Designing Libraries for Research Collaboration in the Network World: An Exploratory Study

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Abstract

Advances in technology and changes in higher education and research are forcing libraries to rethink the services they offer to researchers and how they are presented. Librarians are moving into "higher end support" and adopting new service models based on "deep collaboration" with academic partners. The internal arrangements that form the design of an organization can determine whether it achieves its mission under particular conditions. The present study explores how libraries in 24 leading UK research universities are organizing resources and services to support the research enterprise. Qualitative data were collected from institutional websites and other public domain sources and were analysed using matrix techniques. The results show a trend away from integrated library and computing service organizations; variety in institutional reporting lines, but predominantly in large professional service groups; consistency in internal library groupings, but variation in portfolio and job titles; expansion of specialist positions, with new functional roles complementing traditional subject liaisons; and dedicated spaces, working groups, and integrated websites promoting boundary-spanning activities. The findings confirm and extend prior work and are being used to design a large scale international survey.

Key Words: management structures; organization design; research support; university libraries

1. Introduction

Developments in digital media, network technologies, research workflows, scholarly communication and funding policies are challenging academic libraries to respond with a wider array of services and facilities for researchers (Bourg, Coleman, & Erway, 2009; Housewright, Schonfeld, & Wulfson, 2013a; Vinopal & McCormick, 2013). Subject/liaison librarians have traditionally provided research services as part of their academic support role, but libraries are increasingly identifying research support as a specific area requiring additional co-ordination and strategic development:

> "Open-access publishing, institutional repositories, the need to co-ordinate collection management and storage, the increasing availability of information technology (IT) tools to help researchers with their work and, not least, the Research Excellence Framework (REF) have all pointed to the need for a coherent library strategy and response" (Bradbury & Weightman, 2010, p. 65).

University library support for research has emerged as a strategic issue and generated studies investigating service developments, new roles, skills requirements (Auckland, 2012; Corrall, Kennan, & Afzal, 2013; Covert-Vail & Collard, 2012; Jaguszewski & Williams, 2013). The present paper offers a different perspective on the topic by examining library engagement with research and researchers through the lens of organizational design.

1.1. Background

There is a perceived requirement for libraries to develop more specialized interventions to provide point-of-need research support and advice around the whole knowledge creation cycle: from ideas generation and project conception, through data acquisition, manipulation and interpretation, to the deposit of results, publication of findings, and assessment of impact (Larsen & Riis, 2012; MacColl & Jubb, 2011; Vaughan et al., 2013). Libraries are accordingly moving into areas such as funding opportunities and grant writing, ethics review, data curation and repository management, poster design and conference hosting (physical and virtual), journal and monograph publishing, bibliometric evaluation and impact assessment (Adema & Schmidt, 2010; Carroll, 2011a; Crow et al., 2012; Delserone, Kelly, & Kempf, 2010; Drummond

& Wartho, 2009; Furlough, 2010; Healy, 2010; Herther, 2009; Lyon, 2012; McBain, Culshaw, & Walkley Hall, 2013; Vaughan et al., 2013), alongside their established roles in collection stewardship, resource procurement and information literacy. The development of support for the management of research data in line with national policy is a particular concern (Carlson & Kneale, 2011; Gold, 2007; Lynch, 2008; Lyon, 2012).

Commentators increasingly assert that libraries need to reposition from support service to professional/scholarly partner and to transform their liaison librarians into embedded experts recognized as academic associates (Carlson & Kneale, 2011; Duranceau, 2008; Fonseca & Viator, 2009; Gold, 2007; Vandegrift & Varner, 2013), so that they can add value through "higher end research support" (Corrall et al., 2013, p. 638). Vaughan et al. (2013, p. 313) argue that service presentation is an important factor here: "By basing the service model on the research lifecycle, the library is then poised to be a partner through the entire process, not just at the bookends of research". The proposed shift from the "service-and-support" approach to a partnership model is significant. Posner (2013, p. 45) argues that contemporary digital humanities projects "do not need *supporters* – they need *collaborators*", explaining that libraries need to provide both infrastructure (tools, servers, etc.) and "intellectual labor" (knowledgeable librarians). Vandegrift and Varner (2013, pp. 69, 76) similarly explain how partnering scholars in digital humanities should go beyond collection building to content creation, by "making 'stuff'" (e.g., web sites, digitized collections, new tools), describing the model as "deep collaboration".

Others have questioned whether libraries have sufficient expertise for such roles, particularly the technical understanding and domain knowledge needed for data management and curation in different disciplines (Gold, 2007; Lynch, 2008). However, feedback from biomedical and science librarians collaborating as partners in a large-scale cross-disciplinary multi-institutional research project reveals that personal attitudes and interpersonal skills are the key factors for successful participation in team science, with the willingness to learn and adapt more important than a deep understanding of the technology (García-Milian et al., 2013). Sector organizations including Research Libraries UK, the Joint Information Systems Committee, and the Association of Research Libraries (ARL), have sponsored projects examining the skillsets needed for new or extended subject liaison and specialist roles (Auckland, 2012; Cox, Verbaan, & Sen, 2012; Jaguszewski & Williams, 2013).

