DIGITAL LIBRARY COLLABORATION: A SERVICE-ORIENTED PERSPECTIVE

Steven Buchanan,1 Forbes Gibb,2 Susan Simmons,3 and David McMenemy4

Collaboration in the digital domain offers an opportunity to provide enhanced digital services and extended reach to the community. This article adopts a service-oriented perspective through which it considers environmental drivers for digital library collaboration; discusses emergent collaborative partnerships across UK educational institutions, social services, health services, private industry, and cultural sectors; considers associated challenges; and identifies best practices. Existing and potential synergistic relationships are explored across the broader cultural sector—in particular, with the respective processes of libraries, museums, archives, arts and broadcasting organizations comprehensively identified and mapped (commonality), and the relationship to service-oriented architecture highlighted. The degree of digital service collaboration is also explored through an indicative review of Scottish public library websites, encompassing thirty-two regional library networks and including the National Library. Collaboration is found to be evident but limited in the digital domain, with strategic and architectural recommendations made.

Introduction

Across the public, private, and not-for-profit sectors, collaborative partnerships are widely recognized as not just a strategic option but also, in several instances, considered a strategic necessity [1]. Within the library sector, V. Wildridge, S. Childs, L. Cawthra, and B. Madge [2, p. 21] argue

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[Library Quarterly, vol. 82, no. 3, pp. 337–359]
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0024-2519/2012/8203-0004$10.00
that, in a rapidly evolving and increasingly complex global society, “partnership working is a key area for the library information professional currently, and is crucial for the profession for the future,” a view shared by P. Brophy [3, p. 212], who argues that “libraries cannot go it alone and their future strength will depend on the alliances they forge.” The DELOS Network of Excellence on Digital Libraries, which describes the digital library as “a tool at the centre of intellectual activity having no logical, conceptual, physical, temporal or personal barriers on information” [4, p. 15], has also argued that digital libraries, in pursuit of personalized interactive user experiences, are evolving from content-centric systems to person-centric systems, with the role of the digital library having “shifted from static storage and retrieval of information to facilitation of communication, collaboration and other forms of interaction” [4, p. 15].

Perhaps not surprisingly, therefore, library collaboration (i.e., involved cooperation) is now extending beyond the more obvious partnerships with archives and museums to other cultural organizations, educational institutions, social services, health services, industry, and commerce. Joint initiatives, such as cross-institutional digital collections and shared virtual learning environments, are emerging with libraries assuming the role of both content provider and access provider (i.e., providing access to external content) and notably, in so doing, providing opportunity for the library to evolve as an enterprise in the digital domain [5, p. 169]. However, there is currently limited research regarding collaborative best practice [6, p. 558; 7, p. 9] and, in particular, the extent and degree of digital collaboration.

This study reports on UK public library collaboration, with a particular focus on emergent digital services (i.e., services or digital resources accessed and/or provided via digital transaction [8, p. 278]), and asks, what services, with whom, and how? It begins with the distinction between collaboration and cooperation and then identifies environmental influences and benefits, followed by collaborative practices, challenges, and best practice. The importance of leveraging and exploiting natural synergy between partner organizations is highlighted, based on, or established through common goals, processes, and services. Existing and potential synergistic relationships are identified across the broader cultural sector in particular, with common processes identified and mapped and the relationship to service-oriented architecture highlighted. A review of Scottish public library websites (a devolved sector of the UK), encompassing thirty-two regional library networks and including the National Library of Scotland, provides an indicative example of the extent of digital collaboration within the UK. Recommendations are made for further research and conclusions drawn.

Although UK focused, we acknowledge that there are a number of initiatives
Digital Library Collaboration worldwide from which direction and inspiration can be obtained on what types of collaborative activities are both possible and desirable. These include the Information Policy and Access Center (http://www.ipac.umd.edu) at the University of Maryland, which is running a number of projects looking at accessibility issues, community information platforms, and the integration of library and e-government services. However, such initiatives were deemed beyond the scope of this particular study, which, to the best of our knowledge, provides the first national study of public library digital collaboration.

Digital Library Collaboration in the United Kingdom

Beginning with the important distinction between collaboration and cooperation, this section discusses environmental factors influencing collaboration, the benefits of collaboration, and challenges and best practice, before highlighting how natural synergy between partners can be exploited through common processes and service-oriented architectures. The section concludes with an indicative review of Scottish public library websites that provide an example of the degree of digital collaboration to be found across a domain.

