JISC & SCONUL
Library Management Systems Study

An Evaluation and horizon scan of
the current library management systems and related systems landscape
for UK higher education

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Sero Consulting Ltd
with Glenaffric Ltd and Ken Chad Consulting Ltd

Veronica Adamson, Paul Bacsich, Ken Chad, David Kay, Jane Plenderleith

www.sero.co.uk

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Section 1 – Executive Summary & Key Messages

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1.1 Executive Summary

In autumn 2007, JISC and SCONUL jointly commissioned the Library Management Systems Study to undertake an evaluation and horizon scan of the library management and related systems landscape for UK Higher Education.

The LMS study was conducted by a consortium of Sero Consulting Ltd, Glenaffric Ltd and Ken Chad Consulting Ltd.

The report was published in April 2008, thanks to input from exactly 100 UK HE libraries, all the major LMS vendors and the Reference Group drawn from the UK and the international community.

1.1.1 Context

This is a period of uncertainty and change for HE libraries in terms of institutional priorities, user perceptions, globalisation of services and communities and new technologies. Users expect ease of discovery, workflow and delivery influenced by major web companies such as Google and Amazon and Web2.0. In this context, JISC is working towards an Information Environment for learning, teaching and research, involving deep integration of services and resources within the personal, institutional, national and global landscape. As central service providers, HE libraries are raising questions about the role, interoperability and value of their systems.

1.1.2 Scope

Based on a combination of desk research, online survey instruments and consultation, the study aimed to position library systems in this context.

- To evaluate the supply and demand sides of the LMS / ERM market
- To quantify systems market share, procurement patterns, costs, product differentiation and value.
- To conduct a horizon scan focused on the role of library systems amidst the shift from ‘content to context’.
- To assess the emerging use of SOA, open standards and Open Source

1.1.3 The Report

The report consists of 5 sections designed to be studied together or independently.

- Horizon Scan
- Library Survey Analysis plus statistics from 100 UK HE libraries
- Vendor Perspectives
- Reference Group Feedback
- A practical guide for librarians making systems decisions

1.1.4 Findings

LMS Market - The UK market is mature, dominated by four vendors with relatively little product differentiation. Movement in product replacement is slow and customer loyalty to their LMS vendor is high. Many Libraries remain unconvinced about Electronic Resource Management systems and the take-up of new developments such as vertical search is relatively low.

Service Developments - The ability to aggregate user behaviour has significant potential for discovery services, based on click streams, context and personalisation. Nevertheless libraries are not yet exploiting intelligence about user habits to enhance their position in the information value chain. Libraries are however increasingly aware of the need to 'liberate' their data for users to create new services and applications. Consequently, services like the institutional OPAC will become challenged and the traditional LMS could be reduced to back-of-house functions.

Systems Approaches – Key technological responses include development of open interfaces within a Service Oriented Architecture and developing Web 2.0 models. However, the implementation of an open source LMS is not yet regarded as beneficial. Whilst there is widespread use of Information Environment services from JISC Data Centre's such as EDINA and MIMAS, further development of open interfaces is required.

1.1.5 Recommendations

The study recommends libraries invest in systems with caution but not complacency, emphasizing that, whilst the library function has continuing and potentially growing value, the role of 'conventional' library may appear increasingly unclear.

- Libraries reviewing LMS contracts should seek increased value, looking at ways to improve services by implementing features around the core LMS.
- The focus on breaking down barriers to resources is endorsed, involving single sign on, unifying workflows and liberating metadata for re-use.
- SOA-based interoperability across institutional systems is emphasised as the foundation for future services and possibly the de-coupling of LMS components

There is consensus that the time is right for intensified dialogue about the nature and function of the modern HE library, its systems and processes. It is especially timely to explore consortia and other partnership arrangements to increase critical mass and network effect, whilst potentially reducing system and service costs.

Responding to these business needs, JISC & SCONUL are encouraged to work jointly with the community to develop and enhance understanding of Library 2.0 and the potential role of the international e-Framework. There is also a vital role in developing strategic engagement with the LMS vendors, with a focus on business process and user workflow review.

The key messages are summarized hereafter under the following headings

- Background & Context
- New Requirements
- The LMS Market
- Business Models
- Service Developments
- Technology Developments
- Recommendations for Libraries
- Role for JISC & SCONUL

1.2 Background and Context

1.2.1

Changes in society and technology are impacting significantly on UK HE libraries and consequently on their management systems. Demographic changes, political and economic drivers are affecting university services and funding structures, and a 'new realism' of pragmatic economic and business considerations presides.

1.2.2

Library management systems have developed in response to technical advances and user requirements, mainly in developing electronic interfaces, refining standards and access protocols, purchasing and acquisition processes and cataloguing systems.

1.2.3

Increasing globalisation of goods, services and communities means that technical platforms are now developed on an international basis and implemented for a worldwide network of users and contributors. A new market for library services and information provision has emerged, with Google and Amazon as a de facto paradigm and metaphor for discovery and delivery.

1.2.4

Within this context, perceptions of the role and function of the university library are changing, developing and often conflicting, particularly in relation to the provision for collection and circulation, resource discovery, ownership and control, personalisation and seamless access to resources. Enhancing usability and accessibility for an increasingly diverse user community is of increasing importance for libraries.

1.2.5

Today's library users expect speed and immediacy of information discovery, one-stop access to aggregated services, user-generated open content, and personalised, workflow-related delivery to the desktop.

1.2.6

Institutional spend on the LMS is relatively small compared to other core corporate systems. There is an increasing drive for cost reduction through institutional workflow review, systems integration and the streamlining of corporate functions.

1.2.7

Against this background, a consensus is emerging that the time is right for dialogue in the profession and beyond to prompt a fundamental rethink about the nature and function of the modern HE library, the systems and processes that need to be managed, and a reconsideration of the business case for the library itself.

1.3 New Requirements

1.3.1

Web 2.0 and its corollary Library 2.0 represent a new way of thinking and working that has profound implications, not least in terms of questioning traditional concepts of authority and value, but also in the opportunities presented for networking, developing and sustaining communities of practice, user-generated content and the aggregation of resources.

1.3.2

Libraries must deal with new sources of information that students are increasingly building into their learning experiences. Many claim to be offering Web 2.0 opportunities for engaging users, but these seem in the main to be limited to the provision of blogs and wikis.

1.4 The LMS Market

1.4.1

The LMS market in the UK is mature, and demand is relatively stable. It is dominated by four principal vendors with relatively little product differentiation. Movement in product replacement is slow and customer loyalty to their LMS vendor is high. Opportunities for dramatic growth are therefore limited.

1.4.2

The UK LMS market is relatively insignificant in the global corporate context. Two of the main LMS vendors are private equity companies with a business emphasis on return on investment in developing products and markets.

1.4.3

Libraries currently remain unconvinced about the return on their investment in electronic resource management systems. The take-up of new developments such as vertical search products is relatively low. This may be due in part at least to slow procurement cycles.

1.5 Business Models

1.5.1

The business case for the library is predicated on the assumption that the library is the authoritative source of information, and presents optimum access to the best and most appropriate resources in the most efficient way. This raises a dynamic tension between ‘reliable’ and ‘suspect’ sources and questions about the nature of authority.

1.5.2

Part of the business case review for libraries includes a consideration of their potential role as a corporate information management resource.

1.5.3

Vendors have developed vertical search products in response to a perceived gap in Google’s contextual searching provision. Fundamentally their system developments start with the collection and add search functionality. By comparison, Google’s free library service, with its global reach, based on advertising revenue, starts with search functionality and adds collection functionality.

1.6 Service Developments

1.6.1

The ability to aggregate user behaviour has significant implications for the potential relevance and immediacy of resource discovery services based on click streams, data aggregation, personalisation and contextual information searching.

1.6.2

Libraries are not yet exploiting the metadata they are able to collect about user habits and needs as an asset in a network economy to consolidate their position in the information value chain.

1.6.3

Libraries are increasingly aware of the need to 'liberate' their data to allow users to create new and innovative services and applications. To do so their platforms will require easy-to-use and accessible services for discovery and delivery.

1.6.4

Once open to that model, services such as the individual institutional OPAC will become seriously challenged. The LMS may be reduced to a set of back-of-house systems.

1.7 Technology Developments

1.7.1

There are a number of possible technological solutions to the challenges facing libraries and the LMS. These include a web services-based approach, open source systems and the development of open interfaces within a service-oriented architecture.

1.7.2

The procurement and implementation of an Open Source LMS is not workable for most institutions in the current climate, largely because of the staff capacity and support overheads, but also because the mission criticality of library systems requires users and procurers to have confidence in a robust system. However, Open Source developments are a valuable catalyst for change in terms of exploring possibilities and pushing boundaries for the community.

1.7.3

Vendors view Open Source software developments as an important trend, but most see the value of open source developments mainly in reducing costs by providing low-cost components for their applications.

1.7.4

There is widespread use in libraries of JISC Information Environment services such as those provided by Edina and MIMAS. There is a need for further development of interfaces to exploit the potential of the IE for library service development. This clarifies the relevance of the e-Framework at the practical level of web services and confirms its enabling role.

1.8 Recommendations for Libraries

1.8.1

The study recommends that libraries invest in systems with caution but not complacency, emphasizing that, whilst the library 'function' has continuing and potentially growing value, it is not clear what role 'conventional' library services should play.

1.8.2

Libraries reviewing and renewing LMS contracts should seek increased value from their LMS investment, looking at ways to improve services by implementing features around the core LMS.

1.8.3

The common focus on addressing barriers to resources is endorsed, involving single sign on, unifying search and access, liberating library metadata for re-use and exposing resources via a variety of routes.

1.8.4

Libraries should work internally to develop interoperability across institutional systems based on a Service Oriented Architecture; this will lay vital foundations for future services, possibly involving the de-coupling of LMS components

1.8.5

Given this context, it is timely to explore consortia and other partnership arrangements, especially between HEIs, to increase critical mass and network effect whilst reducing system and service costs.

1.9 Role for JISC & SCONUL

1.9.1

The study confirms that SCONUL is encouraged to work with its members to develop and enhance understanding of Library 2.0 and the potential role of the JISC e-Framework in responding to the business needs of the university library.

1.9.2

There are opportunities to engage with reference groups in the wider development community to inform and be informed by current developments in open standards, systems integration and web services.

1.9.3

There is a clear role for JISC and SCONUL in finding the appropriate platform and developing a shared agenda for strategic engagement with the LMS vendors.

1.9.4

JISC and SCONUL are encouraged to continue to facilitate communication and networking between and among institutions with a key focus on business process review.

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Section 2 - Summary Report

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2.1 The JISC & SCONUL LMS Study

2.1.1 Scope

The Library Management Systems Study, jointly commissioned by JISC and SCONUL, represents an evaluation and horizon scan of the current library management and related systems landscape for UK Higher Education

Key drivers for the study were the JISC long term objective to develop an online Information Environment that provides secure and convenient access to a comprehensive collection of scholarly and educational material, and SCONUL's aim to help its members to enhance services based on a clear understanding of the Library Management Systems (LMS) market in the context of the user experience.

2.1.2 Approach

The study, which took place from August 2007 to February 2008, was based on a combination of desk research, survey instruments and consultation, namely:

- **a horizon scan** of issues, initiatives and key factors influencing the development of LMS and library services
- **an online survey** of UK HE libraries, which gathered current information about the electronic systems and services provided by 100 libraries
- **interviews** with the main UK HE LMS vendors to better understand their businesses, the factors influencing their strategy and their development plans

To ensure that the study was informed by current thinking in the sector and from the wider library arena and by the perspectives of key agencies, a **Reference Group** was established consisting of 17 senior librarians and stakeholders from the UK and international community, including several SCONUL members.

2.1.3 Report

The JISC & SCONUL Library Management Systems Study report consists of 5 sections, which have been designed to be considered as a whole or to be studied independently by specialist readers. Consequently the reader will find a necessary degree of duplication across some sections.

Following the 'Key Messages' outline (Section 1), this 'Summary Report' (Section 2) synthesises the findings and conclusions of detailed sections, which are derived from the four elements of the study methodology:

Section 3 - Horizon Scan
Section 4 - Library Survey
Section 5 - Vendor Perspectives
Section 6 - Reference Group Feedback

The concluding 'Making Decisions' (Section 7) provides a short guide for librarians to consider the implications of the study on processes and practice in HE libraries and on the wider HE institutional context, with especial reference to forward planning for LMS and related systems.

The LMS study report is supported by two appendices which detail the Survey Statistics & Charts (Appendix 1), derived from the responses of exactly 100 UK HE libraries (specific to Section 4) and summaries of the of dialogues conducted with the four leading systems vendors (Appendix 2).

2.1.4 Thanks

The LMS study team was drawn from three consultancies with wide experience in the context of library management, emerging technologies and sector developments – led by Sero Consulting Ltd, working with Glenaffric Ltd and Ken Chad Consulting Ltd.

However the study would not have been possible with the considerable efforts of

- The 100 UK HE libraries, well over 50% of the sector, who responded to the survey
- SCONUL committee members and colleagues from the JISC team who supported the detailed process, namely Anne Bell, Jane Core, Ian Dolphin and Balviar Notay.
- The 17 members of the Reference Group who exceeded the commitments to which they signed up in August 2007, not least those who attended the Horizon Scan workshop held at the Open University.
- Colleagues from Edina and MIMAS, whose input to the JISC and British library 'Discovery to Delivery' workshop in December provided a timely opportunity to correlate findings.
- Not least, the senior managers of the four vendors who provide LMS and associated systems to almost 90% of the UK HE sector – ExLibris, Innovative Interfaces, SirsiDynix and Talis.

2.2 Context

The report outlines the context for change in libraries in terms of institutional priorities, demographic trends, globalisation of goods, services and communities and technological advances.

Perceptions of the role and function of the university library are changing rapidly. Web 2.0 and its corollary Library 2.0 represent new ways of thinking and working with profound implications for traditional concepts of authority and value. Users, whether undergraduates or researchers, increasingly expect speed and immediacy of information discovery, one-stop access to aggregated services, user-generated open content, and personalised, workflow-related delivery to the desktop. A new market for library services and information provision has emerged, with Google and Amazon representing the de facto metaphors for discovery and delivery.