Library and information schools are also responding with modules, courses, specializations, internships, and institutes to prepare new professionals and update the existing workforce (Creamer, Morales, Kafel, Crespo, & Martin, 2012; Harris-Pierce & Liu, 2012; Lee & Tibbo, 2011; Stanton et al., 2011; Yakel, Conway, Hedstrom, & Wallace, 2011).

The model of the librarian as a "scholar-practitioner" and active researcher is being promoted in several institutions (Giesecke, 2010; McBain et al., 2013; Schrader, Shiri, & Williamson, 2012), and being used to bring people with PhDs but no library degrees into research support roles in "alt/ac" (alternative to the academy) positions, particularly in relation to digital humanities developments (Brunner, 2010; Giesecke, 2010; Nowviskie, 2013; Shore, 2012). Even so, MacColl and Jubb (2011, p. 10) point out that despite recognizing their need for support, "researchers have little interest in the support services libraries have built for them". Jahnke and Asher (2012, p. 16) similarly report that "Few researchers see the library as a partner". Two large-scale surveys of academic faculty conducted in the US and UK confirm this message, with only half of the US respondents and one-third of the UK sample rating the library role in supporting their research productivity as "very important", placing this role as the least important of the six service areas specified (Housewright et al., 2013a; Housewright, Schonfeld & Wulfson, 2013b).

Some research libraries are responding to the challenge by moving beyond alignment with academic departments or schools to focus provision of in-depth information advice at the more specialized and dynamic level of research groups and projects, particularly in the biomedical and health sciences area (Carlson & Kneale, 2011; Federer, 2013; Greyson & Surette, 2013). Another significant trend is the creation of specialist positions dedicated to research support, either exclusively or in addition to a subject librarian role (Bradbury & Weightman, 2010; Young & Lund, 2008), including positions coordinating support for graduate students (Covert-Vail & Collard, 2012). The 2013 Ithaka survey of US library directors indicates that almost two-thirds of respondents in doctoral institutions expect to increase staffing for specialized faculty research support (Long & Schonfeld, 2014). Others have decided that traditional structures, such as the subject-specialist information consultant model, are no longer viable, and have reorganized their staffing to align with the broad institutional missions of research and teaching, or adopted business enterprise structures, with teams dedicated to service development and innovation (Andrade & Zaghloul, 2010; Cotta-Schønberg, 2007; Covert-Vail

& Collard, 2012; Drummond & Wartho, 2009; Franklin, 2009; Manchester University Library, 2012; Nutefall & Chadwell, 2012).

1.2. Related work

Organization design has not received due attention in the debate on reshaping the library as research collaborator. Current literature on academic library structures consists largely of institutional case studies (Andrade & Zaghloul, 2010; Chan & Soong, 2011; Franklin, 2009; Larsen & Riis, 2012; Nesdill, Love & Hunt, 2010; Quinlan & McHarg, 2012; Renfro & Neal, 2012; Shore, 2012; Warren, 2011), with few comprehensive surveys. In North America, ARL last surveyed library organization in 1996, although the organization and staffing of specific elements of research support have been examined more recently, including digital humanities, research data management, and scholarly communication (Bryson, Posner, St. Pierre, & Varner, 2011; Eustis & Kenney, 1996; Fearon, Gunia, Pralle, Lake & Sallans, 2013; Radom, Feltner-Reichert, & Stringer-Stanback, 2012). In the UK, the convergence and merging of university libraries with information technology and other academic support services has dominated the discussion of library structures over the past two decades (Bulpitt, 2012; Field, 2001; Hanson, 2005; Pugh, 1997a).

Few writers on library organization relate their discussion to classic organizational theory, notable exceptions being Pugh's (1997b, 2005, 2007) efforts to establish a theoretical basis for the management of technology-driven change in libraries and McGuigan's (2012) essay identifying theories relevant to managing change in academic libraries. Although library case studies rarely use terminology from organization design literature, it is evident that the dominant library model of recent decades is basically the mixed structure (Child, 1988), which organizes technical/back-office processes (e.g., acquisitions, cataloging) and generic front-of-house services (e.g., circulation) along functional lines and specialized client services in a divisional or market-based arrangement (i.e., individuals or teams devoted to supporting particular subjects, disciplines, departments, or schools). Many libraries have overlaid an element of matrix structure, by introducing cross-cutting roles to coordinate service provision across different groups (e.g., designating senior liaison librarians as lead specialist for key areas, such as scholarly communications); an emerging variant of this model uses functional specialists who do not have liaison assignments to supplement and support their liaisons (Jaguszewski & Williams, 2013).

1.3. Definition of key terms

Organization design has been defined as "the allocation of resources and people to a specified mission or purpose and the structuring of these resources to achieve the mission" (Duncan, 1979, p. 60). Duncan (1979, p. 60) also asserts that "Ideally, the organization is designed to fit its *environment* and to provide the information and *coordination* needed" (emphasis added). Stanford (2013, p. 19) offers an alternative definition of the concept emphasizing other dimensions:

> "Arranging how to do the work necessary to effectively and efficiently achieve a business purpose and strategy whilst delivering high-quality customer and employee experience. Arranging involves *aligning* the organization with the strategy, creating *coherent* designs, while building *trust* among key stakeholders."