Collaboration versus Cooperation

Previous research has highlighted the difficulties of defining the various forms of partnership processes, such as coordination, cooperation, collaboration, and joint working, all of which can mean different things to different people under different circumstances [2, p. 3]. B. Diamant-Cohen and D. Sherman (2003) define collaboration as “a more involved cooperation, where there is a more in-depth sharing and pooling of resources” [9, p. 103]. D. M. Zorich, G. Waibel, and R. Erway [10] suggest that collaboration is one of the more complex forms of partnership working, which involves alteration of the institutional processes or practices of at least one of the organizations involved. Zorich and colleagues [10] propose a “collaboration continuum” that begins with contact, in which exploratory dialogue between organizations is initiated; followed by informal cooperation, such as sharing information; to planned and structured coordinated activity; to more in-depth collaborative activity, where information is not just shared but used to create something new; and, finally, convergence, where services, functions, and infrastructure are shared between organizations.

Some difficulty may still remain in judging whether the joint activity meets the criteria for collaboration; for example, establishing the degree to which change should occur for an activity to be deemed collaborative.
However, there is broad general agreement that collaborative partnerships create mutual advantage for those involved [11, p. 3; 7, p. 7] and that partners share resources or intellectual assets, such as costs, expertise, or information, in working toward a common goal [12, p. 45; 13, p. 581]. Such goals are shaped and influenced by various environmental factors, which are addressed in the next section.

Environmental Factors Influencing Collaboration

Libraries operate within an environment that, in system-thinking terms, is outside the system (library) boundary and contains entities that affect the library but that cannot be directly controlled by the library [14]. However, although not controllable, as influencing factors, they must be identified in order to be able to plan for, accommodate, and react to them. A widely applied framework for such environmental analysis is the Political, Economic, Social, and Technological (PEST) model, which can be utilized to identify the various influencing factors and forces that may induce, or indeed compel, libraries to collaborate.

From a political perspective, cooperation and collaboration are often found expressed at the national level. For example, within the United Kingdom under the Labour government of 1997–2010, there was a long-standing mandate to move the public sector from a contract culture to a partnership culture. With specific regard to libraries, the Department for Culture, Media and Sport specified that such cooperation “could include cross-sector co-operation and coordination, marketing and promotion of services in the region, coordinated acquisition, IT exchange and development and coordination of policies for preservation, conservation, dispersal and disposal” [15, p. 5]. Such a mandate arguably established a political imperative that was subsequently supported by national library bodies. For example, in England and Wales, the Museums, Libraries and Archives Council (MLA) recommended that libraries, museums, and archives “integrate with other forms of cultural, the arts, sport and local services to offer essential resources that meet the needs of people, communities and place” [16, p. 3]. Equally in Scotland the Scottish Library and Information Council (SLIC), which acts as an independent advisory body to the Scottish government, asks public libraries to “work in partnership with others to offer value added services” [17, p. 1].

Cooperative and collaborative goals are also implicit within the “Big Society” vision of the newly elected UK Conservative and Liberal Democrat coalition government, which seeks to transfer the organization and delivery of public services from central government to local government, bodies, and groups. Specific aims are to give communities more powers; encourage active citizenship; transfer power from central to local governments; disseminate government data; and support cooperatives, mutual societies,
charities, and social enterprises [18]. A government cited [19] example is the “Digital Inclusion” project of Liverpool First [20], a local strategic partnership that brings together public libraries, businesses, government organizations, public sector agencies, and voluntary and community groups to narrow the city’s digital divide (it is estimated that 69 percent of Liverpool city residents do not have access to the Internet) through improved public access and skills.

In economic terms, public libraries have to compete for funding with other public services and demonstrate value for money (VFM) and/or return on investment (ROI) through public or social value. Sharing services with other institutions can potentially improve VFM and/or ROI through shared infrastructure costs in, for example, storage media and associated networks. Over 23 percent of archive units in a recent collaboration survey reported financial savings as a result of collaborative activities [6, p. 566] although, interestingly, none cited financial considerations as a motivating factor for initiating a project [6, p. 565].