The horizon scan adopts assumptions about the environment, which are framed in terms of society, technology and people. Whilst issues of demographics, learner diversity, fee structures and even carbon reduction will each ripple through university planning, none are as immediate in terms of impact on library services as the march towards ubiquitous broadband access underpinned by a wide range of mobile devices. In that context the web and its associated technical standards continue to dominate.

2.2.1 Technology

Whilst there is no possibility of identifying the full technology picture even in the medium term, tenable assumptions and attitudes include:

- assume digital access devices and broadband connectivity are pervasive
- think mobile in terms of new procurements and service developments
- watch the domestic and schools markets for new trends
- value learner ideas and attitude
- watch out for and leverage influences from peripheral fields
- balance control with agility by deploying Web Services

The world of media is changing beyond recognition, especially in the relative cases for print and electronic resources, regardless of how they are managed:

- e-Books will become widespread on the foreseeable horizon, and the changing requirements for book stock may offer transformative opportunities, potentially involving consortia
- Libraries and repositories have growing role in managing the scholarly output of their institution, due in part to the rise of the Open Access movement
- User participation in publishing presents challenges relationships between the formal and the informal

Web 2.0 has very particular implications for library services, despite the danger that Web 2.0 and its application in libraries (sometimes called Library 2.0) becomes an ill-defined catchall. The Web 2.0 label tends to be used in two different ways, importantly differentiated in the context of this investigation:

- Concentration – the aggregation of information and associated intelligence driven by major data hubs, both the generalist like Google and the specialist like Amazon
- Diffusion – the dissemination and reuse of content involving such as blogs, syndication (RSS) and mashups

Whilst social networking underlies both, the critical factor on the library horizon is 'ownership' of the means of the concentration and diffusion, potentially driving the use of data for business intelligence and therefore enhancing user services, providing a real 'network effect' where individual institutions do not scale:

- Opportunities at levels higher than the individual institution arising from the aggregation of metadata, user activity data (e.g. clickstreams) and user created data (e.g. tags, reviews); in a Web 2.0 world, the resulting 'Network Effect' is key to maximising value and potentially to reducing the unit cost.
- The 'Long Tail', representing opportunity for specialists – based on the fact that a specialist (e.g. subject based) service has little local mass but is highly likely to have critical mass with sustainable community loyalty in a wider geography

It is observed that Google does not yet provide enough 'context' for students and researchers. However, Higher Education has only begun to realise its value as a 'trusted' domain, underpinned by such data, potentially capable of uniquely and efficiently addressing the user context, with developments such as the Intute repository search potentially setting the compass.

In order to address such requirements, libraries (individually and jointly) should question first their ability to develop, sustain and profit from these types of aggregated services and second the potential fit of extended library systems and LMS-related products to deliver the resulting services.

2.2.2 People

The JISC 'Learner Experience' and 'Google Generation' reports have been significant in developing understanding of the changing needs and expectations of current and arriving learners and of researchers. The key challenges for library services arising from the 'Google Generation' may be summarised as:

- Undergraduate and researcher experience of the wider online world in terms of work flows, tools and collaboration
- The implications of that experience for perceptions of interface, efficiency and ultimately use of time
- The disruptive impact, albeit over a longer time, on scholarly behaviour – ranging from research methods to judgements on authority

The LMS survey gathered responses to 'the perception that there may be a growing problem with the way in which students interact with library resources'. Respondents widely

acknowledged that Google and similar metaphors have changed the game in terms of attitudes and workflows:

- 'Generally, the delivery of library resources is not well attuned to student expectations, learning styles, study environment or lifestyles'
- 'Many students go to Google first and go no further'
- 'Students are working in different ways: they are often time limited and off campus and this will affect their behaviour
- 'Disappointment is exacerbated when the students find a resource only to find that they then do not have full-text access
- 'People tend not to think in terms of library concepts and flows; they want fast, accessible results which will suffice not a fragmented utility for deep and exhaustive research'.

The observations of Marshall Breeding on 'Trends in Library Automation: meeting the challenges of a new generation of library users' respond to this perspective in the library systems context, notably

- OPAC interfaces do not compare favourably with alternatives on the Web
- Consider the library's Web site as a search destination not a starting point
- Expose library content and services through non-library interfaces
- Add-ons for dealing with electronic content are "must have" products
- Web services is the essential enabling technology

Access is therefore recognised by many HE librarians and service providers as the number one user issue – from discovery to delivery, one-stop, quick, work-flow related, integrated and personalised.

However there is a growing understanding that the passive 'consumer' journey from 'Discovery to Delivery' is itself being transformed under the influence of Web 2.0 thinking in to an active cycle engaging the user as creator, raising challenges of authority and of new curatorial responsibilities.

2.3 Library Management Systems

Libraries, vendors and Reference Group participants have suggested that the time is right for a fundamental rethink about systems and about the processes that need to be managed. This is based on

- recognition that the world is changing and that libraries need to change too, taking full account of the complex systems ecology within which they operate
- changing perceptions of what a library collection is and does, including collection and circulation, resource discovery, changes in ownership and control, personalisation and seamless access to resources
- a sense of stagnation in service development, other systems having caught and overtaken LMS

2.3.1 The market

The UK HE LMS market is well developed and mature. The study has established that libraries spend approximately £13.1 million annually with the four main vendors who have nearly 90% of the market.

UK HE libraries therefore represent about 5% of the global library systems market across all sectors, estimated to be worth around £285 million in 2006. By comparison Google (defined in its own mission statement as a 'library' company) had revenues of over USD $16 *billion* for 2007.

Private equity investment now plays an important part of the ownership picture with two (ExLibris and SirsiDynix) of the four main vendors now owned by private equity companies. This represents nearly half the UK HE market. The priority of the new owners must be to achieve a good return on their investment before selling or refinancing.

The churn in HE LMS replacement is very slow, as most institutions replaced their end-of-life systems around the turn of the century. Many customers retain long-term loyalty to their LMS vendors despite changes in ownership and confusion over product direction after mergers. Opportunities for dramatic growth are therefore limited, though vendors see opportunity for organic growth. As evidenced in Appendix A, the LMS survey respondents corroborated this picture.

- Whilst libraries typically reported annual spend of over £500,000 on print and electronic library resources, most technology budgets fall mid-range between £50,000 and £250,000 per year, with around half spent on the LMS and associated products.
- On the 5 year horizon, spending is not anticipated to change significantly except with a slight shift to the middle ground with fewer spending less than £50,000 annually on materials, technology or staff.

The survey therefore indicted low prospects for organic growth, such as implementation of add-on modules, even taking into account the development of new products and services to manage, discover and deliver electronic resources.

2.3.2 Key trends influencing vendors

Vendors recognise that their products and services are now, more than ever, part of a much bigger environment, which raises high level challenges; for example

- **Standards –** shifting in emphasis from the domain specific (like Z39.50) to globally recognised standards driven by such as W3C, with the potential to break down product and service boundaries
- **Web Services –** providing robust yet agile mechanisms for developing interfaces both within the LMS product space, opening up opportunities for decoupling vendor modules, and also with the wider world of institutional systems and web applications; significantly, almost 25% of libraries reported some form of Web services development, often linked with IT services.
- **Consortia –** a variety of shared services have been adopted in other geographies ranging from a common LMS to more dramatic changes in physical arrangements. One vendor cited the potential for library management systems delivered through SaaS (Software as a Service – on demand, web-based) to achieve a 40% reduction in overall cost.
- **Open Source –** ranging from a means of adding value around a vendor LMS to the basis for complete and competing LMS solutions; however, current US experience indicates that Open Source does not mean a cheaper LMS, nor a more *interoperable* one. It is therefore not surprising that no survey respondents considered an Open Source LMS a likely possibility, whilst nearly 20% had no interest at all in Open Source.
- **Open Data –** the openness of libraries and services to make their library catalogue metadata freely available would enable re-use (mashup) in new and low cost services, as exemplified by LibraryThing.

In the context of these mutual challenges and opportunities, the vendors would welcome a closer dialogue with JISC and with SCONUL. The vendors themselves have well established processes to ensure they remain engaged with their UK customers and all agree that UK HE is a strategic market. However they observe that neither the JISC itself nor the Information Environment model directly influences their thinking.

2.3.3 Library Perceptions

Most libraries report their LMS to be reliable, efficient and functional. Their main advantage for students and other users, over alternative routes to information, is seen as their ability to find specific items and to report availability. On the other hand around two thirds agreed that the disadvantages to users were that they were 'clunky,' limited to the catalogue and had low visibility to users. From a staff use point of view, 70% of respondents said that lack of corporate integration was the major disadvantage.

Library survey respondents shared many of the vendor views on immediate priorities and trends, especially regarding interoperability and user work flows. When asked to comment on missing functionality, repeated themes were:

- Improved user interface and interaction
- Integration with external systems and the open APIs to do this easily
- Reading Lists fully integrated with the VLE and e-material
- Electronic Resource Management including better reporting
- Inter-Library Loan

There is a perception that in terms of the core LMS there is little now to differentiate systems. Some will review their position as fixed contracts come to term and roughly 20% were looking at a possible replacement between 2008 and 2012. In view of the current level of disruption and uncertainly regarding service models, libraries should carefully consider whether a new procurement is the appropriate response in a market where products are not strongly differentiated.

2.3.4 Product Directions

The trends on the market horizon are clearly influencing the vendor product investment in Electronic Resource Management, extended search and new interfaces.

- **Electronic Resource Management -** The main trend in library systems has been the need to manage and provide access to an increasing range of electronic resources (primarily electronic journals). This has focused attention on enhanced search and delivery mechanisms and new Electronic Resource Management (ERM) systems. With vendors now talking about more integrated 'Universal (or Uniform) Resource Management' of the whole print and electronic spectrum, there is likely to be an evolution from the newer ERM systems to include the management print resources.
- **Vertical Search -** The rationale for vertical search is that, although users are sometimes looking for all the information they can get using the likes of Google and Yahoo, often they are looking for something very specific. In response, vendors have developed 'vertical search' applications, targeted at the specific undergraduate and postgraduate research business channel. Google Scholar can also be considered a vertical search application. Importantly these products are designed irrespective of the underlying LMS.
- **Other Discovery Products –** Metasearch products, providing a consolidated search environment for remote information resources have been less successful for the vendors. It is significant that Google Scholar has the second largest UK HE share, as libraries look beyond the vendors to meet the needs of the extended library function. Open URL Resolvers have relatively high take up, being a key to making best use of scholarly resources acquired or licensed by the library. The usefulness of Google

Scholar has been enhanced by integration with Resolvers, so users can be directed to the 'appropriate copy'.

- **De-coupling systems -** LMS vendors know that new standards for interoperability could enable them to sell their 'add-on' products beyond their own LMS customer base. In a relatively slow moving market, this offers a significant way to grow business, so most new products are designed to work with a variety of LMS. In addition libraries have begun to use web services to interoperate with university portals or admin systems. The greater de-coupling challenge lies however in the disaggregation of core LMS functionality, potentially leading to a smaller LMS system footprint.

2.4 Business models

2.4.1 The Patron Business Requirement

Whilst it is tempting to see the business case for the patron in terms of feel-good factors, libraries should be rigorous in seeking out tangible 'business benefits' from the patron perspective. That rationale needs to be sharper and more explicit an era in which both learners and researchers may ascribe increasing value firstly to what's 'out there' (both content and networked feedback) and secondly to how it's done 'out there' (workflows and interfaces).

Selling points for the patron will include services that

- save time or money (e.g. Print on demand)
- are unavailable elsewhere (especially 'out there' on the network)
- come with the kite mark of authority (e.g. direct linkages to study programmes)
- are supported by value added expertise (e.g. from subject librarians)

2.4.2 The Library Business Case

Libraries need to express their business case unambiguously in terms of corporate rationale in which cost and efficiency are increasingly the drivers.

It is therefore essential that libraries know their unique selling points and let others do the rest. For example:

- identify the essential points of integration with corporate systems, seriously questioning duplicated functions
- embrace the network, recognising that some things are better done by others 'out there', such as Google
- consider the potential of the physical and the online library to become a special space
- take the high ground by applying library expertise to maximising corporate intellectual assets

2.4.3 LMS Positioning

The integration of the LMS with other business systems was the most significant institutional issue identified by many survey respondents. Increasingly, libraries recognise this might involve the disaggregation of LMS services and integration with other corporate systems for learning and teaching, research and administration. A key issue is the extent to which the advantages of LMS functions, such as purchasing or borrower records, justify continued independence from other business systems in the increasingly integrated corporate environment.

The positioning of the Library Management System (covering traditional modules plus relatively recent add-ons such as Electronic Resource Management and Vertical Search) relative to the perceived landscape is therefore central to this study. A number of inferences can be logically drawn, which may have a domino effect:

- The concept of a total solution or a forever expanding one stop integrated system from a single LMS vendor is anathema set against the trajectory of corporate systems and global services
- Google represents ‘the gorilla in the room’, offering a ‘good enough’ free library service based on advertising, start with workflow and adding collections
- The LMS should therefore be considered primarily as a back of house application, doing things that have to be done and that no one else does better, interoperating (or cooperating) with other corporate and external applications

Given this backcloth, three possibilities should be considered very seriously:

- It may be unadvisable to engage in the procurement a new LMS in this climate
- It may over time become more practicable and sustainable to have the option of Open Source LMS components
- It may be the right time to review the value of consortia, not just for purchasing purposes but also with a view to the radical re-casting of some services on a shared or out-sourced basis

2.5 Threat or Opportunity?

2.5.1 Achieving critical mass & maximising value

The technologies and business models of the network economy open up new opportunities to respond to these changing conditions.

The Web 2.0 network economy model suggests that the availability of easily re-usable data encourages a virtuous cycle, yielding critical mass for the user and the service provider. This is based on concentration and diffusion, supported by exposure through Web Services / Service Oriented Architecture.

Discovery to Delivery processes are only part of an emerging user 'creativity cycle' [C2C - Create to Curate] whereby users are free to create and expose innovative objects, to contribute to and to repurpose others' objects. If any HE system is to service this workflow in the specialist context of study and research, it would surely involve some elements we might recognise as a ‘Library Management System’ alongside, perhaps, the characteristics of a PLE and a social network.