Design is thus conceived as the broader higher-level concept, with *structure* forming an important part of the design. However, the terms are often used synonymously, within both management and library literature. Another important point to note here is that "resources" in this context can include "tangible resources such as money and equipment and intangible resources such as knowledge" (Miles, Snow, Fjeldstad, Miles, & Lettl, 2010, p. 93).

1.4. Research question, aims and objectives

The central research question for the study is: *How are academic research libraries and their institutions organizing resources and services to support the research enterprise?*

The overall aims of the research are:

- To review organizational designs of research libraries and evaluate their fitness for purpose in the context of researcher support needs.

The specific objectives of the project are:

- To review trends and developments in library support and services for research and researchers
- To examine design dimensions and structural features of a sample of research library organizations

- To identify specific elements of library organization of particular relevance in supporting research
- To analyze strengths and weaknesses of potential organizational models.

2. Methodology

This research uses an exploratory sequential mixed methods design (Creswell & Plano Clark, 2011) to survey organization structures of research libraries in the specific context of library service responses to challenges presented by the contemporary e-research environment. The purpose was first to qualitatively explore dimensions of library structural designs with a small single-country sample and then to quantitatively determine the extent to which the qualitative findings generalized to a large international sample. The present paper reports the results from the first phase only, but describes the complete design to explain the rationale for the initial research.

In the first (instrument-development) phase, data were collected via institutional websites, organization charts, strategy documents, job descriptions and other public-domain sources from a purposive sample of 24 universities in the UK. The Russell Group of leading UK research universities was used as the sampling frame.[1] The use of websites and web-based documents as sources of data and objects of analysis has been recognized as an appropriate method of investigation for contemporary researchers, particularly in relation to organizational research (Bryman, 2004). Previous studies have used this type of Internet-based research to investigate library strategy documents, either as the sole method of data collection (Corrall, 2007; Pacios, 2004), or as the first phase of a multi-method study (Aldrich, 2007; Corrall, 2008; McNicol, 2005).

Both deductive and inductive strategies were used in the initial phase. A review of related literature informed the systematic browsing and keyword searching of websites, but the key outputs of the research (such as the categorizations of structural arrangements) were generated from the data analysis. Evidence was captured and recorded electronically as raw data (document extracts or whole documents), notes and initial codes. The data were analyzed using matrix analysis techniques, using color coding to highlight examples with striking features, which were then re-examined to select cases

illustrating sharp contrasts (Corrall, 2007). Data matrices are particularly suited to making large amounts of qualitative data accessible and meaningful, enabling insights to emerge, and supporting both cross-site and within-site comparisons (Miles & Huberman, 1994; Nadin & Cassell, 2004).

The findings from this initial exploration will be used to develop assessment measures that can be administered to a large sample. In the planned second phase, data on service configurations, reporting relationships, divisions and specializations, coordination and integration will be collected from research library directors in Australia, New Zealand, North America, and selected European countries, using an online questionnaire survey. The reason for collecting qualitative data initially was that there is little guiding theory on the subject to inform the development of a survey instrument (Creswell & Plano Clark, 2011, p. 86).

3. Results

Formal organization structure charts were found via web searches in eight cases, i.e., for one-third of the sample investigated (*n*=24). However, relevant dimensions and salient features of the structures in use at other sites were identified by browsing their web pages and consulting staff directories, service descriptions and other information available (including structure charts for the institution in some cases, and further particulars for job announcements in a few instances). The main elements examined were service configurations, reporting lines, internal organization, specialist positions, and coordination mechanisms. Throughout the analysis, the focus was specifically on elements of library organization of particular relevance in supporting research.

The headline findings from the data are as follows:

- Integrated library and computing services have fallen from favour
- Reporting lines for library and information services have shifted
- Library structures continue to mix function and market/subject elements
- New senior positions and titles are signalling strategic priorities
- Subject liaison arrangements are being enhanced and remodelled
- Specialist research positions are emerging as a significant trend

- Dedicated spaces for researchers are improving service visibility
- Groups and websites are promoting boundary-spanning services.

3.1. Service configurations

One-third of the services featured some form of convergence between the library and one or more cognate professional services, most commonly the computing/information technology (IT) service, which often also includes learning/education technology. This finding contrasts with the position a decade ago when more than half of the 20 institutions then in the Russell Group were converged and one-quarter had merged structures with fully integrated library and IT provision for several core functions (e.g., help desk, training). Among the currently converged organizations, four had retained the same basic structure for a decade or more, of which one was still a merged service, two were converged, and one was federated (separate organizations within an information services division of professional services).

Two organizations had deconverged their library and IT services and combined the library with other cognate services to form an academic services directorate and a student services directorate respectively. Two other institutions had formed newly converged services in the last five years, in both cases bringing the library and IT together, into an information directorate in one case, and academic services in the other (which also included student services and quality enhancement). However, the key finding here is that most members of the group now have separate library organizations, which includes four high-profile services that have deconverged their merged or converged service organization within the last three years (King's College London, the London School of Economics (LSE), and the Universities of Bristol and Nottingham).