Multiorganizational projects may also result in decreased interorganizational competition for funding, and it has been previously argued that funding bodies are likely to look on joint applications more favorably, as the resources have the potential to reach more of the population [21, p. 408], with funding opportunities for cross-institutional digital collections increasingly prevalent [22].

In terms of social factors, collaboration has been found to enhance lifelong learning initiatives by increasing the range, quality, and accessibility of learning models and experiences [23, p. 1] and social inclusion initiatives through finding new ways and means of delivering information [7]. For example, local archive collections can be digitized and linked to an educational curriculum or used to support online community heritage forums. Heritage projects, in particular, contribute to the social inclusion agenda by building community identity through deeper understanding of local traditions and history.

In an era of unprecedented technological innovation and evolving user expectations and information-seeking behavior [24–25], digital content is now increasingly common and increasingly preferred [26, p. 47; 27, p. 8], with universal access to digital libraries considered essential to social and economic mobility [28]. Changes in work practices, mobility, and lifestyle have affected the use of libraries, with patrons increasingly wanting to be able to access services remotely, independently, and at a time convenient to themselves [29, p. 1]. J. B. Østby [30, p. 232] argues that users often do not care whether the source of the information they seek is in a library, museum, or archive as long as it is freely available. The implication is that organizations can be more flexible in their approach to what information resources are made available from which institution without deterring po-
potential patrons, assuming a seamless user experience via integrated systems. For example, genealogists typically require access to local history collections, archives, maps, social history collections and data sets, each of which is often located within separate institutions and services. Within the United Kingdom, a number of projects have already been initiated at the national level to develop an infrastructure for a shared electronic framework in which libraries, museums, and archives can share a virtual environment, supported by wider metadata schemas, such as Resource Description and Access (RDA), RSLP Collection Description, and the Dublin Core Metadata Initiative (DCMI), which are intended to offer standardized access to resources within a collection through identification of specific elements or major features. Beyond PEST forces compelling collaboration there are also a number of potential benefits to consider, discussed in the next section.

Benefits of Collaboration

Two commonly cited benefits of collaboration are enhanced access to services and improved quality of the services offered [31, p. 8; 6, p. 571; 32, pp. 62–63; 12, pp. 50–51]. For example, time and effort can be saved by providing access to information via a single portal, thereby avoiding separate inquiries to separate websites. The integrated nature of the information can also provide benefits in terms of comprehensiveness, more direct comparability, and consistent presentation (with associated usability benefits).

A further commonly cited benefit relates to increased visibility and awareness of services [6, p. 571; 32, pp. 62–63; 33, p. 75]. Eleanor Rodger, Corinne Jörgensen, and George D’Elia [12, pp. 50–51] found that enhancement of the public profile was rated as the most significant benefit for the organization, closely followed by the potential to expand or diversify the library’s audience and the opportunity to enhance the use of collections or services.

Collaboration can also bring improved relationships with other organizations [6, p. 571; 32, pp. 62–63; 34, pp. 201–2] and the opportunity to develop or acquire expertise or preserve traditional skills [32, pp. 62–63; 35, p. 254; 36, p. 480]. For example, potential audiences of heritage projects are not only diverse but also potentially cross-cultural and will benefit from partners with associated understanding. The density (and mobility) of the population can also be highly variable, with outreach services to remote and sparsely populated areas benefiting from local support that, dependent upon service, could be provided by local education services and health services.

As previously noted, collaboration can also reduce total cost and improve ROI through shared infrastructure. However, it has been previously argued
that the financial element should not be regarded as a prime motivator for collaboration [12, p. 51] and, in the context of broader societal goals, it has been described by Goulding as “peripheral to . . . the main business” [37, p. 241]. However, in times of extreme economic pressures, such as the present, it is perhaps time to revisit this dimension of collaboration. Such benefits have encouraged libraries to collaborate not just with archives and museums but also with other cultural organizations, educational institutions, social services, health services, and industry; these are discussed in the next section.

**Collaborative Practices**

Libraries, schools and higher educational establishments have a shared interest in developing literacy skills and supporting student information needs [12, p. 45; 13, p. 579], with partnerships actively encouraged by funding bodies [38, p. 50]. An example is the Resources for Learning in Scotland (RLS) project managed by the Scottish Cultural Resources Access Network (SCRAN) and the National Library of Scotland. The project developed a resource base for schools to access materials on Scottish history and culture, involving the collections of over 100 Scottish libraries and archives. Financial support for RLS has ended (highlighting the self-sustaining challenge of digital projects), but SCRAN continues to host the RLS website for general public access.