The biggest driver to this end is the liberation of data and services, involving the removal of both technical and commercial barriers to the ‘network effect’.

- **Expose -** Data and services must be ‘liberated’, exposed for re-use and wider exploitation by anyone (subject to unavoidable licence constraints)**.** Originators and curators, such as libraries, should not be concerned with the shape and scale of the resulting services – they may be personal, collaborative, institutional, sector wide or domain specific, global.
- **Re-use -** The result will be opportunity for fusion, exploiting canonical data by re-purposing, remixing or mashing it up. Developers of services should be concerned about hitting the network level to suit their purposes, to maximise the network effect or to engage the long tail, recognising that libraries may not be best placed to develop the end services

- **Participate -** There is a clear link between the enfranchisement of individual participation in the library domain and the national policy objective of greater personalisation in learning. All players (students, lecturers, researchers, learning support staff and librarians) must be free to contribute through such as recommendation, links and tags.

2.5.2 Corporate Implications

The corporate implications of such opportunities for HE institutions are not insignificant.

- Human Resources & Professional Change
    - Levels of library staffing, relating to 'traditional' roles
    - Roles of library staff (e.g. relating to learner support, cataloguing)
    - Business process changes (e.g. Acquisitions)
    - New approaches to authority, authorisation and authenticity
    - Increased dependency on cross-service working
- Systems
    - Requirement to expose data and services to get in the game
    - Risks of an 'always Beta' systems culture
    - Integration required to right size the LMS footprint
    - Possible dependency on vendor cooperation
- Wider
    - Challenge of establishing new licensing models with publishers
    - Reputational impact of change and collaboration relating to the library
    - Opportunity to re-purpose significant intellectual assets

2.6 Moving Forward

There is evidence of a growing collective will for concerted and constructive dialogue in the profession about the business processes that a library is expected to manage,

- Adapting relatively inflexible legacy systems to meet increasing user expectations of flexibility and speed of response.
- Envisioning the future footprint of library systems relative to growth of the personal learning environment and other user developed processes
- Addressing internal capacity and professional development needs, including capability in and understanding of the technologies underpinning Web 2.0

2.6.1 Guidance to Libraries

Time for review

It is widely suggested that the time is right for a fundamental rethink of the nature and function of the modern HE library, set against new institutional and user contexts within which the systems and processes need to be managed.

In the ongoing process of re-assessing their business proposition, libraries should in particular identify their unique selling points and consider the extent to which they should concede or cooperate with others to do the rest. This will involve:

- recognising essential points of integration with corporate systems, questioning duplicated functions
- embracing the network, understanding their place in the value chain and recognising that some things are better done by others
- delivering tangible 'business benefits' from the user perspective, to be found in workflows that save time or money and services that are unavailable elsewhere, that come with the kite mark of authority or are that supported by value added expertise.

Reasons for caution

Now is not the time for new LMS procurements, though there may be opportunity for re-structuring deals with incumbent suppliers. Nor is it the time to cut over to completely new models as Open Source developments are still tied to established processes.

Whilst recognising that change and disruption will continue, there is expectation of greater clarity over the next five years in terms of

- Impact of Google Scholar and potential alternatives
- The value of services addressing HE specific needs, such as Intute repository search
- The role and value of a range of Web 2.0 related developments
- e-Books business models
- The coverage of Open Source offerings
- Vendor and publisher responses to new paradigms

Recommendations for action

Libraries therefore need to invest with caution but not complacency. Whilst is clear that the library 'function' has continuing and potentially growing value, it is not clear what role 'conventional' library services will play. Therefore, it has been the intention here to position a set of short-term investment recommendations relating to Library Management Systems. These recommendations are geared to build and benefit from that 'exploratory experience' amidst disruptive trends.

Libraries will not be in a position to act on all these recommendations in parallel, but should rather consider this as a menu to assist in the necessary action planning process.

- 'Sweat the assets' to get more value from your LMS investment
- Look at ways to improve services by implementing features around the core LMS
- Address the barriers to resources through single sign on, unifying searching and access
- Liberate library metadata for re-use, exposing resources via a variety of routes, including search engines, portals, VLEs and PLEs
- Work internally to develop interoperability, possibly de-coupling LMS components
- Explore partnership to increase critical mass and network effect whilst reducing costs

2.6.2 Role for JISC & SCONUL

In the present climate of change, there is a joint role for JISC and SCONUL in promoting communication and networking between and among institutions:

- Facilitating a business process review for libraries to scope the nature of the systems that are to be managed, articulating user needs, workflows and information behaviour; notably but not exclusively in the context of
    - Sector wide user experience considerations
    - Web 2.0 / Library 2.0 developments
    - International e-Framework models

    - Investigation and brokerage of consortium and shared service models
- Forecasting and horizon scanning with reference to such as Open Source
- Identifying future skills specifications for library staff, including the possibilities of Librarian 2.0
- Dissemination and awareness raising to close the gap between innovative projects and operational developments and practice in institutions

In this context the natural role of JISC would be expected to include

- Initiating projects to develop models of practice and exemplars of services, generating accessible reports and case studies
- Facilitating the development of open technical specifications (not necessarily standards), shared services and enterprise architecture
- Investigating the national value of 'the long tail' and user feedback from reviews to clickstreams
- Developing links across the HE systems community

In order to better engage with libraries and vendors, JISC potentially has a key role in helping to define the domain application of web services. Such initiatives might open up the market, and leverage the skills of a new breed of 'mashers up', both reducing costs and opening doors for libraries.

Section 3 - Horizon Scan

Contents

3.0 Introduction

The Horizon Scan is a key element of the LMS Study commissioned by JISC and SCONUL. Its aim is to summarise the current and projected trends, developments and initiatives which impact on the future of the LMS market and the business and service models for HE library development.

This is a broad and wide-ranging remit, and presents a wide scope and array of potentially relevant issues. The report on the Horizon Scan offers a summary of some of the key points of debate and references further sources of information where appropriate. It informs – and is informed by – other elements of the LMS Study, particularly the Library Survey and Vendor Survey reports.

The Horizon Scan consists of the following sections:

1 Scope and Framework
2 Background and Assumptions
3 Changing User Requirements
4 The External Environment ('Out there')
5 The Library Context ('in here')
6 Vision for Development ('a place in both worlds?')
7 Exemplars.

The sections are the work of various contributors within the project team, and reflect different styles and perspectives. Together, however, they present both a wide view and specific comment on the developing context for UK HE libraries and the systems they manage.

3.1 Scope and Framework

'There are two worlds – out there and in here.'

We offer no apologies for appropriating Benjamin Disraeli's stark reflection on 'the two nations' of mid-Victorian Britain, 'the rich and the poor'. In the context of this study, we are less concerned with the digital rich and the digital poor (the so-called Digital Divide), and more with the worlds inside and outside the HE institution, and particularly with the worlds of information inside and outside the library.

It may be useful to scan the horizon through the lens of a simple model of the forces at play within the world of information.

<table>
<tr><td colspan="3">Paradigm</td></tr>
<tr><td rowspan="2">Platform</td><td>Patrons (users)</td><td rowspan="2">Process</td></tr>
<tr><td>Practitioners</td></tr>
<tr><td rowspan="2">Place</td><td>Publishers</td><td rowspan="2">Practice</td></tr>
<tr><td>Partners</td></tr>
</table>

This model may provide a framework or mapping device to assist considering the synergies, dependencies and implications of the forces identified in the Horizon Scan. The eight 'P's identified here are not particular to higher education, to scholarly information or to the United

Kingdom. Nevertheless there is within the UK HE community a heightened sense of urgency not simply to scan the horizon but to read the runes and to identify both the implications and the options for institutions, library users and professional colleagues.

The framework is intended to position people (patrons etc) at the centre, in relationship with the institutional service infrastructure (the IT platform and the library itself) and its ways of working (hard process and softer professional practice). These elements are not operating in a vacuum or an institutional black box (each itself has a relationship with the world 'out there'). Most significantly, each one is subject to the changing paradigms (business models, information ecosystems, research practices and community loyalties) in the wider world of information and information technology.

3.2 Background and Assumptions

This section looks at wider issues over a five-year time frame, from now until the end of 2012. The research methodology is basically literature search. Assumptions about the environment for this study are framed in terms of:

- society and technology
- universities and publishers
- students and staff

3.2.1 Society and Technology

There are a number of documents that pertain to this but the current HEFCE Strategy for e-Learning[1] can be assumed to have taken the most pertinent socio-economic conditions into account.

(For a longer term view, see the Social Issues Research Centre (SIRC) report Life Online: the Web in 2020.[2] For universities, there is little point in making assumptions based on the birth rate since by the time they bite, it is 18 years from now. This may be less so for immigration, especially of teenage children of immigrants, but the issue of the impact of immigration on HE is outside the scope of this study. However, one should note the evidence for a significant demographic downturn from 2011.)[3]

We can further assume that towards the end of the five-year period the carbon reduction agenda is beginning to bite and that there are active moves to reduce the amount of travel undertaken by citizens in their work, leisure and study.

The cap on top-up fees in England and Wales expires in 2010. Unlike for demographics, universities are already thinking about what to do in the era when there is most likely no cap on fees – it is expected that fee levels will rise at many universities.

We assume that the web and its associated technical standards continue to dominate, although within a framework of much more use of mobile devices. At a more UK HE specific level, we assume that the JISC Information Environment and e-Framework programmes[4] set the technical framework (but other reports in this study have noted that management at many UK HEIs do not seem to be particularly aware of the e-Framework).

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[1] 'HEFCE strategy for e-learning', March 2005/12, http://www.hefce.ac.uk/pubs/hefce/2005/05_12/. Note that the strategy and its implementation plan are currently under interim review.

[2] 'Life online: The Web in 2020', A study by the Social Issues Research Centre on behalf of Rackspace Managed Hosting, December 2006, http://www.sirc.org/publik/web2020.shtml. A good and very readable introduction to the literature in this area but rather light on predictions that can be applied to student and staff use of university libraries. From the same team that brought us 'Watching the English'.

[3] See for example http://www2.le.ac.uk/ebulletin/news/he-news/2000-2009/2007/11/nparticle.2007-11-07.1512947627. However, there is little overt evidence of serious planning for this in most universities.

[4] See http://www.jisc.ac.uk/whatwedo/themes/information_environment.aspx and http://www.e-framework.org/ respectively.

3.2.2 Students and Staff

We make the following assumptions about the five-year period:

- a ubiquity of broadband (at current speeds)[5] to student study locations (campus, residences, homes, workplaces and to many places of recreation)
- the PC (desktop or laptop, always with keyboard) is still the study workhorse and the relevance of other especially smaller devices is still marginal except in e-books and similar contexts not requiring significant keyboard input. (It is just possible that by the end of the period some version of the e-book will have reached the tipping point.)
- the increasing utility of mobile, as devices from laptops to phones mature and as access services increased coverage and establish more functional roaming models
- an innate conservatism among academics and students in that the resources they will be required to retrieve will be largely textual in nature for the majority of courses (text is a very efficient medium including for copying)
- a gradually increasing accountability burden on universities and on university libraries so that "who accesses what, and why?" becomes a key issue[6]
- students are still time-poor whether they are (allegedly) full-time or part-time
- no further reduction in the relative salary level of staff compared to the rest of society – meaning that staff will have discretionary income as at present to purchase PCs, broadband access and wireless communications if they wish – as well as continue to purchase some books and subscribe to some hard-copy journals as they do now

3.3 Changing User Requirements

3.3.1 JISC Learner Experience studies

The JISC 'Learner Experience' series of studies are one of the main sources of input on student behaviour, though still at a general level. In particular the overview report[7] 'Recommendations for post-16 institutions on enhancing the learner experience of e-learning' states in its section on 'Information searching, retrieval and evaluation':

> The learner experience studies suggest that Google and Wikipedia are the preferred information retrieval tools for many students. Learners frequently use search tools to find and retrieve learning materials from other universities. While most students appreciate that information found on the Web can be unreliable, they still see library resources as much harder to use than Internet search engines and free online encyclopedias. While some students develop sophisticated and effective information search and evaluation methods, many do not.

The report recommends that institutions should:

- provide learners with better information search and evaluation support and library tutorials, helping to develop the required information literacy
- work to improve the usability of their information and library systems
- rethink the worth of the course content they produce with a view to rationalising its production in a world where there is access to a vast amount of free content
- develop methods and tools such as repositories to aggregate and approve content

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[5] Speeds of 2 Mbit/s are quite sufficient to deliver LMS functionality including full-text downloads

[6] Notice in particular paragraphs 19 and 22 of the DIUS Grant Letter to HEFCE.

[7] 'Recommendations for post-16 institutions on enhancing the learner experience of e-learning – Guide 1', JISC Learner Experiences of e-Learning Programme, April 2007, http://www.jisc.ac.uk/media/documents/programmes/elearningpedagogy/guide1.pdf

Confirmation of these points at a much more detailed level has come from the 'Google Generation' series of reports,[8] commissioned by JISC and the British Library. However these became available to us too late in the lifetime of this project to allow full incorporation of the details of their analyses.

3.3.2 A North American Perspective

Marshall Breeding of Vanderbilt University has produced in 2006 a masterly presentation 'Trends in Library Automation: meeting the challenges of a new generation of library users' [9]. In it he makes the following points:

- Given the relative parity of library automation systems, choosing the right automation partner is more important than splitting hairs over functionality (slide 21)
- The core ILS focused mostly on print resources and traditional library workflow processes. Add-ons available for dealing with electronic content ... are [now] "must have" products for academic libraries with significant collections of e-content (slide 23)
- [OPAC] Interfaces often do not compare favourably with alternatives available on the Web. Print materials becoming a smaller component of the library's overall collections.
- Where do you typically begin your search for information on a particular topic? College Students Response: 89% – Search engines (Google 62%) (slide 29)
- The New Library Search Model: Don't count on users beginning their research with library catalogues or Web site. Consider the library's Web site as a destination. Make it a compelling and attractive destination that uses will want to explore more. Web users have a low tolerance for ineffective and clunky interfaces (slide 30)
- Expose library content and services through non-library interfaces: Campus portals, courseware systems, e-learning environments; County and municipal portals and e-government; Other external content aggregators: RSS,[10] etc
- Web services is the essential enabling technology for the delivery of library content and services to external applications.
- Library community lags years behind other IT industries in adoption of SOA and Web services[11] (slide 33)
- Millennial generation library users are well acclimatised to the Web and like it. [They are] used to relevancy ranking.