The variety of service configurations was a feature of UK converged information service organizations in the 1990s and 2000s, and this pattern has continued as services have de-converged and re-converged more recently. For example, at both the University of Birmingham and the University of Exeter, Library services is one division within an Academic Services directorate of seven divisions, but the composition of each directorate and structure of the library division varies. Table 1 shows the breakdown (based on data collected in summer 2013).

Table 1: Sample composition of academic services directorates

University of Birmingham		University of Exeter	
Academic Services Divisions	*Library Services Departments*	*Academic Services Divisions*	*Library & Culture Services Groups*
• Birmingham Foundation Academy	• Academic Liaison, Learning, Research Support & Academic Skills	• Academic Support Unit (Cornwall)	*Library & Research Support Teams*
• Centre for Learning & Academic Development and Learning Spaces	• Collection Management & Development	• Education Quality & Enhancement	• Academic Engagement
• Student Employability	• Library Customer Support	• Employability & Graduate Development	• E-Strategy and Resource Development
• Library Services		• Exeter IT	• Heritage Collections
• Special Collections		• Library & Culture Services	• Library Customer Services
• Registry		• Planning & Resources	*Arts & Culture Team*
• Student Services		• Student Services	

At divisional level, in addition to library services, common functions here include academic development/educational enhancement, student employability (careers services), and student services/registry functions (combined at Exeter). However, technology services (including administrative systems, academic computing and student IT services) are part of the converged service at Exeter, but at Birmingham, in the re-converged service, IT Services is a separate unit within Professional Services reporting to the Registrar & Secretary – unlike the former converged information service organization at Birmingham, where IT was a central part of the original unified structure. At the library divisional level, Table 1 shows that the primary split into four functional sections is similar in both institutions, namely: academic liaison/engagement; customer services/support; collection/resource development; and special/heritage collections. However, Birmingham has departed from established practice by making Special Collections a separate division (not reporting to the Director of Library Services), while Exeter has brought in Arts and Culture as an additional

service group reporting to the Assistant Director of Academic Services/ Head of Library and Culture Services.

The make-up of the academic support department/team within each library also differs slightly. The Birmingham department includes responsibility for the University's Academic Skills Centre (which provides support in areas such as academic writing, maths and stats, and study skills), in addition to academic liaison, and research support (including supporting the REF and research data management); whereas Academic Skills Development at Exeter is located within the Education Enhancement division, and the Library's Academic Engagement group includes separate teams specializing in digital content and library marketing, and open access and data curation, in addition to liaison support for teaching and research. (At Birmingham, responsibility for managing and supporting the institutional repository and open access is part of the Collection Development and Management department.) Both institutions use the traditional subject librarian model to carry out liaison activities: at the time of data collection, Birmingham had 15 Subject Advisors supporting 5 Colleges, while Exeter had 10 Subject/Liaison Librarians supporting 4 Colleges and separate Business and Medical Schools (part of the College structure at Birmingham). The numbers of liaisons are commensurate with the respective sizes of the populations served, Birmingham being approximately 50 percent larger than Exeter.

The Information Services directorates that have continued as merged, converged or federated services are now more uniform in their service portfolios. All include libraries (and archives), IT (academic computing and corporate systems), and learning technologies, usually including responsibility for both equipping and managing teaching spaces, but not covering academic skills (other than information literacy), which are typically provided by academic support/learning development units, nor other student services functions. Within the sample, although some instances of shared support functions were found (e.g., Operations and Central Projects at Birmingham; Strategic Support, Finance, HR, etc. at Cardiff; Planning and Resources at Exeter), only Edinburgh currently displays elements of the more radical merged service structures that were adopted to varying extents by Birmingham and other leading research universities from the mid 1990s.

The key features of the Edinburgh structure are the combined library, e-learning and IT first-line help/support service, and the organization of

liaison librarians and IT professionals into three College-facing consultancy teams within the User Services Division. The consultancy teams are in a different part of the organization from other library staff, who are mainly located in the Library and Collections Division. This means they are separated from staff working in related research and learning support services, including teams and sections dealing with scholarly communication, and collection development and management, and also do not report to the *de facto* library service head, the Director of Library & University Collections.

3.2. Reporting relationships

In UK universities, the Librarian traditionally reported to the Vice-Chancellor or Principal (as the chief executive officer of the institution), which often differentiated the library from the IT/computing service; but the adoption of more formal management arrangements in higher education institutions over the past two decades and the reconfiguration of administrative support functions into groups of professional services has resulted in different structures. Nearly three-quarters of the library directors in the sample report directly (or indirectly, via another senior officer) to the University's Registrar/Secretary/ Chief Operating Officer. Chief Operating Officer (COO) is becoming the dominant title in use, found in half of the institutions.

Only Oxford and Cambridge seem to have retained their traditional reporting line in its original form, although the head of the converged service at Edinburgh (who holds the formal title of Vice-Principal for Knowledge Management, CIO and University Librarian) reports directly to the Principal. At the time of data collection, the university librarian/library director at Manchester and Imperial reported to the equivalent of the Deputy Vice-Chancellor (Deputy Rector at Imperial); at Leeds and Nottingham, they reported to a Pro-Vice Chancellor (PVC), in both cases the PVC with responsibility for education/teaching and learning. The grouping of the library with education/student services is another notable trend in structural arrangements, reflected in the recently converged academic service model adopted at Exeter, the reconverged academic services directorate at Birmingham, and reconverged student services at Queen Mary (University of London). In addition, the deconverged library service at King's now reports to the College Secretary via the Director of Students & Education; similarly at Bristol, the reporting line is via the Deputy Registrar, responsible for "the student-facing and education-related services".