Libraries are also being encouraged to form partnerships with the basic skills education sector to reach adult literacy learners within local communities [39]. Notably, it is now generally recognized that literacy must go beyond basic reading, with libraries encouraged to promote “document literacy” or “information literacy” [3, p. 176], a goal shared with educational bodies.

Libraries often work with social services departments on social inclusion literacy initiatives, particularly in providing reading material and a point of contact for immigrants and designated disadvantaged groups within the community. Notably, such initiatives are not just about reaching new users but also about building community identity [40, p. 7].

Partnership initiatives between libraries and health care organizations range from collaborative research in assisting with literature reviews on health care topics to joint initiatives to distribute health information [41]. For example, Suffolk public libraries’ collaboration with the local Primary Care Trust and Mental Health Partnership was established to provide “information prescriptions” to patients affected by dementia and diabetes who were being encouraged to self-manage their medical condition [42].

Partnerships between libraries and commercial organizations are often philanthropic, which, while benefiting the recipient, may not be of immediate benefit to the donating organization beyond enhancing its rep-
utation for generosity and social responsibility [43, p. 186]. Such relationships are often geared toward funding and sponsorship of programs relating to literacy and to IT provision [37, p. 238], although donations can be made in terms of time, expertise, and products [44, p. 10]. It is arguable, however, whether such donations constitute collaboration or cooperation, as they do not necessarily involve sharing of skills or knowledge or develop any degree of dependency between organizations.

Within the cultural sector, libraries, museums, and archives share a common remit to preserve and promote the community’s cultural heritage [45, p. 2; 36, p. 480; 32, p. 56]. Library collaboration with museums is particularly common, with over half of the total number of library respondents to a survey of cultural organizations confirming such collaboration [12]. Common themes are typically history based [32, p. 59] and often focused on preservation and presentation of items of historical interest, and it is argued that libraries should consolidate and increase this preservation role to become a repository of community knowledge and champion of cultural heritage [46, p. 456; 36, p. 487]. Example digitization projects are the Moving Here project, chronicling 200 years of immigration to England via the collections of thirty archives and museums, and the Am Baile project, bringing together museums, archives, libraries, schools, visitor centers and radio stations to build, promote, and provide access to Highland cultural material.

Arts organizations also have a shared interest in cultural heritage, it being argued by M. Gorman that art galleries are “in a sense, specialised museums” [36, p. 487] recording and preserving cultural heritage in the form of art works. Cohosted exhibitions can raise awareness of holdings and link events and exhibits [38, p. 56], providing an opportunity to combine the promotion of literacy with art appreciation. Public broadcasting organizations are also involved in developing literacy through campaigns such as the BBC’s Big Read project in 2003 and Read and Write in 2005 [47] and, notably, are in themselves cultural repositories. As such, they are legislatively required to preserve cultural material, with many having their own research libraries that collect, catalog, preserve, and facilitate access to their cultural repository [48, p. 17] and those that do not partnering with local libraries to provide such a facility [23, p. 35]. However, while collaboration offers significant mutual benefit to partners, it is also recognized as a challenging activity, discussed in the next section.

Challenges and Best Practice

The challenges involved in collaboration can be broadly categorized into those occurring at the strategic level and those occurring at the operational level. Challenges at the strategic level are complex and not easily resolved, as underlying issues may be deeply ingrained in the culture of the orga-
nizations; for example, there may be a lack of trust between organizations, particularly where the partners have not worked together previously. A lack of understanding of respective strengths and weaknesses can endanger the smooth running of a project [32, p. 63], often as a result of cultural misunderstanding or stereotyping [2, p. 8; 49, p. 285; 23, pp. 23–26]. Issues can also arise through perceived inequality between the partners or a distortion in the balance of power. Such challenges highlight the need for the careful choice of collaborative partner and, if possible, building on existing relationships [50, p. 17] or taking time initially to build up “a climate of trust and mutual respect” [13, p. 577].