Breeding also gives many more detailed insights in his presentation.

3.3.3 Economic and Social Research Council Review

Key insights into the needs of the academic community were provided in early 2006 by Schmoller and Ferguson in their 98-page report 'Review of the information environment for social science researchers', commissioned by ESRC in 2005. The report was never published by ESRC[12] but seems to have affected the thinking of at least one agency, as judged by public statements of their response. Though seemingly controversial at the time, many of the points are confirmed in the later 'Google Generation' studies.

Below are some of the key extracts from the Review that are particularly relevant to this Study. (Note that the Review was considerably wider-ranging than the remit of our Study. The numbers

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[8] 'Google Generation' web site, http://www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx.

[9] 'Trends in Library Automation: meeting the challenges of a new generation of library users', Marshall Breeding, Vanderbilt University, November 2006, PowerPoint presentation, http://www.oclc.org/research/dss/ppt/breeding.ppt.

[10] See Section 4 for a definition of this.

[11] See Section 4 for definitions of these.

[12] The consultancy brief is available at http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Images/Consultancy_Brief_Review_Information_Environment_Social_Sciences_tcm6-9390.pdf.

are not in the original report but are added for our convenience. Points of particular relevance to this Horizon Scan are italicised.)

- We believe that it is vital for the ESRC information services, and all ESRC-funded resources, to open as much as possible of their data and records to indexing by Google and other search engines. (page 4)
- Information skills' training has a bad name, with some justification, because of workshops focussing on skills which are not transferable and rapidly out of date, particularly the details of using particular databases and services. "Why can't these services be as easy to use as Google?" is the reaction. (page 5)
- We note that the mandatory deposit in open access repositories of all ESRC research results and resulting publications (*and all PhD theses*) is supported by the community and we recommend this should be pursued with vigour.
- The primacy of online search means it is vital to ensure that all resources have some sort of web presence that is indexed by Google. In such an environment, it is crucial to "Get offline stuff online" (either by digitising the resources themselves or, as is suggested by the British Academy review, by digitising catalogues of the resources). *It seems clear that, in the near future, resources which have no web presence will not be seen or used by the majority of their potential audience*. (pages 10-11)
- The search tools on existing web sites (and this is true for the environment as a whole but we have noticed it particularly during our scanning of the information environment for social sciences) are rarely good, often poor or worse. Our conversations lead us to believe that many users share our view. The more e-literate of them are going to Google and using the advanced search to search a site rather than use the site's own search engine.... Confidence is a key issue here and Google inspires confidence... For information services with limited budgets and without the power of a huge, technically powerful entity behind them, saying "Use us first not Google" is futile and should be abandoned. Saying "Use Google to find us" is much more sensible. (pages 22-23)
- Our conclusion is that the semantic web, as foreseen by some its proponents, will have a rather limited impact on the information environment for social science research in the near future.[13] What we do expect to see is a dramatic increase in services using a changing mixture of technologies to supply information based on its meaning and in the process accomplishing some semantic-web-like things. (page 48)

The only public response to the Review is in the 2005-2006 Annual Report[14] of IBSS, the International Bibliography of the Social Sciences, based at the London School of Economics. This signalled phased acceptance of several recommendations, in a climate of accepting the overall report. Among other things IBSS noted:

- The ESRC Review of the Information Environment for Social Sciences Researchers provided very positive feedback from researchers on IBSS, and led to 2007-08 funding for IBSS being released by ESRC. (page iii)
- Looking ahead to 2006-07, our major task will be bidding for continued (post-2008) funding from ESRC, and this we will do based on the recommendations of the Review of the Information Environment, and in a way that builds upon our existing strengths and the findings of our 2006 User Survey. (page iii)
- As a result of the ESRC Review, IBSS identified a number of key strategies to work toward. (page 4)
- The Review of the Information Environment noted that search engines, despite their shortcomings for precise and comprehensive research, were useful and much used tools

[13] Our italics.

[14] 'IBSS Annual Report: October 2005 to September 2006', http://www.lse.ac.uk/collections/IBSS/pdf/Annual%20report%2005-06.pdf.

> for resource discovery. It therefore recommended that services work to ensure that they have a visible presence through search engines, especially Google. With this in mind, IBSS has already made the following changes...
>
> - IBSS is also investigating exposing some of the data itself, though this is a longer term project. (page 5)

The work to ensure that all PhD theses are available is now ongoing – see the report from ETHOS in 2007.[15]

A search for 'information environment' on each of the web sites for other research councils – Arts and Humanities, Biotechnology and Biological Sciences, Engineering and Physical Sciences, Medical and Natural Environment Research Councils – reveals only a handful of hits, and none relevant.[16] It is not clear what to make of that especially since it is unlikely that researchers funded by AHRC for example are more technically expert than those funded by ESRC. One theory is that the demands of e-Science have driven many other issues from the headline agenda.

3.3.4 Challenges

The key challenges for library services arising from the 'Google Generation' may be summarised as:

- Undergraduate and increasingly researcher experience of the wider online world in terms of work flows (such as discovery to delivery in an aggregated service such as Amazon), tools (such as search and recommendation) and collaboration (learned through wikis and book marking as well as social networking)
- The implications of that experience for perceptions of interface, efficiency and ultimately use of time
- The disruptive impact of Web 2.0 thinking, albeit over a longer time, on scholarly behaviour – ranging from research methods to judgements on authority

Underlying all these is a fundamental attitude which is growing in respectability in the world of commerce and public service as well as in the minds of young people – crudely characterised in the judgements that 'if you can't Google information, it doesn't exist' and 'if the services are painful to access, they'll not be worth using'. In stark McLuhanesque terms, the medium is taken as wholly representative of the message.[17]

However, in any fast moving area, it is not necessarily essential or even desirable to be the early bird – the key is getting both the response and the timing right. As Terry Mayes wrote in the HE Academy weblog in response to the 2007 JISC Learner Experience report:

> *the conclusions make fascinating reading, and contain the following interesting, and to my mind, important principle: "if universities want to take advantage of, for instance, web 2.0 or distributed learning systems, they could choose the launch time carefully, waiting until the target audience have already been 'trained' by consumer systems, and then presenting adaptations of the systems that audiences are already familiar with.*

3.4 The External Environment ('Out There')

3.4.1 Technology

There is no possibility of identifying the full technology picture even in the medium term. We are aware of how the industry as well as education has been unprepared for successive waves of hardware, software and network developments over the past decade; consider the web, search

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[15] 'EThOS – the Electronic Theses Online Service', 2007, http://www.jisc.ac.uk/publications/publications/pub_ethosbp.aspx.

[16] A recent search on PPARC suggested rather more of a footprint.

[17] For an informal overview see http://en.wikipedia.org/wiki/The_medium_is_the_message.

engine application, music downloads, text messaging and the take up of mobile in all its forms (from laptop to phone). Even is a climate of constant and uncertain change, there are however assumptions we can make and attitudes we can take.

Notably, we should:

- assume digital access devices and broadband connectivity are pervasive across the HE audience – and make that happen rather than investing in alternatives
- think mobile in terms of new procurements and service developments – ensure everything works regardless of IP address and device type and is reliably persistent for the person on the move
- watch the domestic market (as opposed to the business market) for the trends that will matter to the learner and will bite quickest and hardest; likewise, watch the schools environment for the learning habits arising from the Harnessing Technology drive[18] and large scale programmes such as Glow[19] in Scotland
- consider efficient tools for creation and publication will become increasingly important, especially in the HE community
- value learner ideas and attitude as the wellspring of ideas and even applications
- watch out for influences from peripheral fields and leverage them before they become threats (Google being a prime example in recent years)
- encourage agility in systems development – the 'beta forever' culture[20] is dangerous in terms of quality but can be powerful with the right management

These assumptions and attitudes will generate demands of the corporate technical infrastructure and the conditions under which it is operated (way beyond but not ignoring the LMS).

Service Oriented Architectures (SOA), using technologies such as Web Services, provide dynamic and flexible approaches to system integration and reflect the motivations behind the JISC Information Environment.[21] SOA are crucial as the manageable means of defining and providing interfaces (open and closed) in a rapidly changing solution space, an issue right across the HE information environment. The two key principles are:

- Ensuring Agility – whilst SOA provides the design and development method, open source should be considered as the source of building blocks that will enhance agility – the ability to respond quickly with reliable code and to work across corporate boundaries without licensing blockages
- Driving Value – whilst open source offers opportunity to derive value from software development across a potentially global community, it is 'Software as a Service' (SaaS)[22] that could make the most significant difference in terms of getting what you need when you need it, by leveraging consortium buying power and perhaps by providing the service underpinning for the possibility of HE assets achieving a critical mass of 'network effect' (see later).

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[18] See the Harnessing Technology Delivery Plan at http://publications.becta.org.uk/display.cfm?resID=28223

[19] For the Glow programme see http://www.glowscotland.org.uk/about/index.asp

[20] For more on this see the high-ranking hit 'Beta today, beta tomorrow, beta forever' at http://informl.com/2008/01/18/beta-today-beta-tomorrow-beta-forevah/.

[21] For a brief introduction to this topic see the article 'Service-Oriented Architecture Introduction' by Michael Stevens at http://www.developer.com/services/article.php/1010451. (The wikipedia article is not recommended.)

[22] A software application delivery model where a software vendor hosts and operates an application for use by its customers over the Internet. For a reasonably neutral and user-oriented view of SaaS see the article 'The Truth About Software as a Service (SaaS)' on the CIO web site at http://www.cio.com/article/109706/The_Truth_About_Software_as_a_Service_SaaS_.

3.4.2 Media

The world of media is changing beyond recognition – especially the relative cases for print and electronic sources, regardless of how they are managed.

It is evident that the realities of the web and of network capacity (notably as an end-to-end discovery-to-delivery channel)[23] have transformed the possibilities for electronic delivery. Whilst issues remain relating to such as business models and the roles of intermediaries, the direction of travel of clear. It may be assumed that e-books will become pervasive realities on the foreseeable horizon, changing the requirements for library book stock. Such developments may offer transformative opportunities, potentially including consortium models. For example, putting access to physical book stock principally on a regional or specialist Inter-Library Loan basis might transform far more than acquisitions and cataloguing and would certainly devalue the local LMS.

Multimedia, cross-platform hybrids and other large scale digital media requiring real time delivery (as opposed to file download) present their own challenges. Consider examples ranging from simulations to virtual laboratories to mixed media 'datasets' generated by publishers, projects, researchers or students. In curatorial or delivery terms, these are neither the concern of the LMS nor the VLE (perhaps the VRE, however that is defined[24]) – though LMS vendors may wish to fill this space with a 'solution'. However the challenges require the combined attention and skills of the librarian and the service provider.

User participation in publishing presents a further media challenge. To some extent nothing has changed for libraries accustomed to taking responsibility for theses and other local research publications. Furthermore VLEs and e-portfolios offer space for undergraduate deliverables. However we should recognise an increasingly complex set of relationships between the canonical (a published resource) and the formal and informal inputs that will be increasingly be regarded as parts of the whole. For example, as librarians or archivists or researchers, will we come to care about the workgroup weblog underlying the 21st century equivalent of Einstein's Theory of Relativity?

3.4.3 Web 2.0

Tim O'Reilly's thinking on Web 2.0 included the following definition from his blog in 2005:[25]

> *Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an 'architecture of participation', and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.*'

There is no doubt that Web 2.0 has very particular implications for library services. There is however a real danger that Web 2.0 and its application in the world of the libraries (sometimes called Library 2.0)[26] becomes an ill-defined catchall, representing 'all things to all people'.

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[23] NISO, the (US) National Information Standards Organization, has some useful resources on this concept. See for example 'Discovery to Delivery: Solutions to Put Your Content Where the Users Are' at http://www.niso.org/news/events_workshops/D2D-06-wkshp.html.

[24] JISC defines the purpose of a VRE as to help researchers in all disciplines manage the increasingly complex range of tasks involved in carrying out research. 'A VRE provides a framework of resources to support the underlying processes of research on both small and large scales, particularly for those disciplines which are not well catered for by the current infrastructure.' See http://www.jisc.ac.uk/whatwedo/programmes/programme_vre.aspx.

[25] 'What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software', http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html.

[26] For an introduction to Library 2.0 see the article 'Library 2.0: Service for the next-generation library' by Michael Casey and Laura Savastinuk in Library Journal, January 2006 – http://www.libraryjournal.com/article/CA6365200.html.

In service terms, the Web 2.0 label tends to be used in two different ways, those differences being important for the context of this investigation:

- Diffusion – involving such as blogs, syndication (RSS), mashups and RIA[27]
- Concentration – driven by major data hubs which are characteristic of so much of our internet use (e.g. both the generalist like Google, flickr, Facebook, and the specialist like Amazon, Propertyfinder and etree)

Whilst social networking underlies both of these, it is important to recognise that the critical factor on the library horizon is the 'ownership' (perhaps better expressed as 'exploitation' or 'leveraging') of the means of the concentration and diffusion.

A 2008 perspective in the library services context is offered by a member of the JISC SCONUL LMS Study Reference Group:

> *It seems the main factor is the network effects generated by the major data hubs. They may 'diffuse' some of the benefits through service and data syndication, APIs, participation, etc, but their value derives from successfully driving those network effects through wide participation, from consolidation of data and from mobilizing usage data to improve their services. Of course their success may also depend on the diffusion features and on co-creation with a large user community.*

It is essential to tie these impacts down to real changes in the use of data which drive both business intelligence and better user services where individual institutions do not scale. Examples include:

- aggregating user data across sites (e.g. click counter data)
- aggregating user created data (tags, reviews)
- aggregating transactions (e.g. circulations)

There are profound challenges about the relationship of an isolated library service to these types of services, and whether libraries (individually or even jointly) should be trying to generate these types of aggregate services.