It is debatable whether a PVC reporting line is preferable to the COO line, particularly where the PVC portfolio has a focus on teaching/students. Reporting directly to the COO role can position the library director along-side other professional service heads, including both student services and research services, which is particularly valuable in the context of collaborative service development with the research office or equivalent in areas such as managing research data and measuring research impact.

3.3. Internal organization

The size and shape of the library superstructures vary significantly, with leadership teams ranging from three to eight members. The titles of senior management positions and labels used for the main divisions/departments/operational units also vary, and some libraries combine one or more functions together, but overall there was a striking consistency in the way activities were grouped into the following five areas:

- Academic services/research and learning support (generally subdivided by subject field)
- Collection development/information resource management
- Special collections and archives/heritage collections
- Customer services/reader services/user support
- E-strategy/digital services/information technologies.

The academic (learning and research) liaison/support function was explicitly represented in the senior team in three-quarters of the sample. In one-third of these (six cases), the relevant manager had other responsibilities (e.g., Planning & Resources, Collection Development/Management, Special Collections, User Services, Service Development). In one novel example, at the University of Manchester, research services, teaching and learning support, and academic engagement were distributed among three different members of the leadership team, and combined with other related responsibilities. At Edinburgh, the merged Information Services organization separates consultancy including library liaison services (in the User Services Division) from other library-based research and learning services (in the Library & Collections Division).

Academic Services was the descriptor used most consistently, found in the job titles of seven senior managers. However Research, or Research & Learning

(or Learning & Research) featured in seven titles of associate/assistant directors/heads of division or equivalent. The word Liaison was included in four titles, and the term Academic Engagement in two jobs. Other variants included the position of Head of Relationship Management at York, and the five Heads of Faculty Services in the senior team at Southampton (where academic liaison is directed by the Deputy Librarian). The most complex title identified was Assistant Director – Academic Liaison, Learning & Research Support, and Academic Skills at the University of Birmingham (a position that has subsequently been changed to Academic Engagement).

The collection development/management function was equally prominent, also being represented in the senior teams of three-quarters of the sample. However, the term "collection" was used explicitly in slightly less than half the sample, and the titles of the relevant roles, divisions, or sections also varied within these cases, e.g., Collection & Access Management (Nottingham), Collection Development & Description (Cambridge), Collection Services (Durham, Leeds). The term "resources" seems to be gaining currency as an alternative to "collection", suggesting the concept of the library collection may become less prominent as migration from purchased printed materials to licensed e-journals and e-books continues. At York, the relevant senior position is Head of Content.

In approximately half of the cases featuring a collection development or management role in the top team, the collections function was combined with the management or strategic development of library systems (in two cases along with facilities), represented by roles such as Head of Collections and eStrategy (Sheffield – a position that has now evolved into Assistant Director for Academic Services by adding responsibility for the Learning & Research Services team to the Procurement & Content and Digital Services & Systems teams), Head of eStrategy & Resource Development (Exeter – a position that is now combined with academic liaison responsibilities in an enlarged Academic Support portfolio), and Head of Information Management & Library Development (Bristol). A slightly less prevalent, but equally significant, trend (found in around one-quarter of the total sample), was the creation of senior roles solely concerned with the library's information systems/information technologies portfolio, notable examples here including: Associate Director, Digital Library Programmes & Information Technologies (Oxford), Head of Digital Library Services (Leeds), and Head of Digital Technologies & Services (Manchester).

Around half of the institutions had special collections and/or archives repre-sented as a distinct role in the library's senior team at the level of divisional/departmental head, including two who used the alternative title of Head of Heritage Collections (Durham and Exeter). Also in around half of the sam-ple, delivery of frontline services to users (such as lending/circulation and enquiry/help services) was represented explicitly in the senior group, e.g., Assistant Director – Customer Services (Kings), Head of Library Customer Services (Exeter). In several other cases, customer/user services was part of a larger portfolio for a member of the executive. Customer Services (or Customer Support) was by far the most common label used for this function, followed by four instances of User Services, two of Reader Services, and only one where the term Public Services was used.

3.4. Subject liaison

The importance of subject-based academic support was evident in the struc-tures of all 24 libraries in the sample. With the exception of the Universities of Cambridge (where the library's strategic objectives include development of "integrated, subject-based provision for teaching and learning as well as research") and Manchester (where academic liaison through teams of fac-ulty librarians was recently discontinued), every institution currently uses some form of subject librarian arrangement to provide specialized support to students and academic/research staff. Seven use the title *Subject* Librarian (or Subject Advisor or Subject Consultant) for this role, while 11 use *Liaison* Librarian (or Academic Liaison Librarian, or Faculty Liaison Librarian). (Other titles found include Academic Support Librarian, College Team/Support Librarian, Faculty Team Librarian, and Information Specialist.) In ten cases, the library had a team structure mirroring the institutional structure of Colleges or Faculties, with subject/liaison librarians led by Heads of Faculty Services, Faculty Team Leaders, Faculty Librarians, or similar. Some librar-ies had additional structural differentiation by including *Assistant* Liaison Librarians, or Liaison *Assistants* in their teams.