A related strategic consideration is that of ensuring congruence of goals and values among partners [51] and that these are clearly articulated in, and supported by, a clear project plan [45, p. 4]. Joint planning allows partners to establish the ground rules for the partnership [52, p. 574], ensuring that participants have clearly defined roles, joint accountability and commitment [23, p. 54; 2, p. 7; 53, p. 208], and a mutually valued outcome [54]. All partners need to see that the resources invested will have a positive return, both collectively and individually, otherwise there is a risk of the initiative losing focus, with a resulting decrease of interest in the project and lack of achievement. Libraries should also conduct a formal evaluation of the project, including goals and objectives (and whether these were modified or changed during the course of the collaboration), and any measurable results [7, p. 33]. Evaluation does not appear to be particularly prevalent in the United Kingdom [32, p. 60] but is common in the United States, where the Institute of Museum and Library Services actively encourages evaluation of projects in order to inform and enable further collaboration.

At the operational level, a frequently cited challenge relates to staff and resource capacity, which, when approached poorly, can result in “partnership overload” or “partnership fatigue” [53, p. 17]. Sufficient time and resources must be allocated to ensure the success of a project and, importantly, collaboration should not be viewed as an addition to regular staff duties [34, p. 201]. However, there is evidence that collaboration is often insufficiently staffed or is allocated to staff in addition to existing duties [32] and that little training for collaborative working is offered [6].

Significant operational challenges can also arise from tendencies toward departmentalism or a reluctance to change either established processes or procedures or to combine resources using different systems of description and arrangement. Although libraries use standard classification systems (such as DDC or LCC) and employ cataloging standards (e.g., MARC, ISBD, RDA), there is no single standard to which they all subscribe. Museum collections may be arranged according to function, content, or format, and there are again alternative approaches, such as SPECTRUM and the CIDOC standards. Finally, archive collections may be organized by
provenance or creator and based on standards such as ISAD, ISAAR and MAD2. While there are standards to promote the interoperability of systems (e.g., OAI) and retrieval of records (e.g., Z39.50 and SRU), these records may need to be modified if they are to be integrated with local systems or as part of cooperative collections. Differences in stock description techniques have been found to be particularly obstructive in establishing joint digital collections [27, 55]. Libraries must therefore consider whether the efforts involved in overcoming these and additional hurdles, such as the high cost of digitization [23, 34, 27], ongoing preservation costs associated with maintenance and renewal of digital media [56], and copyright and other rights-related issues [57], are justified.

In consideration of the above challenges, a number of key best practice recommendations arise:

- there should be shared motivation for collaborative partnerships based on shared goals and values;
- an informed choice of collaborative projects should be made based on common processes and services;
- partnerships should be formalized, funding committed, accountability shared, and evaluation cycles established;
- prior to commencement, time should be taken to establish trust and effective communication channels and protocols;
- change should be managed and resourced, with staff having clearly defined roles and having received appropriate training.

Undoubtedly a key success factor is that collaboration is best undertaken where natural synergy can be exploited: between organizations with shared goals and values and common processes and services (i.e., recommendations one and two above). For example, across the cultural sector there exist shared remit, purpose, and services to such a degree that it is has been argued that the boundaries between activities performed by custodians of information and those performed by custodians of artifacts are becoming more and more blurred [58, p. 2; 59]. There is also an equivalent customer base. For example, genealogists, who make up the vast majority of archive users [60] also field 16 percent of inquiries dealt with by librarians [61, p. 81]. Perhaps not surprisingly, therefore, evidence from previous studies (7, 34) suggests that collaborative initiatives with cultural organizations are particularly productive.

In other instances synergy may exist, but to a lesser degree, which may make collaboration with some partners more difficult than with others. For example, health organizations are focused on the promotion of health and well-being, which is not core to the function of a library, while social work departments operate under a “different set of priorities and a dif-
ferent set of outcomes” to those of libraries [37, p. 240]. This, of course, does not preclude collaboration to various degrees, but it may focus effort, particularly where individual organizations are seeking to build upon or establish common processes and services, discussed in the next section.