Applying Web 2.0 principles to libraries, Jack Maness of the University of Colorado observes:

> *While Library 2.0 is a change, it is of a nature close to the tradition and mission of libraries. It enables the access to information across society, the sharing of that information, and the utilization of it for the progress of the society. Library 2.0, really, is merely a description of the latest instance of a long-standing and time-tested institution in a democratic society. Web 2.0 and libraries are well suited for marriage, and many librarians have recognized so.*

However, Maness goes on to identify a range of shifts from Library 1.0 to Library 2.0 practice and services which have significant implications from professional practice to systems design. For example:

- Controlled classification schemes > Tagging coupled with controlled schemes
- OPAC > Personalized social network interface
- Catalogue of largely reliable print and electronic holdings > Catalogue of reliable and suspect holdings, web-pages, blogs, wikis, etc.

3.4.4 Business Models

We complete our review of the drivers 'out there' by considering the business models that have emerged from the take-off of the network economy. Whilst recognising that critical mass of online activity in most areas has only moved beyond the viral 'tipping point' in very recent times

[27] RSS – see http://en.wikipedia.org/wiki/RSS_(file_format).
Mashups – see http://en.wikipedia.org/wiki/Mashup_%28web_application_hybrid%29.
RIA, Rich Internet Application – see http://en.wikipedia.org/wiki/Rich_Internet_application.

(for example, perhaps Christmas 2005 for shopping), there are specific business models that have made that possible.

In the world of information services, within which HE libraries operate, three complementary models are noted:

- **Aggregation** of metadata wins over federation of targets when it comes to search (Google) and even more for delivery (the Amazon marketplace operating as a one stop supply chain behind Amazon.com)
- In a Web 2.0 world in which user input is integral to the desired service (e.g. recommendation based services such as book or CD shops) gaining **the 'Network Effect'** is the key to maximising value and potentially to reducing the unit cost. A service needs to determine the reach that would give the best cost / value return; for example, a consortium of HE libraries with a shared catalogue would benefit from critical mass of reader feedback and click patterns as well as from reduced maintenance costs. However, taking the service beyond the HE community might introduce undesirable network effects, such as casual traffic and poor quality user inputs.
- **The 'Long Tail**' represents a new opportunity for such as subject specialists – this simple business equation is based on the fact that a specialist service (e.g. a unique collection) has little local mass but is highly likely to have critical mass with sustainable community loyalty in a wider geography (e.g. The legal file-sharing community using Bit Torrent).[28] In many cases that will be global, though national or regional may be 'sticky' in specific cases, perhaps restricted more by licensing than by the community of interest.

Each of these models involves critical mass and reach, raising questions about the value of service partners focused solely on the local market.

We close this section with an example from 'out there', which illustrates the business models of the 'Network Effect' and the 'Long Tail', based on many of the technological assumptions described here. The legal music file sharing community from which these statistics are drawn includes etree.org where you can see one of the most compelling examples of the Long Tail on one web page.[29]

At the moment of writing there are 1.357 million people active online at this Bit Torrent based service, using a download technology that works for music, video and any large scale media. With extensive metadata and an interactive review capability linked to every torrent (i.e. catalogue item), this service represents a classic combination of concentration and diffusion. Here are three examples of what the users are doing:

- In past week 81 people worldwide have downloaded the 310mb file set of a 1973 concert by the bluegrass combo, the Seldom Scene
- Meanwhile 161 people have found the network and disc resources to download a 4gb 1971 concert series; 44 people are currently assisting 8 latecomers and so it will go on for some weeks
- Less pre-historically, 2180 people have downloaded the 809mb recording of a November 2007 concert by Phil Lesh.

[28] See http://www.bittorrent.com.
[29] See http://bt.etree.org.

3.5 The Library Context ('In Here')

3.5.1 The Library Business Case

The Corporate Case

Opinions relating to recent publications such as the 'Google Generation' report indicate that libraries need to express their business case (even their core raison d'être) unambiguously in terms of their HEI's corporate rationale.

That is not to suggest that heads of library and associated converged services are not already operating in that mode. However, there is a sense that such rationale needs to be even sharper and more explicit as we enter in to an era in which both learners and researchers may ascribe increasing value firstly to what's 'out there' (both content and networked opinion) and secondly to how it's done 'out there'.

The warning signs are stronger when that patron thinking is linked to issues of economy, efficiency and effectiveness, taking account of a lower valuing of physical stocks, a convergence of the roles of learning support and library services and a sense of dislocation between LMS and mission critical corporate systems (e.g. VLE as well as MIS).

Therefore it is essential that even the greatest of libraries know their unique selling points (USP) and let others do the rest. For example:

- Work with the vendors of LMS and other applications to Identify the essential points of integration and co-operation between corporate systems, questioning duplicated functions (perhaps such as 'Patrons' and 'Acquisitions')
- Embrace the network, recognising that some things are better done by others out there (e.g. search engines), others might be done by the individual library but still out there (e.g. the National Library of Wales digitisation project for literature in Welsh),[30] others by consortia sharing assets and services, leaving a question mark over what truly needs to be maintained internally to the institution
- Consider realistically the potential of the physical and the online library to become a special space, offering things that cannot be found more easily and in better combination elsewhere – a different resource landscape than Google, a better workspace than Starbucks.
- Review the assets in terms of both content and intelligence and consider the cost / benefit business case for exploitation:
    - Unique or rare collections, exploitable in terms of metadata and / or digitisation via the Long Tail of such as subject specialties.
    - Localisation of services and resources in the context of courses, research specialties and special collections (as above)
    - Intelligence about the user community, though the advantage might not be local. The challenge may be to aggregate 'business intelligence' across network spaces and institutional boundaries, remembering that academic loyalty is primarily to discipline and that the network effect lies in speciality not geography. Whilst the 'long tail' in some disciplines must rely on a global community, JISC and its partners may find the scale to aggregate this nationally in many cases, perhaps shaping the next generation of e-Lib's subject networks.
- Take the 'high ground' by applying library expertise to new views of corporate intellectual assets, such as the long term management and 'exposure' of both research and undergraduate outputs in a multimedia and collaborative world.

[30] See http://www.llgc.org.uk/index.php?id=2.

The User Case

Whilst it is tempting to see the business case for the patron in terms of feel-good factors, libraries should be rigorous in seeking out tangible 'business benefits' from the user perspective.

Selling points for the user will include services that:

- save time or money (e.g. print on demand, optimal workflow)
- are unavailable elsewhere (especially 'out there' on the network)
- come with the kite mark of authority (e.g. direct linkages to study programmes)
- are supported by value added expertise (e.g. from subject librarians)

These principles are emphasised in a 2007 US study by ProQuest, 'Observing Students in their Native Habitat', [31] which reported that:

> *Student researchers have an overwhelming preference for online resources that make the best use of their research time … Students prefer the content available in library databases for its ability to deliver more relevant information in a single search. However, if discovery and access to library databases is more cumbersome than they expect, they will abandon library resources for the more familiar terrain of Google and Wikipedia.*

Inhibitors

The will be many inhibitors to the approaches suggested here. To name but a few, these will include:

- existing commitments to evolutionary change
- lack of finance to take risks
- professional development challenges
- unending uncertainty
- not least the shape, malleability and maintenance demands of Library Management Systems

However, there is no doubt that a strong and sustainable business case must extend beyond the reputational importance of the traditionally defined library and its collections. Furthermore it is increasingly evident that the business case must focus on success factors derived from corporate strategy and patron expectation.

The challenge for the HE library is therefore to re-position its investment and skills, perhaps based on data and co-operating services rather than physical assets, whilst staying on the institutional map as a study location of choice.

3.5.2 Service Challenges

Any horizon scan from the library perspective must seek to identify key features in the landscape rather than becoming mesmerised by the overall vista, by all that is going on – quite simply, to separate the wood from the trees.

The idea of Library 2.0, an archetypal freeform tag cloud conjured from the primeval sludge of Web 2.0, represents a classic example. Perhaps the most important thing in respect of Library 2.0 is to advocate stronger emphasis on the 'wood' (connectedness, platform, network effect) than the 'trees' (blogs, wikis, social software, Facebook, flickr, etc.). The underlying service platform is the key, not the social wraparound or the public interface or the revitalised role of 'Librarian 2.0'.

In this context the platform is what enables data to be reused in many different contexts, encouraging participation and contributing to the network effect. Amazon and Google are popular examples. Anyone can make use of Amazon web services to repurpose the Amazon data in their own service or application. It is arguable that most HE services are the opposite.

[31] For the press release on this see http://proquest.com/pressroom/pressrelease/07/20071105.shtml.

They are data silos. A service may open up access via Z39.50[32] but it is still a silo as outsiders (and even insiders in some cases) are not able to take the data and repurpose it.

Institutions must consider what it means to 'liberate' their data, to allow all comers to create new and innovative services and applications. To do so their platforms will require easy-to-use and accessible services like Amazon and Google. Once open to that model, some services will become seriously challenged. For example, do we really need around 200 Online Public Access Catalogues (OPACs) to serve the purposes of UK HE?

Given that platform, the community can look to derive both local and national benefit from innovative services on a cost effective basis. For example:

- Recommender services, which are based on a critical mass of commentary on single canonical items, as opposed to local copies
- Union catalogues, which will come back in to the frame as Amazon-like aggregators
- Smart applications, which derive intelligence from the mass of clicks and profiles within the variety of academic communities to inform the future design of workflows, to focus purchasing, to pinpoint redundancy and services to be divested to increase network effect

3.5.3 LMS Positioning

Central to this horizon scan is the positioning of the Library Management System (covering traditional modules plus relatively recent add-ons such as Electronic Resource Management and Vertical Search) in relation to the perceived landscape.

A number of inferences can be logically drawn, which (if even partially correct) may have a significant domino effect:

- The concept of a total solution or a forever expanding one stop integrated system from a single LMS vendor is anathema set against the trajectory of corporate systems and global services; the LMS is a cluster of small stars in a very large constellation.
- The LMS should find its place as a back of house application, doing things that have to be done and that no one else does better (or could do more appropriately do better in the case of VLE or MIS); bear in mind this is where the core library management modules (such as Catalogue and Serials Management) originated.
- The back of house functions must interoperate (or cooperate) with other applications – corporate (such as student and staff records, purchasing processes) and external (such as search and delivery and therefore aggregators).
- Ideally these back of house functions will be modular, though that requirement declines in importance once LMS is reduced to a much smaller back of house footprint.
- The business case for the library OPAC as a key LMS 'module' is challenged by this perspective; whilst users seem to reflect positively on a view that combines local resources with local courses (etc) , the challenge is whether this function needs to be part of the LMS or rather to exploit data exposed by the LMS.

Such a prognosis may to some extent be in conflict with the business needs of LMS suppliers, and especially those public corporations which must seek increasing returns for their investors and therefore cannot stand still. Assuming therefore a decline in the value of the core LMS solution and increasing difficulty in persuasively tacking on further modules, there may be a shake up in the LMS market.

Given this backcloth, three possibilities should be considered very seriously:

[32] A client server protocol for searching and retrieving information from remote computer databases. See http://en.wikipedia.org/wiki/Z39.50.

- It may be unadvisable to engage in the **procurement** a new, replacement or significantly upgraded LMS in this climate
- It may become essential for the 'community' to have the option of **open source** LMS modules that might be economically developed (globally) and implemented (perhaps by consortia)
- It may be the right time to review the value of **consortia**, not just for purchasing purposes but also with a view to the radical re-casting of services on a shared or out-sourced basis (perhaps based on SaaS); this would apply to both physical and electronic services (e.g. book stock and e-books) and should be considered on a case by case basis.

It should be noted that sub-national geographic proximity is just one basis for consortium formation, others including subject networks (which might be international) and shared service vendor groupings. Considerations will include

- common management vision, balancing value against reputational threats
- existing shared facility arrangements, as already exist over a number of remote campuses (such as Medway and Tremough, near Falmouth)
- enhanced or reduced collection, based on shared specialties or conversely lack of shared specialties

3.5.4 Corporate Implications

Much of what is on the horizon suggests the threatening likelihood of disruptive change and also the potential for pre-emptive transformation.

The issues apply to both research and teaching centred services and therefore to all types of institution. Furthermore it is reasonable to suggest that size and location are not significant factors in mitigation, simply because the challenges relate to the ability of services (ranging from Google to Intute, from Amazon to etree) to benefit their patrons and to exploit their assets by exploiting the potentially global network effect.