The strength of liaison teams/subject support varied across the sample from six liaison librarians at Queen Mary (University of London) and eight at Durham, to 32 subject librarians at Cardiff and 52 at Oxford (at the time of data collection). Although generally the liaison librarian title was associated with smaller-scale provision, this was not universally the case, as the Queen's

(Belfast) structure included only eight Subject Librarians (led by three Faculty Librarians), whereas Southampton had 24 Liaison Librarians, led by five Heads of Faculty Services (who also fulfilled liaison roles). The mean number across the sample was 15.9 and the median was 13.5. However, these figures should be seen as approximations only. They do not always represent the total number of librarians involved in subject-based learning support and research services, as many libraries have recently established specialist positions that focus solely on learning or research support, or a particular aspect of academic support. In addition, the method used to collect data on subject liaisons did not differentiate between full-time and part-time liaison staff.

3.5. Specialist positions

As reported in the Introduction, support for research has traditionally been a formal part of the subject/liaison/faculty librarian role, alongside support for teaching and learning, but published literature indicates a trend towards libraries putting more effort into the delivery and promotion of support for researchers, having identified opportunities to provide more specialized "higher-end" services, and also become aware that researchers often have a limited view of what librarians provide (tending to focus on resource procurement and collection management). A significant development in the past decade has thus been the creation of new roles within the academic services/support area designed to provide specialist support for researchers in areas such as literature searching, systematic reviews, current awareness, reference management, citation analysis, publishing advice, open access and data curation.

One-third of the sample libraries had established a specialist position with a research support focus, mostly within the past five years. In some examples, the role is similar to and positioned alongside existing subject/liaison librarians, with titles such as Academic Liaison Librarian (Researcher Support) at Durham, or Research Support Librarian at Queen Mary. In most cases, the post-holder is also expected to fulfill a management coordination or strategic leadership role, both carrying out specialist work and providing direction for research-related service developments across library teams; examples of relevant job titles here include Research Support Leader at Liverpool, Library Liaison Manager (Research) at King's, Head of Scholarly Communications at Southampton, and Academic Support Manager (Research) at Warwick – where the post-holder is supported by a dedicated Academic Support

Librarian. In a few instances, the post-holders also act as subject librarians/academic liaison contacts (e.g., Senior Consultant, Research Support at Cardiff, and Research Support Services Manager at LSE).

In addition to this type of cross-cutting coordination and development role, several libraries have established more specific research support positions, whose remits have evolved in line with additional needs identified. For example, the Research Skills & Development Librarian at Cambridge directs the University Library's Research Skills Programme, but is also a member of the University's Open Access Project team; at Imperial, the intended focus of the new position of Research Support Librarian (Medicine) was mediated literature searching for systematic reviews, but the role developed to provide support in other areas, such as data management. Other longer established examples of specialist research support provision in libraries include two largely grant-funded units, the Support Unit for Research Evidence (SURE, established in 2000) at Cardiff, which specializes in systematic reviews of the literature; and the Centre for Research Communications at Nottingham (established formally in 2009, but with a history going back to the SHERPA project of 2002–2006), which carries out research and development work in scholarly communication, open access and related areas.

Management of the institutional repository/research archive is now an established library function, but its location within the organization structure varies. In two instances within the sample, the repository function had been subsumed within the institutional research information system managed by the research office; in another two examples, the repository service was a joint venture with the university computing service, but located in the library. However, repository management was mostly a library responsibility, generally located either in the library's systems/IT/digital services division (10 examples), or with academic/research and learning services (9 examples). In two cases the research support librarian or equivalent was formally designated as the institutional repository manager, and in another two cases, the research support leader had formerly filled the role of repository manager. At Birmingham, the repository is the responsibility of the Collection Development and Management department, where the Digital Assets team is located (in the absence of a library IT department).

Policy developments and funding mandates related to research assessment, open access and data management have resulted in many new and

redesigned specialist library positions and teams to manage and coordinate institutional support in these areas. For example, Edinburgh has a Scholarly Communications Team of four people providing support for policy development and implementation, open access advice and advocacy, intellectual property rights, bibliometrics, repository administration, publications submission, and metadata quality. Exeter has an Open Access and Data Curation Team, comprising a Manager, a Data Curation Officer, and an Open Access Administrator. At Bristol, an institutional Research Data Service was launched in summer 2013, as a Library-led collaboration with IT Services and Research & Enterprise Development; it is staffed by a Manager, two Senior Research Data Librarians and an Assistant Research Data Librarian. Sheffield has formed a new Research Support Team within its Learning & Research Services group, which includes two Coordinators for Open Access and Research Data Management, two Open Access Assistants and a Research Data Management Liaison Assistant.

