in MARC format.

Acknowledging the relationship between digital delivery and data management, the data.bnf.fr project was co-owned by the Gallica (the Digital Library of the BnF) and Metadata teams. Project management was conducted from the IT division with 50% technical support. Crucially, the project was championed by the head of the Services Directorate and Networks, reporting to the Executive Director of the BnF. While a formal project, the data.bnf.fr project was one of the BnF's first forays into Agile project management. This allowed a certain level of freedom, elements of experimentation, and included a focus on the project rather than on a product.

The BnF outsourced the realisation of the project to Logilab who won the tender. This was the first French public tender using agile technology and modelled the innovative approach required for the project. In the words of BnF, "we grew up together" (Simon, Di Mascio, Michel, and Peyrard 2014), which highlights the co-learning process this project adopted between the business owner and the service provider. To allow for agile development, instead of a product description, the BnF provided a description of a world view or world map of requirements required to achieve the project. This approach afforded the BnF a sense of experimentation and catered to the organisation's risk appetite with a sense that this project could afford to fail.

While one facet of the BnF's goal for their data was to help users find information on the web, another was to support the BnF's data dissemination strategy after implementation. Following the launch of data.bnf.fr, the BnF observed people 'playing' with the data: researchers, Wikidata, rights holders companies, and publishers. This was because the data was in a format easier to manipulate outside the library world. This helped demonstrate the value of implementing linked data, as the format allowed BnF data to be delivered to non-library audiences.

Post-implementation: benefits and demonstrating value

BnF staff observed that "it had to exist before it demonstrated its value" (Emmanuelle Bermès, personal communication June 20, 2016). The value and benefits of the data.bnf.fr project are both tangible and intangible. While the initial goal was to help users find information on the web, the project has also improved data management processes, enhanced skills, connected staff to new ideas and ways of working, and embedded the BnF into the semantic web.

BnF collections are now more visible on the web. Statistical information about the number of visits to data.bnf.fr demonstrated that what BnF wanted to do actually worked. 80 – 85% of visits to data.bnf.fr come from search engines. The web pages are suitable for people, but are also in a format easily found by search engines, which again re-directs people to the information they seek. This was seen as a key indicator of success. Additionally, data.bnf.fr created new types of usage in the BnF.

Data.bnf.fr demonstrated the value of BnF data sets as assets that could be recognised and enhanced. The BnF were able to use data.bnf.fr as a motivation for doing high quality work, creating a higher profile for data management at the BnF. This became a tool for promoting authority data and controls for bibliographic description. At the BnF, this work helped to justify what is difficult (organisationally) to be justified organisationally: the costly work of description and data quality management. This shifted the way the organisation looked at cataloguing, highlighting authority records and entities as the building blocks of linked data. This shift was so different that it changed fundamental activities and reference points within the BnF. The BnF readily reflected on a checklist of elements required to implement a significant metadata strategy: think in terms of identities and links, not records; establish a strong identifier policy; focus on entities; name entities and advocate for a good identifier system; create links between entities; follow standards; and plan for the future to consider scalability and longevity.

Summarising the implementation experiences of the British Library and the Bibliothèque nationale de France

Alongside the strategic imperatives of government policy for open data, factors embedded in the BL's history, structure and organisational culture leant themselves to an agile and 'make it happen' approach to implementing linked data. These factors included tolerance for risk and innovation, existing infrastructure and skills, business models relating to data delivery, relationships and personnel.

The size and scale of the organisation, and the internal cultural approach described in interviews, indicated a high degree of autonomy allowed the relevant business units to develop workable business plans and effect innovative approaches aligned with strategic directions without needing a complex approval system. The business unit did not seek a 'whole of organisation' approach to authorise engagement in this project. The BL's history, the commercial history of BNB, and the existing business model for delivering a range of data outputs, meant that this evolution in metadata strategy was a natural progression in the BL's data stewardship.

The BnF's mission is to collect, preserve, enrich and communicate the national documentary heritage. In doing so, its broadest mandate is to collect, store, and catalogue; and to ensure the widest possible access to collections.

The data.bnf.fr project endeavoured to make the data produced by BnF more useful on the web and thereby deliver it to a wider audience. The objective was to promote the BnF's collections and to provide a hub between different resources. Data.bnf.fr was intended to support the BnF's other applications (e.g. Gallica) and was firmly positioned in the context of BnF's policy to become part of the web of data and adopt semantic web standards.

Since 2014, the BnF's linked data strategy has been fully integrated into the BnF's data/digital strategy, and is reflected in the organisational structure with a Metadata team dedicated to metadata dissemination – Département des Métadonnées (Bibliothèque nationale de France 2016).

Neither the BL nor the BnF set out to implement linked data *per se*. Rather, both organisations saw the dissemination of this information as part of their mission, purpose, and value. Both organisations had a clear vision and strategy for their data and recognised the value of the national bibliographic metadata set, and the logical ease of using this data set as their initial foray into linked open data. Both organisations were operating in an environment of open government with clear political instructions to make publicly funded data open and available. Both organisations were seeking new ways to reach new audiences, maximise their data assets, and improve the way they distributed existing data sets to researchers, libraries, and developers. In addition both organisations were looking for ways to implement and connect with an 'open' data/government strategy.