Some of the corporate implications for HE institutions have been detailed above. We conclude this section with a summary checklist:

Human Resources and Professional Change

- Levels of library staffing, relating to 'traditional' roles
- Roles and skill sets of library staff (e.g. relating to learner support, cataloguing)
- Business process changes (e.g. Acquisitions)
- New approaches to authority, authorisation and authenticity
- Increased dependency on cross-service working (e.g. Information Systems, Knowledge Management, Library & Learning Support)

Systems

- Requirement to expose data and services
- Risks (and potential benefits) of an 'always beta' systems culture
- Integration required to right size the LMS footprint
- Possible dependency on vendor cooperation

Wider

- Challenge of establishing new licensing models with publishers
- Reputational impact of change and collaboration relating to the library
- Opportunity to re-purpose significant intellectual assets (for those who have them)

3.6 Vision for Development ('a place in both worlds?')

3.6.1 Achieving critical mass, maximising value

We introduce this section with a contribution from a member of the LMS Study Reference Group:

> *Rather than creating their own online one-stop-shops using environments created by library system suppliers, libraries really need to surface their resources in the online environments already inhabited by their users. This is something discussed in several places by Lorcan Dempsey, for example.*
>
> *Such an approach implies a more open architecture using standards and protocols to be able to move structured information around so that it can be presented in other places. We cannot expect users to come to us, but should rather design systems that can go out to them. We should be able to present library-managed information and services in institutional environments such as VLEs and institutional portals, as well as in other [external] environments such as Google Scholar and iGoogle.*
>
> *If implemented, systems like this would mean that information managed by the library could become far more prominent in the online lives of learners and researchers instead of running the risk of being sidelined by Google, etc.*

The model is that the availability of easily re-usable data ('consumable' through web services) encourages innovation, increasing use and higher visibility in a virtuous cycle, yielding critical mass for the user and the service provider. Consider what Tim Spalding has done with catalogue records in LibraryThing, which is now one of the largest 'libraries' in the world.[33]

The biggest driver in the liberation of data and services is the removal of barriers – technical and commercial. If the barriers to participation are low then this will encourage a 'network effect'. For example, the more people that sign up to Facebook the better (broadly) it is. That is one reason why Skype is free. The Union Catalogue offers a library oriented example, for which value would be a function of such as:

- the more people contributing their metadata (formal and grey publications, other objects of all media types), enhancing coverage
- the more people contributing such as recommendations and reviews, adding value from all angles
- the more activity passing through, yielding more robust click counter data
- balanced with the quality of participation or filtering thereof, which is where personal profiles may be the HE community's major asset

However, it would be dangerous to restrict our thinking to the traditional (though essential) workflows and processes of the Discovery to Delivery (D2D) cycle. The Web 2.0 experience emphasises that the user as participant, rather than just as consumer, needs to be central to the process model. As a member of the LMS Study Reference Group observed:

> *While D2D [the Discovery to Delivery process model] has served us well up until now, we need to start thinking more about what happens before the first 'd' and after the second. D2D is in fact only part of what I would term user 'creativity cycle' whereby people create innovative objects (in any medium they care to), expose them to others, contribute to others' objects, discover new stuff, get it, modify it, re-purpose it, use it to create something new and so on round the cycle. We could call this a C2C [Create to Curate] model which circles round the core concept of creativity.*

[33] See http://www.librarything.com.

This view is well aligned to library landscapes proposed elsewhere[34] (see the Collection Management quadrant) as well as to the thinking on participation and publishing underlying Web 2.0 more broadly. Institutional repositories are one of the early services which academic institutions are putting in place to support this emerging cycle, though the components are not yet integrated to support the likely workflows. The challenge is whether academic libraries are well placed and agile enough to facilitate their users in exposing and re-mixing content. Certainly, they have key strengths in the curatorial part of the cycle, if they have the mindset and the resources.

3.6.2 The Approach – Liberation

This final section provides a high level summary of the approaches to deliver these objectives, which are already highly developed in both commercial and free services across the web. Whilst these services may be characterised as being inspired by Web 2.0, we need to recognise the business and technical models underlying what is often portrayed as a social phenomenon. These were summarised in the External Context section of this report as concentration and diffusion supported by exposure through Web Services (SOA).

Expose

- Data and services must be 'liberated' – surfaced and freely exposed for re-use and wider exploitation by anyone (subject to unavoidable licence constraints)
- Libraries will need to understand the real barriers (political, legal, financial) to their exposing consumable data, content & services
- Originators and curators, such as libraries, should not be concerned with the shape and scale of the resulting services – they may be personal, collaborative, institutional, sector wide or domain specific, global.

Re-use

- The result will be opportunity for fusion (perhaps synergy is a helpful alternative) – exploiting canonical data by re-purposing, remixing or mashing it up. Whilst the use of Google Maps is the most common mash-up example, it is no coincidence that remixes and mash-ups originate in the music industry, which passed ahead of others down the path of financial and intellectual deconstruction and reconstruction in the digital age.
- Developers of services should be concerned about hitting the network level to suit their purposes, to maximise the network effect or to engage the long tail
- Libraries may not be best placed to develop the end services
- The community should engage with disruptive innovation, encouraging information professionals to lead the way with services of specific value, as exemplified by such as LibraryThing.
- Professional development should address head on issues of intellectual authority and loss of control, alongside introducing the skills for librarians to 'do it for themselves'.

Participate

- There is a fundamental pedagogic link between the enfranchisement of individual participation in the library domain and the national policy objective of greater personalisation in learning
- All players (students, lecturers, researchers, learning support staff and librarians) must be free to contribute through such as recommendation and other forms of interaction
- Some participation will use local services, some will take data to spin new services
- Whilst some forms of participation can be set up locally at low cost (such as tagging and recommending), instigators should always consider the mass of the network effect

[34] See http://www.slideshare.net/lisld/library-landscape-large-2007-04/

- Links to peripheral 'stuff' such as social networks and ephemeral information should not be judged as 'off model'.

Optimise

Library managers will be seeking to optimise (enabler, enhance) key patron facing processes. These will include workflows such as:

- Discovery to delivery for electronic, print on demand and physically deliverable items
- Search models involving historically distributed resources
- Decision support through qualified recommendations and statistically validated user pathways ('Other people did this').

3.7 Exemplars

3.7.1 Library thing

http://www.librarything.com/

Description of the service (adapted from Wikipedia)

LibraryThing is a prominent social cataloging web application for storing and sharing personal library catalogues and book lists. LibraryThing was developed by Tim Spalding, a web developer and web publisher based in Portland, USA (not a librarian!) and went live on August 29, 2005. By its one-year anniversary in August 2006, LibraryThing had attracted more than 73,000 registered users who had catalogued 5.1 million individual books, representing nearly 1.2 million unique works. By February 2008 the figure was more than 23 million books catalogued.

Users (informally known as *thingamabrarians*, a term coined by contributor RJO) can catalogue personal collections, keep reading lists, and meet other users who have the same books. While it is possible to keep a library catalog private, most people choose to make their catalogs public, which makes it possible to find others with similar tastes. Thingamabrarians can browse the entire database by searching titles, authors, or tags generated by users as they enter books into their libraries.

Libraries can also make use of Library Thing. Library Thing for Libraries[35] (LTFL) lets libraries add tag-based browsing, book recommendations, ratings, reviews etc to their OPAC.

Business model

The LibraryThing website displays Google AdSense advertising on work and author pages for users that are not logged in, and receives referral fees from online bookstores that supply book cover images. Individual users can sign up for free and register up to 200 books. Beyond that limit and/or for commercial or group use, a subscription fee is charged. Online bookseller Abebooks bought a 40% share in LibraryThing in May 2006 for an undisclosed sum

Significance for the LMS Study

- This is an exemplar of the re-use of library metadata for a Web 2.0 Social Networking site. The site uses MARC records from Library of Congress and many other libraries. In February 2008 Talis and LibraryThing partnered. In return for access giving LibraryThing users access to two core databases (The British Library catalogue and a union catalogue of over 6 million records, catalogued by public and academic libraries in the UK over the last 30 years) within their Talis Base service, Talis customers will gain access to LibraryThing book jackets and ratings data.

[35] http://www.librarything.com/forlibraries/

- LibraryThing demonstrates that even very conventional 'library' (meta)data can be repurposed for something librarians themselves may not have thought about in advance.

Lessons to be learned

- Value is not so much in the (meta) data itself but rather in how it is used.
- JISC and SCONUL should consider encouraging libraries and services to expose metadata more widely to enable imaginative re-use in innovative applications.
- JISC is perhaps well positioned as a pan-HE (and FE) body help lower administrative, technical and legal barriers to data re-use. For example they should look at the applicability of 'The Open Data Commons Public Domain Dedication and Licence', [36] which is the basis for The Talis/LibraryThing partnership.

3.7.2 Google

http://www.google.com/

Description of the service (adapted from Wikipedia)

Google is largest search engine on the web and indexes a portion of the total amount of web pages. Google.com uses a patented algorithm called PageRank to rank web pages that match a given search string. The PageRank algorithm computes a recursive score for web pages, based on the weighted sum of the PageRanks of the pages linking to them. The PageRank derives from human-generated links, and so correlates well with human concepts of importance.

The exact percentage of total of web pages that Google indexes, is not known as it is very hard to actually calculate. Previous keyword-based methods of ranking search results would rank pages by how often the search terms occurred in the page, or how strongly associated the search terms were within each resulting page. In addition to PageRank, Google also uses other secret criteria for determining the ranking of pages on result lists, reported to number over 150.

Users can customize the search engine somewhat. They can set a default language, use 'SafeSearch' filtering technology (which is on 'moderate' setting by default), and set the number of results shown on each page. Google has been criticized for placing long-term cookies on users' machines to store these preferences, a tactic which also enables them to track a user's search terms over time. It retains this data for more than a year.

Non-Web sources of data including library catalogues

Despite its immense index, there is also a considerable amount of data in databases, which are accessible from websites by means of *queries*, but not by links. This so-called deep web is minimally covered by Google and contains, for example, catalogues of libraries, official legislative documents of governments, phone books, and more. By default the 'Library Search' option in Google Scholar links to library holdings via OCLC's WorldCat platform. The Talis platform (UK libraries only) will also provide a link to library holdings but has to be actively selected in the Google Scholar preferences. COPAC[37] is also looking at providing such a link to holdings service from Google.

Business Model

Google gets its revenues from online advertising related to its Internet search, web-based email, online mapping, office productivity, and video sharing as well as selling advertising-free versions of the same technologies

Significance for the LMS study

- Google is a clear demonstration of the advantage of *aggregation* (as opposed to federated search for example) technologies to search massively large distributed content.

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[36] http://www.opendatacommons.org/odc-public-domain-dedication-and-licence/

[37] http://copac.ac.uk/

- Google (Scholar), in combination with the OCLC WorldCat platform, provides a richer and more fulfilling 'catalogue' experience that most individual library OPACs and UK union catalogues (e.g. COPAC M25). For example it includes reviews, author notes linked articles and alternative (e.g. purchase via Amazon) routes to fulfilment.
- There is potential for a combination of Google, a library platform (that aggregates and exposes data to Google) and standard (potentially OpenURL) that enables library fulfilment (deliver and request) to transform the traditional OPAC dominated discovery to delivery paradigm in HE libraries. COPAC, OCLC and other have already developed the request transfer message[38]- a Community Profile of OpenURL to enable inter library requests to be made.

Lessons to be learned

- There is genuine value in libraries exposing their (mostly currently hidden) catalogue (Meta) data to Google and alternative search services.
- This is most effectively done by a shared 'platform' (such as OCLC WorldCat) that can, not only make the job easier (no need for each individual library to do it) but, on the basis of a significant aggregation, is also able to get the attention of Google.
- The Google+ library platform combination now provides direct competition to conventional library OPACs and union catalogue services like M25 and COPAC. These will need to look at how they can offer *competitive* advantage to justify their cost over what is a free (or low cost) and pervasive service.

3.7.3 Amazon

http://www.amazon.co.uk/

Description of the service (adapted from Wikipedia)

Amazon.com, Inc. is an American e-commerce company based in Seattle, USA. It was one of the first major companies to sell goods over the Internet. Founded by Jeff Bezos in 1994, and launched in 1995, Amazon.com began as an online bookstore but soon diversified its product lines by adding VHSs, DVDs, music CDs, MP3s, computer software, video games, electronics, apparel, furniture, food, toys, and more.

Amazon has established separate websites in Canada, the United Kingdom, Germany, Austria, France, China, and Japan. It ships globally on selected products

Business Model

As well as being on online retailer itself Amazon is a 'platform'. The Web sites of Borders (borders.com, borders.co.uk), Waldenbooks (waldenbooks.com), Virgin Megastores (virginmega.com), CDNOW (cdnow.com), and HMV (hmv.com) are powered and hosted by Amazon. Amazon.com powers and operates retail web sites for Target, the NBA, Sears Canada, Sears UK, Benefit Cosmetics, Bebe Stores, Timex Corporation, Marks & Spencer, Mothercare, and Lacoste. It also powers AOL's Shop@AOL service via Web Services technology. Amazon provides a variety of web services to enable developers of other applications to make use of Amazon content and services.

Significance for the LMS study

- Amazon is preeminent as platform for discovery and delivery of books. (As noted above it has now extended beyond books). It was an early demonstration of the value of the long tail. 'As the costs of production and distribution fall, especially online, there is now less need to lump products and consumers into one-size-fits-all containers. In an era without the constraints of physical shelf space and other bottlenecks of distribution, narrowly-targeted goods and services can be as economically attractive as mainstream fare'.[4]

[38] For background and details see http://www.oclcpica.org/content/1409/xsd/RequestTransferMessage_v5.doc

- As a *marketplace* platform for books it has attracted second hand booksellers and even individuals who now have a global market for their wares and do not have the barrier of cataloguing their stock or setting up their own web presence/e-commerce system.
- Libraries use it to purchase material and some have used it to get better value for their 'withdrawn' stock sales. Amazon.com has established a specific service for libraries[39] that provides books with protective jackets and even a MARC record service.
- Amazon's 'catalogue' is now the benchmark against which many users will judge their library catalogue experience. Amazon provides much 'enhanced content such as review, blurbs, book jackets and recommendations
- A key element of Amazon is it recommendation service which is based on tracking the search and purchase history of users. Based on a large aggregation of user activity it can be uncannily prescient for regular customers. Users can also actively improve the recommendation service by 'rating' their past purchases.

Lessons to be learnt

- Aggregating data and a global web presence provides a market for much material that would otherwise stay on the shelf. This has had an effect in lowering the costs of book purchasing. This kind of model might be usefully applied to fulfilment in a library context (e.g. what is now known as Inter-Library-Loan –ILL)
- Amazon is a prime example of the value of the aggregating users' clickstreams to determine relevance. User *behaviour*, as manifested in their clickstream, *automatically* provides relationships between books. This is information about books that is not included in the catalogue record itself. Users are additionally able to 'refine' their own 'context' by rating their purchases.
- It terms of the 'customer experience' most library OPACs rate poorly against Amazon in terms of the range and depth of information about resources they provide. They are also poor at offering alternative fulfilment mechanisms. If a book is not available new in Amazon it is often available second hand from an alternative source (but still via the Amazon 'marketplace' so it feels like you are getting it from Amazon). Why don't libraries routinely offer such alternatives?