Exploiting Natural Synergy through Common Processes and Service-Oriented Architecture

While a functional structure may be convenient for the definition of reporting lines and the organization of physical assets, an overemphasis on functions can create barriers to effective workflow, introduce resource inefficiencies, and encourage managers to adopt parochial domain views and behavior; this can constrain the value that can be generated by the organization as a whole, an issue compounded in a collaborative partnership. A process view transcends the functional view and encourages an organization to focus on how individual groups should cooperate to achieve customer satisfaction, irrespective of functional or organizational boundary [62]. A process perspective also facilitates the development of service-oriented architecture (SOA), with process modeling one of the first recommended SOA steps in order to identify candidate application services and shared information [63].

If we take the cultural sector as an example (given the degree of natural synergy identified), a number of common processes and/or services between public libraries, museums, and archives have already been variously identified, including reference, digitization, heritage, genealogy, and subscription services [3, 64, 65]. In the context of Zorich et al.’s “collaboration continuum” (see sec. 2), such common processes enable convergence. However, identification of common processes has been arguably selective, rather than comprehensive, and limited in reach when the full extent of collaboration is considered, as previously noted. As a consequence, the authors, drawing on personal practitioner experience and utilizing a previously developed approach to process mapping [62], have identified the key processes involved in the delivery of services across the main participants in the cultural sector, extending beyond libraries, museums, and archives to performing and visual arts bodies as well as public broadcasting organizations. This is based on a typology of processes by Gibb and colleagues [66], which we believe encourages a comprehensive perspective:

5. In a SOA, services are loosely coupled, reusable, and sharable “modules of business or application functionality with exposed interfaces invoked by messages from service consumers” [63, p. 34]. Service consumers can be either internal or external, with services not necessarily visible to end customers (e.g., digital “customer services” delivered via automated processes enabled by embedded “application services”).
• **transaction processes** service external customers. They are customer sensitive, with customer need and satisfaction key drivers for configuration and improvement;

• **production processes** support transaction processes, managing product and resource availability. They are resource sensitive, mediating between external supply and demand;

• **governance processes** provide strategic direction and organizational oversight. They are market sensitive, concerned with responding to political, economic, sociological, and technological factors;

• **interaction processes** link organizations and partners in the customer supply chain, including funding bodies and sponsors. They are supply sensitive, concerned with resource exchange to meet customer need;

• **facilitation processes** service internal customers, managing infrastructure and associated resources. They are resource sensitive, with operational efficiency a key driver.

Gibb et al. illustrated their typology with a library model, identifying twenty-four discreet library processes as illustrated in figure 1. Our study builds upon and extends this model, identifying corresponding processes for museums, archives, arts, and broadcasting organizations, and mapping commonality.

A summary of processes and the levels of commonality between cultural organizations is provided in figure 2. Two levels of commonality can be identified: processes that are core to the activities of a service (shaded as dark gray) and are initiated on a day-to-day basis and processes that may only be core to selective members of a service or are only initiated relatively infrequently (shaded as light gray). For instance, while the central library of a public library service may collect and conserve archival material as part of its special collections, the branch libraries are unlikely to do so; equally, a library may acquire some objects associated with an author as part of a special collection but does not actively seek to acquire such objects. It is not claimed that figure 2 is comprehensive, as there may be localized or specialized processes that are beyond the scope of this article. However, it does identify the main processes that are likely to be encountered, and it is argued that it is useful for visualizing opportunities for collaboration. For example, several transaction, governance, and facilitation processes, although they may differ in the details, are largely common to all organizations, as are, to varying degrees, several production processes relating to the acquisition, description, and provision of resources, which suggest opportunities (beyond gateway portals) for shared procurement, development of online catalog facilities, reference services, and active cross referral of patrons (as opposed to passive web links). Such opportunities can be further explored and verified through functional process decomposition (i.e., identifying, mapping, and comparing underlying subpro-
Fig. 1.—Process model for a library (adapted from [66])
Fig. 2.—Process mapping across the cultural sector. **Note.**—T = transactional process; G = governance process; P = production process; F = facilitation process; I = interaction process.

Processes) extending (in pursuit of SOA) to the identification of candidate application services that are shareable across organizations (e.g., login, catalog browsing, order creation, order fulfillment, order confirmation, etc.), which can be realized as integrated, interactive systems, with seamless user navigation and interaction key goals. The key question of how far public libraries have progressed down this path already is asked in the next section.
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Fig. 2.—(cont.)
Exploring the Extent of Digital Collaboration: An Indicative Review of the Scottish Public Library Sector

In exploring the extent of digital collaboration, it was outwith practical scope to attempt to comprehensively review all UK public libraries; consequently, a review of Scottish public libraries was undertaken, providing an indicative example of the extent of digital collaboration across an entire subdomain.