3.6. Dedicated spaces

The University of Warwick Library launched its Wolfson Research Exchange in 2008 as an innovative suite of specialist services and dedicated technology-rich spaces for researchers, with provision for quiet study, interdisciplinary networking, academic meetings, and social activities, and a programme of events on topics such as funding opportunities, grant applications, data management, journal impact, and spinout companies, "offered not only by the library but by other university departments supporting research too" (Carroll, 2011b, p. 55). Novel services include Research Match ("a unique service which profiles your research and makes it visible") and Collaborative Sandpits (interactive multi-day workshops to create project proposals for funding).

With separate programming for graduate research students, early career researchers, and academics/research staff, the facility has its own dedicated staffing, with a Research Exchange and PG Hub Manager, a Coordinator, Support Officers, and Assistants, who work alongside other managers and academic support specialists in the Academic Services division of the Library. *In situ* support is provided by a team of part-time Advisers, who are all current or recent PhD students (Carroll, 2011a). The Library website presents the facility as "A space, a website, a community", reflecting its several

dimensions, including its hosting of networking evenings, interdisciplinary special interest groups, online peer to peer discussions, and blogs.

The development of dedicated purpose-designed space for researchers emerges as a significant trend creating physical presence for renewed efforts by libraries to position themselves as research partners and collaborators. The new research spaces typically have card-controlled entry to restrict access and demonstrate that libraries understand that researchers want and need physical facilities that are separate from undergraduates. Queen Mary opened a new 58-seater Research Reading Room for graduate researchers and academic staff in 2011, after a consultation identified the need for a quiet, comfortable working environment away from busier noisier parts of the Library. The facility was "designed along similar lines to The British Library Reading Rooms, with high specification study desks finished in oak and leather, providing larger than standard worktop space, and LED task lighting at each desk". Birmingham, similarly, has a Researchers' Room "reserved for use by postgraduate research students and academics only".

Social space and technology provision generally differentiate contemporary researcher facilities from traditional reading rooms. For example, Durham is developing a researchers' study area for the exclusive use of postgraduate research students, with individual, collaborative and social areas, which is also being used to promote information about library support for research. At Exeter, the Old Library housing the University's special collections has been refurbished and renamed the Research Commons, with a new large reading room, enhanced IT, multi-media seminar room, and café-style break out space and terrace area. At York, where the Library was able to extend into an adjoining building, renovation has created new improved research space, including a study area, specifically for researchers; an informal research lounge area; and – the most unusual marketing feature – a Research Hotel, a suite of bookable rooms that visiting academic staff or researchers can reserve for their exclusive use as temporary work areas. The website explains that "The hotel concept does not extend to the provision of sleeping arrangements, but does offer use of the research lounge".

3.7. Boundary-Spanning Activities

Policy developments in the UK, notably the Engineering and Physical Sciences Research Council Policy Framework on Research Data (EPSRC,

2011) and the Research Councils UK (RCUK, 2013) Policy on Open Access have given rise to other structural arrangements, such as steering/working groups bringing institutional stakeholders together to facilitate compliance with funder requirements. Such groups are typically led or chaired by a Pro-Vice Chancellor for Research or senior research administrator and usually include representatives of academic schools/faculties/colleges in addition to key staff from the library, IT service and research office or equivalent. For example, at Cambridge, an Open Access Working Group was set up in 2012 to draft an institutional policy and make recommendations on implementation, followed by an Open Access Project Board in 2013 "to manage the transition to Open Access". At Exeter, "an Open Access and Research Data Management Policy Task and Finish Group was set up in March 2012 to develop an institutional policy on research data and Open Access issues". Leeds, University College London (UCL) and Warwick all have a two-tier structure for managing research data, with a high-level steering/oversight group or project board complemented by a Research Data Working Group at Leeds, a Technical & Operations Group at UCL, and an Action/Implementation Group at Warwick; the UCL structure also includes a User Group, which meets less frequently.

Institutional websites offer another opportunity to coordinate, focus and promote services to support research and researchers. Three-quarters of the library and information services in the sample had a set of web pages bringing together information targeted at researchers. At one-third of the sites, there was a prominent link from the library/information services home page, labeled Research Support, Researchers, or simply Research; at another eight, users could reach the relevant page with two clicks. The web pages varied in the topics featured, but there was a clear trend towards selectivity and integration, bringing together resources judged most useful to researchers, offered both by the library and other institutional units (such as research computing/IT services and the research office), and also trying to present the information from a research user viewpoint, rather than a service provider perspective. For example, at King's College London, the Library Research Support home page has the sub-title "Support through the research lifecycle" and a choice of six categories to click: Ideas, Research funding, Managing information, Disseminating research, Evaluating research, and Preserving research; there is also a link to the Library Research Support site from the institutional Research Support website. The Researcher@Library website at

Leeds "gives researchers at the University of Leeds a single point of access to information, support and resources across the University".

Research impact, open access, and data management feature strongly on these web pages, reflecting current preoccupations of the UK research community, and also demonstrating how libraries are taking advantage of recent policy developments to position themselves as central to the research process. In almost all institutions in the sample, the library has been assigned responsibility for managing the funds allocated for Article Processing Charges incurred in compliance with funder requirements for gold open access. Most libraries have developed new web pages to support this process, typically including tables and/or decision trees/flow charts adapted to show how the institution is interpreting and implementing the relevant policies. Web pages supporting research data management were found at two-thirds of the institutions, with half of the sites clearly branded as part of the library/information services offer. Five services (including two projects led by the library) were presented as university-level offerings, usually acknowledging contributions by different services, and two services were based in the IT service. The websites were at various stages of development, with two consisting solely of links to external sites.