3.7.4 Intute

http://www.intute.ac.uk

Description of the service (adapted from information on the Intute website and Wikipedia)

A free online service (hosted by MIMAS) providing access to *authoritative* Web resources for education and research. The service is created by a network of UK universities and partners. Subject specialists select and evaluate the websites and write high quality descriptions of the resources. The database contains ca.120, 000 records. The basis of the Intute service is a large database of resources submitted and edited by subject specialists. Each resource is reviewed and described via various metadata fields, such as which subject discipline(s) it will be useful to, what type of resource it is, who created it, who its intended audience is, what temporal or geographical coverage the resource has, and so on. Intute was formed in July 2006 after the merger of the eight semi-autonomous "hubs" that formed the Resource Discovery Network (RDN). These hubs each served particular academic disciplines:

Altis	Hospitality, leisure, sport and tourism
Artifact	Arts and creative industries
Biome	Health and life sciences
EEVL	Engineering, mathematics, and computing
GEsource	Geography and the environment
Humbul	Humanities

[39] The Librarian's Store http://www.amazon.com/Librarians-Corporate-Accounts/b?ie=UTF8&node=13753131

PSIgate	Physical sciences
SOSIG	Social sciences

The restructuring and re-branding was undertaken to create a service with a more uniform identity and appearance, better cross-searching facilities, and more focused technical and management teams. As part of the restructuring, the eight RDN hubs were reorganised into four subject groups.

The Intute repository search

Intute has been commissioned by JISC to develop a repository search infrastructure. This development will build on the ePrints UK project, and aims to facilitate the discovery, access and retrieval of material. In doing so, the project aims to raise the visibility of repository content and perpetuate the deposit of content. The project initially ran from March – August 2006. The second phase of the project will run for three years from September 2006 – August 2009.

Business Model

Intute is free to access. Grant funding (c £1.5m) pays for hosting and includes in house cataloguers at the seven key institutions and external staff on a per record basis. The service is being evaluated by JISC and AHRC.

Significance for the LMS study

- Intute offers a personalisation service, 'MyIntute', which enables users to tag records, set up email alerts, export data, and construct remotely-maintained lists of resources that can be used as reading lists.
- It also offers the Virtual Training Suite, with over 60 free online tutorials teaching Internet research skills for most of the subjects taught in UK universities and colleges.
- The Intute Integration service enables users to customise and export Intute content to their own web pages or VLEs. This includes newsfeeds, an embedded search box and MyIntute (where users can save Intute content in their own online space, tag and export it). Machine-readable interfaces to the database are available using the Z39.50, Search/Retrieve Web Service and OAI-PMH protocols.
- A collection of bookmarks showing examples of how universities or colleges have integrated Intute content is available on del.icio.us.

Lessons to be learned

- Demonstrates the value of a community based effort in locating and describing authoritative web resources. For specific subject areas there may still be value in a traditional 'cataloguing' approach to the web.
- Exemplar of a JISC Web services: Intute can be 'embedded' in other services. It also uses Web 2.0 technologies, for example in employing RSS to report new addition.
- Uses Opensearch[40] (developed by Amazon –A9) so didn't have re-invent a the search capability—just took it as a service from the web
- The additional Intute repository search project shows how the HE community can provide sector wide access to repository content and importantly *deliver* the resource - not just find out where it is.

3.7.5 Vertical Search

Encore : http://www.encoreforlibraries.com/

Primo: http://www.exlibrisgroup.com/category/PrimoOverview

AquaBrowser: http://www.medialab.nl/

[40] OpenSearch is a collection of simple formats for the sharing of search results. The opensearch.org website was created by A9.com, Inc., an Amazon.com company. The web site is maintained by members of the OpenSearch community. http://www.opensearch.org/

Description of the service (adapted from Wikipedia and vendor web sites)

Vertical search, part of a larger sub grouping known as 'specialised' search, is a relatively new tier in the Internet search industry consisting of search engines that focus on specific businesses. Niche search engines are not new. Web sites that help users find people, shop and get business information have existed for years. But the number of these search engines being introduced has greatly increased in recent years. Local search is already a burgeoning subset, with Google Local and many newspapers offering this functionality. The rationale for vertical search is that, although users are sometimes looking for all the information they can get, (and for that the likes of Google and the Yahoo search engines are used), often they are looking for something very specific related to their businesses. In the library domain we can characterise new products such as Encore (Innovative Interfaces), Primo (Ex Libris) and AquaBrowser (Media Labs/CSA) as 'vertical search' applications. Whilst they are not targeted at a specific *topic,* they are targeted at a specific *business channel* of (in HE) undergraduate and postgraduate research. Google Scholar might be considered a vertical search application.

Vertical search vs. broad-based search

Broad-based search engines such as Google or Yahoo fetch very large numbers of documents using a Web crawler. Another program called an indexer then reads these documents and creates a search index based on words contained in each document. Each search engine uses a proprietary algorithm to create its indexes so that, ideally, only meaningful results are returned for each query.

Vertical search engines, on the other hand, send their spiders out to a specialised set of databases/resources. Ex Libris expresses it like this. 'Primo is designed to work with standard integrated library systems (ILS) and other library applications, regardless of vendor. Built-in pipes enable harvesting of library collections—the library catalogue, digital repositories, and knowledge bases (such as the SFX and MetaLib KnowledgeBases)'.

As the broad-based search engines have become broader still, so have their search results. This has become increasingly frustrating to users who have turned to search engines to find information on a specialised topic, be it local information, travel sites or specific business channels. A vertical search product will deliver more relevant results for its target audience than a broad search application. LookSmart, an online media and technology company that has launched more than 180 vertical search sites, contends that Web users will increasingly use the Internet the way they do cable television, opting for specialized channels that speak directly to their concerns. This company says vertical search engines will chip away at Google's and Yahoo's audiences the same way cable TV channels such as TLC and the National Geographic Channel have eaten into network audiences.

Business Model

Library Vertical Search products are sold as straightforward commercial application software. In some instances (e.g. AquaBrowser) they can be made available as a hosted (or SaaS) solution.

Significance for the LMS study

- 'Vertical Search' products represent the LMS vendors' response to the Google 'metaphor'. This is the battleground upon which the conventional LMS vendors have raised their standard. If we look at the wider global search context it can be seen that vertical search is not uncommonly perceived by as having genuine value against the broad based Google search approach. So it is not unreasonable to think it might have value in the 'library' domain.
- Aggregation is a key technology -over federated search. Products still have to incorporate federated search, as they currently can't aggregate all e-journal resources--- but this is likely to change.
- Primo for example makes discovery a 'service' that can be 'consumed' by external systems (like a VLE or a Portal).

Lessons to be learned

- Other (non library) domains do not necessarily see Google as the *only* player in search so there may be a positive message here for libraries. Clearly Google itself saw some value in a 'scholarly' approach or it wouldn't have introduced Google scholar. However Google's business model at the moment is advertising and the scholarly market may not be that important to it.
- Aggregation is (once again) a key attribute to the success of this approach.
- Library vertical search products have started to do something about 'personalisation' but it is not very remarkable. Currently there is no evidence of them exploiting the user's 'context' as expressed in clickstreams. This would require a bigger user base than simply a single HE institution.

3.8 Summary of key points

Key point	Section(s)
Assumptions	
Whilst issues of demographics, learner diversity, fee structures and even carbon reduction will ripple through university planning, none are as immediate in terms of impact on library services as the march towards ubiquitous broadband access underpinned by a wide range of mobile devices. In that context the web and its associated technical standards will continue to dominate.	3.2.1 3.4.1
To spot the breaking wave watch the domestic market (as opposed to the business market) for new trends, value learner ideas and attitudes, watch out for and leverage influences from peripheral fields.	3.4.1
The moves by publishers towards more open access to electronic versions of journals will continue, extending slowly to books, but progress will be patchy and inhibited by cost barriers.	3.2.2 3.4.2
An innate conservatism among academics and students will dictate that the resources they will be required to retrieve will continue to be largely textual in nature for the majority of courses	3.2.3
The User Experience	
Key challenges for library services arising from the 'Google Generation': (a) impact of the wider online world in terms of workflows, tools and collaboration; (b) perceptions of interface, efficiency and ultimately use of time; (c) disruptive impact on scholarly behaviour	3.3.4
Discovery to Delivery (D2D) processes are only part of the emerging user 'creativity cycle' (C2C - Create to Curate) whereby people create and expose innovative objects, contribute to and repurpose others' objects.	3.6.1
User participation raises challenges in an increasingly complex set of relationships between the canonical (a published resource) and the formal and informal inputs that will be increasingly be regarded as parts of the same whole.	3.4.2
There is a pedagogic link between individual participation in the library domain and the policy objective of greater personalisation in learning; libraries can play a facilitating role through enabling such as recommendation services, tagging and links to social networks and ephemeral information.	3.6.2
Web 2.0 and the Network Effect	
Web 2.0 has very particular implications for library services, differentiated between 'diffusion' (involving such as blogs, syndication & mashups) and 'concentration' (driven by major data hubs, generalist like Google and specialist like Amazon)	3.4.3
The Web 2.0 network economy model suggests that re-usable data	3.4.3

Key point	Section(s)
encourages a virtuous cycle, yielding critical mass for the user and the service provider alike. Concentration, leveraging the 'network effect', is the key consideration involving aggregation resources, metadata, user created data and user activity.	3.4.4 3.6.1
The 'Long Tail' represents a new opportunity for specialist services with little local mass but highly likely to have critical mass with sustainable community loyalty in a wider geography	3.4.4
Libraries should realistically assess the USPs of their assets, especially in terms of collections and user intelligence, and consider the cost / benefit business case for exploitation	3.5.1
Whilst the 'long tail' in some disciplines must rely on a global community, JISC and its partners may find the scale to aggregate this nationally in many cases.	3.5.1
Creators and curators, such as libraries, should not be concerned with the shape and scale of the resulting services – they may be personal, collaborative, institutional, sector wide or domain specific, global.	3.6.2
The Library Business Case	
Libraries should identify their unique selling points and let others do the rest: (a) recognising essential points of integration with corporate systems, questioning duplicated functions; and (b) embracing the network, recognising that some things are better done by others 'out there'.	3.5.1
Libraries should seek out tangible 'business benefits' from the user perspective, to be found in services that save time or money, that are unavailable elsewhere, that come with the kite mark of authority or are supported by value added expertise.	3.5.1
Libraries should prioritise optimisation of key patron facing processes. These will include the workflows for such as discovery to delivery for electronic, print on demand and physically deliverable items	3.6.1
The LMS Position	
The concept of a forever expanding one stop integrated system is anathema set against the trajectory of corporate systems and global services. The LMS should be a back of house application, doing things that have to be done and that no one else does better, interoperating with other corporate and external applications.	3.5.3
In this climate it may be appropriate to channel resources into rethinking library services rather than re-procuring the LMS.	3.5.3
Corporate Implications	
There are implications for levels of library staffing and the roles of library staff, taking account of business process and user workflow changes and of new approaches to authority, authorisation and authenticity.	3.5.4

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Section 4 - Library Survey

Contents

4.1 Introduction

The JISC & SCONUL LMS Study survey (November 2007) was completed online by exactly 100 HEIs, representing over half the total of UK HE institutions.

Responses were not concentrated from any particular sector of higher education and can be categorised as follows:

Russell Group	15
1994 Group of research-led institutions	13
University Alliance of old and new	15
Old (pre-92) university not in one of the above	14
Million+ (CMU) group of former polytechnics	22
Guild HE of recent universities	10
Former polytechnics not covered above	7
Unclassified	4
Total	100

However, there was some bias in the spread of respondents towards larger HE institutions.

This section focuses on observations of importance for the wider study and should be read in conjunction with the statistical and graphical analysis of responses presented in Appendix 1, which will itself give rise to many further insights.

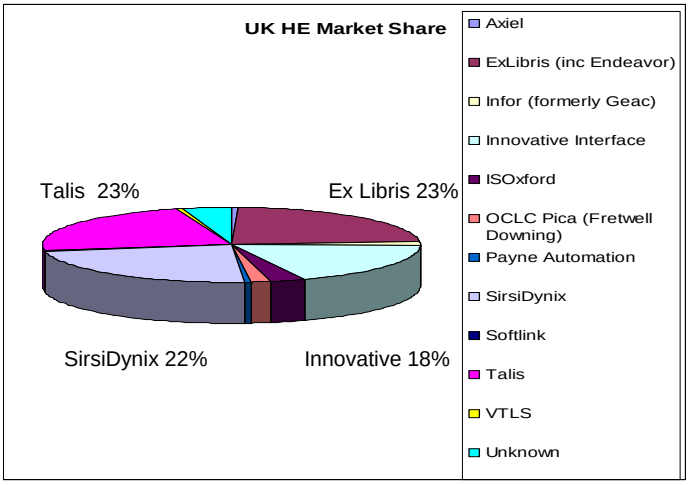
4.2 The state of the systems market

4.2.1 The Library Management System

In the UK, there are over 180 institutions delivering some form of Higher Education[41]. All have a Library Management System (LMS or ILS 'Integrated Library System' in US parlance). It was possible to enumerate the LMS provider for virtually every HEI outside the context of the library survey itself. The main vendors interviewed for the study are highlighted.

Market summary	**Customers**	**% Share**
Total number of HE institutions	**183**	**100**
ExLibris (inc Endeavor)	43	23.50
Talis	42	22.93
SirsiDynix	41	22.40
Innovative Interface	33	18.03
Axiel	1	0.55
Infor (formerly Geac)	3	1.64
ISOxford	6	3.28
OCLC Pica (Fretwell Downing)	3	1.64
Payne Automation	1	0.55
Softlink	1	0.55
VTLS	1	0.55
Unknown	8	4.37
Main players are Ex Libris, Innovative, SirsiDynix and Talis		86.88

[41] HERO Website. Listing http://www.hero.ac.uk/uk/universities___colleges/hei_listing.cfm



The overall market position of all HE LMS vendors is represented in this chart

The LMS market is mature and there has been little 'churn' in the last few years.

4.2.2 Electronic Resource Management (ERM) systems

In contrast the market for products specifically aimed at managing, providing access to, and delivery of, electronic resources (predominantly e-journals) has yet to mature. It is a more complex and fragmented landscape. The library survey was used to clarify this picture.