Scottish public libraries are the devolved responsibility of the Scottish Government, guided by the Scottish Library and Information Council, an independent advisory body. There are thirty-two regional public library networks in Scotland covering a wide-ranging urban and rural demographic, stretching from the Scottish Borders to the northern isles of Orkney and Shetland. All thirty-two public library networks were reviewed. For completeness, the National Library of Scotland was also included.

A methodological challenge, when considering how best to identify the extent of digital service collaboration, was a lack of comparable studies from which to draw guidance, as this was neither a usability nor usefulness study. Such studies were nonetheless referred to, but associated inspection and test approaches such as heuristic evaluation, cognitive walk-through, action analysis, field observation, and so forth, were not deemed applicable, given that our primary goal was identification rather than evaluation. However, an inspection-based approach was considered appropriate, with identification of collaborative digital services guided by a specification derived from Williams [8] and Zorich et al. [10]:

- a digital service is provided online, characterized by providing digital content via digital transactions;
- a collaborative digital service will demonstrate involved cooperation between partners, characterized by coordinated or convergent activity and shared resources.

A collaborative digital service would thus exhibit the above characteristics. Identification was approached in a systematic and structured manner via visual inspection of public library websites, beginning with respective home pages and further exploring services offered via content analysis of associated pages beneath. Top-down analysis was conducted for three reasons: (1) to assist with service conceptualization and interpretation (it was anticipated that the nature of the service might not always be self apparent from the home page); (2) to identify any further services not available from the home page; and (3) to ascertain the degree of digitization. Analysis was typically to the equivalent of level three in a tree structure (service descriptions and subcategories appearing at level two and corresponding subcategory details at level three), though they were followed further as
and when necessary. Content analysis identified key phrases such as “in partnership with” or “jointly delivered with” alongside service titles or within service descriptions. Degree of collaboration (evidence of coordinated activity, shared resources, etc.) was identified via the service description and for digital services, further explored via service trial (unless an activated user account was required). Digital service trials paid particular attention to the online/offline status of transaction and fulfillment steps to establish the degree of digitization exhibited with degree classified as either partial or complete.

The key finding from this review is that within the Scottish public library sector there was limited evidence of collaborative digital services. All libraries provided a relatively comprehensive set of external links to online information resources (i.e., NewsUK, Credo Reference, Britannica, Oxford Reference, BBC Education Scotland, NHS Inform, etc.), but such links are arguably, at best, examples of passive cooperation rather than involved cooperation or convergence (and notably varying library by library in both list and structure). Where services existed that could be classified as being both digital and collaborative (but to various degrees, with none entirely digital [all classified as partial]), they were as follows:

- fourteen of the thirty-two public libraries were participants in “Ask Scotland,” a pilot online virtual information service staffed by librarians and library assistants, funded by the Scottish Government through the Public Library Quality Improvement Matrix, and coordinated by SLIC;
- Dumfries and Galloway, in partnership with the University of West of Scotland, offered distance learning MS Certified Application Specialist (MCAS) courses in MS Word and MS Excel with the online VLE supported by a library learning support officer;
- East Renfrewshire, North Ayrshire, and Dundee Libraries, working in partnership with local educational services, provided teaching and learning support to schools, with library reading lists structured by school topic and year. Students could browse associated reading lists online, check availability, and reserve online;
- the National Library of Scotland provided online teaching materials designed to make historical collections accessible and relevant to the needs of the history departments of Scottish schools (set activities/questions devised in accordance with Scottish Government and Scottish Qualifications Authority [SQA] guidelines) and relating to two areas of the curriculum: 5–14 environmental studies (People in the Past) and standard grade history.

For completeness, nondigital collaborative services identified included creative writing classes run in partnership with the Scottish Book Trust and
Home-Start and involving a children’s author and publishing house (Renfrewshire Library); a cancer information support service in partnership with Macmillan Cancer Support and the National Health Service (Glasgow, Renfrewshire, West Lothian Libraries); and a book prescription service in partnership with the National Health Service (Inverclyde, Fife, Scottish Borders, and Shetland Libraries).