Both the BL and BnF sought to utilise existing skills of their staff as well as develop additional skills, had keen and agile staff to experiment in this space, supported a spirit of innovation and enterprise, and implemented their metadata strategies within existing resources. Both the BL and BnF embarked on a data focussed programme utilising skills of traditional cataloguing and upgrading them – a focus that continues today – that reaffirmed their commitment to managing their greatest intangible asset, their data. Both organisations had an organisational structure that supported data analytics, intellectual discovery/exploration, and experimentation.

There were, however, differences in the approaches taken by the BL and BnF. The impetus for their implementations came from slightly different drivers: the need to

connect their collections and be visible on the web (BnF) and the need to find new ways to disseminate their metadata (BL). In contrast, the BL noted, however, that they had not gone as far as the BnF in integrating the system into a public facing infrastructure.

Lessons learnt about the conditions needed to implement a linked data strategy

From the experiences of the BL and BnF we can distil two broad business preconditions that supported their efforts to implement strategic metadata initiatives: organisational capability, and a clear understanding of local context including the combination of business 'problems' looking for a solution.

Organisational capability and capacity include the elements required for any organisational innovation: the critical mass of skills, agility, preparedness to take risks (capability); and the organisational structure that allows room for experimentation and innovation into its business goals (capacity). This precondition relates to the organisation's health and culture, resources, and appetite for change. In essence, this is a leadership mindset.

Both the BL and BnF had the internal skills, capacity and interest to make it happen. Both organisations utilised a light-weight and agile approach to implement their chosen metadata strategy. Both organisations sought out partnerships with third-parties to deliver their strategy, Both the BL and BnF reaffirmed and invested in the skills of their people, growing technical capacity and creating 'buy in' for their

projects. Critically, both organisations had a risk appetite that permitted some level of failure associated with experimentation, innovation, and agile approaches; and the patience to wait until after implementation to perceive value and assess return on investment. This relates to a robust corporate culture.

The ability to ‘make linked data happen’ and connect a library’s collection into the semantic web are also predicated on the local context. The unique set of local business, policy, political, and cultural drivers that combine to pose the problems, offer possibilities, and take advantage of the opportunities that linked data will solve.

Both the BL and BnF identified a range of ‘problems’ they needed to solve as part of their broad strategic goals. Transforming their data sets and publishing them as linked data was the solution that enabled both organisations to achieve their mission.

However, there is a third element required to implement change as significant as implementing linked data: a community of practice. The Propinquity Effect posits that the more people interact because they occupy the same time and space, the more they develop similar features and connect with each other. This facilitates the flow of knowledge, skills, builds trust and literally creates regular personal contact to enable the exchange ideas, and even engenders beneficial competition that drives innovation.

Observing the BL and BnF implementations, it is instructive to note that both were actively involved in international discussions associated with the semantic web through IFLA's Bibliography Section and the Linked Data Special Interest Group (formerly the Semantic Web Special Interest Group). Both organisations were actively connected to other national institutions experimenting with data.

The BnF, principally through the work of Emmanuelle Bermès, was instrumental in forming the IFLA Semantic Web Interest Group in 2009. There was a clear interest in moving beyond Web 2.0 technologies and adopting the principles of the semantic web to embed libraries in the web value chain: a library 'zeitgeist' to embed library data and services in the user's flow. From its inception the national libraries of France, Great Britain, Spain, Germany, Sweden, Library of Congress, Japan and the Library of the National Congress of Chile have been involved in IFLA's Semantic Web Special Interest Group, then the Linked Data Special Interest Group. Participation in this group has afforded these organisations the benefit of being connected to a community of interest and practice.

The results of the OCLC International Survey of Linked Data Implementers (Smith-Yoshimura 2016) illustrate this aspect as the implementers of linked data at a national scale are closely aligned to participants in IFLA's Linked Data Special Interest Group. Mapping the 'hot-spots' of linked data implementations against strong and active communities of practice, the opportunities for co-learning, experimentation, access to expertise, and implementation are evident. Geographic

propinquity alongside a community of practice can help shape strategy and shared solutions. This can be read as another precondition for the implementation of linked data technologies.

Coda

The Friends of the National Library of Australia supported this research through a Travelling Fellowship. This investigation identified the elements needed in an organisational context to progress a metadata transformation strategy. The National Library of Australia is in a research and information gathering phase exploring the benefits and requirements of linked data and reflecting on what the Library may do in this space.

Linked data, and linked open data, represent the next stage in the evolution of data management and present great opportunities for libraries to unlock the rich data within library catalogues, finding aids, archival descriptions, and collection records.

In an information landscape where digital content is king, the experiences of the BL and BnF have shown that a strategic focus on metadata builds organisational capacity, creates visibility on the web, puts rich library collections into the hands of the reader, repositions the role of metadata and metadata management in the organisation, strengthens the return on investment as it transforms ‘traditional’ library cataloguing practices, and makes access happen.

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