4. Discussion and Conclusions

4.1. Convergence

The move away from the converged service model is one of the striking findings of the study. However, the distinction between "organizational" and "operational" convergence (Field, 2001, p. 268) is important here. *Organizational* convergence (i.e., formally combining two or more services to form one organization) is evidently in decline within the sample, especially structural designs merging libraries with computing/IT services. *Operational* convergence (i.e., separate services/departments collaborating to coordinate their activities to improve conference and effectiveness), in contrast, is arguably more prevalent than ever, with libraries extending and deepening their collaborations and partnerships beyond IT and educational development colleagues to other professional services, such as research offices. This is particularly evident in:

- services (e.g., institutional repositories, research data services) delivered as collaborative ventures with IT services and/or research offices
- relationships and structures (e.g., committees and groups) supporting boundary-spanning activities in areas such as data management and open access
- unified research support websites providing a single point of access to university-wide resources for researchers, which could be described as an example of a *virtually* converged information service.

4.2. Positioning

The location of the library/information service organization in the institutional organizational structure is rarely discussed in the literature, but is important because it has implications for the allocation of resources, the coordination of activities, and the perception of the service by stakeholders. The two significant trends here were first, the administrative positioning of the library within professional services reporting to the Chief Operating Officer or equivalent, which was identified as the dominant model; and secondly, an increasing tendency to group libraries with "student-facing and education-related services" through reporting lines and directorate structures. The latter is arguably not a positive move for libraries trying to reposition themselves as credible collaborators and partners in research activities.

4.3. Specialization

The survey showed that departmentalization within libraries has evolved beyond the traditional reader/technical services model to a focus on five strategic areas of activity: information resources, academic engagement, customer service, heritage collections, and digital technologies, although there was significant variation in the size of leadership teams. Use of the term "Research" in the job titles of around one-third of the senior management positions identified sends a signal to stakeholders about the priority attached to this area. The strong focus on information systems/technologies identified at the senior management level is not surprising, but it was interesting to find that in many cases the technology portfolio was combined with another area of responsibility, and most frequently with information resources/collections, which in effect continued the tradition of locating systems librarians in a technical services division/department.

Specialization of library professional staff continues to focus on the subjects/ academic disciplines taught and researched in the institution, but subject/ liaison roles are increasingly being complemented and supplemented by coordinating roles (such as research support managers) and functional specialists for particular areas of activity (e.g., research data management, open access publishing). The hybrid approach to specialization found in UK research libraries echoes structural developments reported in North America (Covert-Vail & Collard, 2012; Jaguszewski & Williams, 2013).

An interesting dimension of specialization is the growing trend to extend the development of specialized research support into dedicated spaces for researchers. The space-as-service concept is gaining currency internationally as a visible contribution to research, particularly in support of early career researchers, and interdisciplinary collaboration, with the research commons beginning to emerge as a parallel development to the successful learning commons movement (Corrall & Lester, 2013; Daniels, Darch, & de Jager, 2010; Ohio State University Libraries, 2012). UK examples range from traditional reading rooms to the fully-serviced technology-rich space at Warwick, using early career researchers as peer support advisors, and offering novel services such as research profile matching and suites of bookable rooms for individuals and meetings (Carroll, 2011a,b).

4.4. Coordination

Coordination within libraries is being formalized through roles such as research support managers and leaders, and data management and open access coordinators (and also by internal committees and working groups). Coordination with other services and operations is being pursued through and facilitated by institution-wide groups at both strategic and operational level, typically established to deal with external mandates, but offering the potential of additional benefits for librarians in relationship building, professional credibility, and institutional positioning. As noted above, websites are an additional valuable way of coordinating research services to provide a single point of access for researchers and can be used not only to pull together library and other institutional resources and services, but again to position the library as a major player in the research arena. Research support websites complement the work of research support coordinators in libraries, but can also fulfill that role in libraries which do not have an individual tasked with that responsibility.

4.5. Outcomes

The purpose of the present study was to explore qualitatively how a sample of academic research libraries are organizing resources and services to support their research mission with the intention of identifying important dimensions of organizational design that could be used to develop an assessment instrument for a larger scale international survey. The study achieved its objectives and the results both confirm and extend the findings of related research investigating library plans, roles and skills for supporting and serving researchers. Although the sample was limited to 24 libraries in one country, the results identify structural variables related to library support for research that can be used as a provisional framework for libraries in the UK and other countries to examine and evaluate their own structures.

The present study was conceived as the first phase of a larger scale international survey of organizational design in research libraries and the findings are being used to develop a questionnaire to collect quantitative data on important structural and contextual variables identified from this exploratory study and ongoing review of related literature. The dimensions to be investigated include:

- positioning of libraries within their parent institutions
- scope of library/information service organizations
- size and focus of library leadership teams
- specialization of units, roles and space
- formal and informal convergence of activities
- mechanisms facilitating boundary-spanning activities.

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Notes

[1] http://www.russellgroup.ac.uk