As can be seen from the above, collaboration is evident but limited in the digital domain, which is surprising, given previously noted digital trends and preferences. Additional insight into this situation is provided by an evaluation of the strategic plans of twenty-eight of the thirty-two public libraries discussed above [67]. In an approach derived from Chance and Williams [68], the study found that approximately half of the strategic plans were variously incomplete, contradictory, or uncoordinated, and it recommends that Scottish public libraries improve not only their completeness of plans but also their precision, specificity, explicitness, coordination, consistency, and overall mapping to library services. Notably, digitization is identified as a key goal in several strategic plans but found to be broadly and generically defined with limited supporting specification. Collaboration is broadly expressed in several instances but not detailed. More explicit and detailed planning may, of course, be underway outwith strategic planning cycles not formally documented and communicated, but, if so, there is a risk that initiatives will be introduced independently of one another, encouraging parochialism and potentially leading to disparity and duplication, particularly at the regional and/or national levels. Such planning (or lack of) also raises questions regarding the direction provided to enterprise architecture planning, which extends strategic planning to IT architecture, facilitating strategic and architectural alignment across one or more organizations. Limitations of our study and further research arising are discussed next.

Limitations and Further Research

Our identification and mapping of processes (see fig. 2) should be considered representative rather than comprehensive, as it is likely that there will exist localized or specialized processes that are beyond the scope of this article. Further research will refine and build upon processes identified, which we hope would extend to identification of candidate application services shareable across respective organizational systems.

6. Strategic plans were obtained via Freedom of Information requests, with four of thirty-two not forthcoming.
Our review of the Scottish public library sector is limited by the constraints of remote website analysis of nascent digital services (collaboration might not always be explicitly communicated, services not always in their final form) and the inherent limitations of undertaking qualitative evaluation open to subjective interpretation. A second, independent assessment could be used to verify the findings, while further research might produce a more detailed specification of digital services to guide future identification and analysis. Such a specification might extend to the concept of a digital service spectrum, which recognizes that services can range from online information pertaining to services, services transacted online but fulfilled offline, and services transacted and fulfilled entirely online. If this service spectrum were mapped to Zorich et al.’s [10] “collaboration continuum,” such a spectrum might assist with identifying joint activity and whether or not it meets the criteria for collaboration (a noted challenge [see sec. 2]) by distinguishing between “cooperative” web links and “collaborative” interactive services through a focus on the relationship between transaction and fulfilment. Such a specification might also assist with identifying opportunities for further digitization of existing services (providing a method to grade the degree of digitization). This might provide valuable input to enterprise architecture planning, addressing an area of concern highlighted by this study (see sec. 3).

Conclusion

In an era of unprecedented technological innovation and evolving user expectations and information-seeking behavior, digital libraries are evolving from digital repositories to providers of personalized interactive digital services. Collaboration provides an opportunity to enhance services offered and to provide a seamless user experience via integrated systems. Beyond technological and sociological drivers, there are also significant political and economic drivers for collaboration, not least of which is demonstrating value for money.

Across the domain, cross-institutional digital collections and shared virtual learning environments are reported, with digital libraries assuming the role of both content provider and access provider and, in so doing, evolving as enterprises in the digital domain. However, if the Scottish public library sector is typical of the sector as a whole, evidence suggests that collaborative initiatives are not widespread nor necessarily coordinated, and, as a consequence, public libraries are failing to fully capitalize on the opportunities offered by the digital domain and their enviable position as a trusted information provider. It would appear that coordinated strategic
and (information systems) architectural planning is required at both the regional and national levels or an opportunity will be lost and a key societal role diminished in the digital domain.

Successful collaborative partnerships are defined at both the strategic and operational levels; the former via shared vision, the latter via shared processes and services. It is acknowledged that there is no single transferable model of partnership working [52], as individual libraries will have their own unique circumstances to consider, dictating local opportunities and constraints. However, it is hoped that the mapping of processes to other cultural sector organizations (see fig. 2) will assist libraries with future collaborative efforts and that further research will refine and build upon the processes we have identified, extending to the identification of candidate application services that are shareable across respective organizational information systems.

REFERENCES

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