LMS vendors were slow to respond to this e-resource need and other vendors such as Serials Solutions, TD-Net and the serial subscription agents and aggregators (EBSCO, Swets, OVID) began to fill the gap. The need to search across multiple (print and electronic) resources spurred the development of 'Metasearch' products and again non-library vendors like WebFeat[42] led the way. The requirement to locate an 'appropriate copy' (typically the one licensed by the library) of a (typically e-journal) resource was met by linking technologies and components, most notably 'Open URL Resolvers' such as Ex Libris's SFX. All these products and components had, to integrate, to a greater or lesser degree, with the core LMS and this has lead to an increasing use of global (rather than narrowly library) web-based interoperability standards.

LMS vendors either integrated these third party products with their LMS (e.g. SirsiDynix and Serials Solutions) or developed their own components (notably Ex Libris), which they could also target at libraries with a competitor's LMS. More recently LMS vendors have developed Electronic Resource Management (ERM) systems to do the same job for electronic resources, in terms of the staff management of electronic resources, as the LMSs had done for print. The latest development is what may be characterised as 'Vertical Search'. Products such as Encore from Innovative Interfaces or Primo from Ex Libris are aimed at providing a 'complete search and discovery experience that is appealing, sophisticated and easy to use'[43] or a 'one-stop solution for the discovery and delivery of local and remote resources, such as books, journal articles, and digital objects[44].' and one that 'leverages new Web 2.0 technologies and practices'.[45] They aim to do better than Google in a library context.

4.2.3 Electronic resources: the present state of systems in UK HE

As indicated above, the need to manage and provide access to electronic resource (separate and together with print resources) is being met by a range of components and systems from a variety of vendors. Most libraries mix and match these pieces together with varying degrees of integration.

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[42] From the WebFeat website: 'In 1998, WebFeat set out to change the way people did research. The idea was simple: let libraries search any or all of their databases at the same time' http://www.webfeat.org/company/history.htm

[43] Innovative Interfaces Encore http://www.iii.com/encore/main_index2.html#

[44] Primo overview http://www.exlibrisgroup.com/category/PrimoOverview

[45] Innovative Interfaces Encore http://www.iii.com/encore/main_index2.html#

E-journal management

There is no dominant provider of solutions. Most libraries are using solutions from their serial subscription agents/e-journal aggregators with Serial Solutions providing the main 'independent' (from the LMS vendors) solution. LMS systems can load (or create) e-journal catalogue records for display in the conventional OPAC.

Metasearch

As libraries licensed more electronic resources their web pages became crowded with a baffling array of potential sources for students and researchers to navigate. These resources were not generally catalogued in the LMS and so were not findable via the OPAC. Metasearch products aim to 'provides a consolidated search environment for remote information resources.'[46] The leading library vendor product is MetaLib from Ex Libris. ExLibris claims 44 UK customers and the library survey counted 33 libraries using MetaLib (this indicates a bias in the survey response to the larger HEIs). The next largest share was achieved by Google Scholar, which indicates that libraries are looking beyond the vendors of conventional 'library' products and services to meet the needs of the 'library function'. The usefulness of Google Scholar in a library context has been enhanced by its ability to integrate with Open URL resolvers. For example, in 2005, Ex Libris announced a 'new set of tools to enable GoogleTM Scholar to display OpenURL links to SFX®. With these tools, institutions with the award-winning SFX link server can register with Google Scholar to have their SFX links displayed in Google Scholar search results[47]' This facility now goes beyond SFX and Google says it is 'working with link resolver vendors to make it easy for libraries to participate in this program'.[48] This means that users of Google Scholar can be directed to the 'appropriate copy' available from, or under licence to their institution's library.

Resolvers

Resolvers are therefore key to making best use of scholarly resources acquired or licensed by the library. So we should not be surprised by the relatively high take up of these products. Once again Ex Libris leads the field, in part because they were first to market. They took over the initial development of the Open URL standard itself, (now a NISO standard)[49] created a commercial product (SFX) and undertook an effective marketing campaign to promote the value of the technology.

ERM systems

These function to deliver the same kind of 'back-end' functionality (notably the management of the acquisition/licensing and cataloguing) for electronic as the LMS does for (mainly) print resources. The development of ERM systems is example of how commercial development was informed by a specific library initiative –the Electronic Resources Management Initiative (see below) from the Digital Library Federation. DLF members are predominantly from the USA but Oxford University and the British Library are 'Strategic Members'. JISC itself is a DLF 'Allied Member.' The DLF 'is a consortium of thirty-three members and five allied organizations that are pioneering the use of electronic information technologies to extend library collections and services. We pride ourselves on our ability to concentrate the talent of our librarians and technologists on issues of shared importance. The Electronic Resources Management Initiative (ERMI) is one such collaboration and has proved to be a timely and wide-reaching endeavor, finding a ready audience in libraries, systems vendors, and standards organizations'[50].

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[46] Ex Libris MetaLib http://www.exlibrisgroup.com/category/MetaLibOverview

[47] Ex Libris Press Release 19th May 2005.

[48] http://scholar.google.co.uk/intl/en/scholar/libraries.html#start3

[49]. The OpenURL Framework for Context-Sensitive Services. NISO. http://www.niso.org/standards/standard_detail.cfm?std_id=783

[50] 'Electronic Resource Management. Report of the DLF ERM Initiative'. By Timothy D. Jewell, Ivy Anderson, Adam Chandler, Sharon E. Farb, Kimberly Parker, Angela Riggio, and Nathan D. M. Robertson. Digital Library Federation. Washington, D.C. 2004. http://www.diglib.org/pubs/dlf102/

Notwithstanding this input from librarians, UK HE libraries appear to remain unconvinced that these products will deliver a good return on investment. Take-up has been slow and a significant number of libraries report this function is being managed by in house solutions. Innovative Interfaces and Ex Libris are the main commercial vendors for UK HE.

Vertical Search

Vertical search is a relatively new tier in the Internet search industry consisting of search engines that focus on specific businesses. But the number of these search engines being introduced has greatly increased in recent years so its not surprising that the library vendors are adopting this approach. The Library Survey used the following definition. 'By vertical search we means products that use combined federated/Metasearch techniques and data aggregation (by data harvesting) to provide unified access to the totality (as far as possible) of library resources whether print, electronic, locally held or licensed'. Some library vendors are now directing much of their product development effort to solving this problem. Take up of these products is low, understandably at this stage because they are new and library procurement cycles can be slow. Only a handful of libraries have installed them.

4.3 Library spending patterns on resources and systems

4.3.1 Resources

In terms of spending most institutions are annually spending over £500,000 on library materials (print and electronic). This may overstate the case a little as the response was somewhat biased towards larger institutions.

4.3.2 Technology

Half the library technology budget is spent on the LMS. Most spending is between £50,000 and £250,000. Projecting forward to 2007/08 and then 20012/13 spending is not anticipated to change significantly except with a slight shift to the middle ground with fewer libraries spending less than £50,000 annually on materials, technology or staff.

Unsurprisingly we don't see the characteristics for significant growth in the market even taking into account the development of new products and services to manage, discover, access, and deliver electronic resources. Only 16 respondents have plans (up to 2012) to purchase an ERM for example and the bulk (10) is planning to do that in 2008. However this may be a response based on the needs of an annual planning cycle rather than long-term intent. ERM figured as one of the elements that librarian saw as 'missing' from LMS functionality.

We might expect that an efficiency focus on the core LMS will shift the balance more to products and services to support e-resources. The potential for new ways of delivering applications such as Software-as-a-Service (SaaS) might reduce costs (including staff costs) over time. In the vendor interview Stephen Abram from SirsiDynix claimed there is potential for a 40% reduction in costs by using a SaaS approach[51].

SaaS is essentially a more web-centric update of what were known as 'hosted 'and then 'ASP' (Application Service Provider) solutions. In a strict definition 'SaaS vendors typically use a 'multi-tenant architecture', meaning that *multiple* customers are running the *same* software, but with virtually separate data. ASPs by comparison, merely deployed one application instance on a server for each customer…... It's reasonable to assume that multi-tenant architecture simplifies application management for the vendor. The multi-tenant model also simplifies the

[51] More details on SirsiDynix SaaS approach is on their we site http://www.sirsidynix.com/Resources/Pdfs/Solutions/Services/SirsiDynix.net_Software_as_a_Service.pdf

value for all customers since upgrades are instantaneously available across the entire platform'.[52]

LMS vendors would probably need to substantially re-architect their LMS to take full advantage of this multi-tenant approach and what they may claim to be SaaS, in reality, remains ASP at the moment. Nevertheless libraries should be expecting to get better value for money from their core LMS.

Low growth opportunity will also support the current trend towards vendor consolidation in the market as companies seek achieve efficiencies through scale and elimination of product duplication. We have already seen this with ERM. The former Endeavor Meridian product is being replaced by Ex Libris Verde, following the takeover of Endeavor by Ex Libris. It would be unsurprising to see the same happen with former Endeavor LMS -Voyager.

4.4 Library systems and the needs of staff and users

4.4.1 The staff perspective on the LMS

Most libraries report that their LMSs are reliable, efficient and functional. Their main advantage for students and other users, over alternative routes to information, is seen as their ability to find *specific* items and report *availability*. On the other hand around two thirds of respondent agreed that the disadvantages to users were that they were 'clunky,' limited to the catalogue and had low visibility to users. From a *staff* use point of view 70% of respondents said that (lack of) corporate integration was the major disadvantage. Only 9% of respondents (this is a library *staff* perspective) said they were (definitely) not satisfied with their LMS.

The UK picture is not out of line with that in the USA. In January 2008 Marshall Breeding published the results of his LMS satisfaction study, which although international is cope was heavily biased in results from the USA[53]. Nevertheless, in North America, there a very vocal minority make their strong dissatisfaction with the library vendors. 'These companies have become unresponsive to the collective goals of our profession and, like so much of our society these days, are no longer focused on the we but the me. It is a sad state of affairs and one that will not be tolerated.'[54] This attitude reveals a sense of market failure, which needs a structural solution.

Some see Open Source as the salvation and this has led to a small but growing number of Open Source LMS being installed, largely in North America. UK HE library attitudes to Open Source are described later.

4.4.2 What is missing from the LMS?

Libraries were asked to comment on 'what functionality, if any, is missing from the LMS. There is a wide variety of responses but certain key themes emerged, which are listed below (in order of how often they were mentioned) with some associated comments from libraries.

Improved user interface/interaction

- 'Web 2.0 functionality in OPAC'
- 'Lack of 'Web 2.0' type components in end user interface'
- 'Some aspects of personalisation'
- 'Intuitive and modern interface, Web 2.0, etc'

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[52] From Wikipedia. http://en.wikipedia.org/wiki/Software_as_a_Service

[53] 'Perceptions 2007: An International Survey of Library Automation. By Marshall Breeding. January 9, 2008 http://www.librarytechnology.org/perceptions2007.pl

[54] 'A symphony out of tune: when companies go deaf'. Carl Grant. Care-Affiliates blog. 4th July 2007. http://www.care-affiliates.com/thoughts/archives/6

- ‘Faceted searching. More intelligence assistance re expanding a users search’
- ‘Vertical, search functionality, personalisation, visualisation, integration’
- ‘Web 2.0 technologies i.e. RSS feeds, tagging, reviews etc.’

Integration with external systems and the open APIs to do this easily

- ‘Web services/APIs to allow customers to develop their own add on functionality’
- ‘Ability to interact with corporate institutional systems. Lack of ability to extract data in the format we would prefer’
- ‘MLE integration’
- ‘Integration with University finance system and student registry’

Electronic Resource Management

- ‘ERM - electric resources management functionality is completely missing’
- ‘Electronic resource management - but this kind of functionality is now being delivered by products outside of the traditional LMS’
- ‘E-resource management – why does this need to be an additional plug-in which has to be purchased (it is a 'library' management system not a system for books and journals - maybe LMS needs to be renamed’

Reading Lists capability

- ‘Need better reading list system fully integrated with the VLE, and e-material’
- ‘Management of course reading material’
- ‘Reading lists. Third party developed products which provide lots of additional functionality (especially in batch editing) should have been incorporated into the core product by now’

Better Management reporting capabilities

- Easy-to-use reporting - e.g. statistics.’
- ‘Easily accessed reports on services / resources (document supply, acquisitions, usage stats, etc.)’
- ‘Budget management - and ability to extract data that is meaningful’

Inter-Library-Loan (ILL)

- ‘ISO ILL’
- ‘Poor ILL functionality; lack of ability to link with inter / intra-institutional systems’
- ‘Better ILL functionality (the UK is different from the rest of the world in having the BLDSC!).’

4.4.3 Library views of student perceptions

The survey did not set out to determine students’ views *directly* (there are many other studies that have done that and some are discussed in accompanying Horizon Scan part of this study) but it did ask for comments ‘on the perception that there may be a growing problem with the way in which students interact with library resources’

The Google metaphor

Almost all respondents acknowledged that Google ‘metaphor’ has changed the game, shifted the paradigm. There is clearly a high awareness of the problem that is summed up by Welsh understatement. ‘Generally, the delivery of library resources is not well attuned to student expectations, learning styles, study environment or lifestyles’. A university in the North West noted that ‘many students go to Google first and go no further’ and went on: ‘Students are working in different ways: they are often time limited and off campus and this will affect their

behaviour: desktop searching for e-resources is easier. Google searches are based on content and relevance searching. Our ideal LMS would include a semi-commercial version of Google.'

An expectation that all resources should be full text was widely noted. Despite the shortcoming of the Google only approach, 'disappointment is exacerbated when the students find a resource via Google etc only to find that they then do not have full-text access, because the library does not subscribe' it may be perfectly rational behaviour, at least for undergraduates. A West Country university commented that, there is a 'changing attitudes to study by students … a means to an end" – that end being a degree. The majority of students no longer come to university to "read" for a degree – to study a subject because they enjoy it – so there is probably little "reading around" the subject'. Google may simply be 'good enough'.

Recognising Barriers

Libraries noted a number of barriers to students in the existing institutional and library set up. A Russell Group university reported that 'students, including academic staff, are having problems in distinguishing the e-journals we list and those with full text access. Not enough information is displayed to help them to understand what they are able to have access to. More is less in this case, as they lost their way in the maze of resources. Students are still not conversant with searching strategies' A Midland University put it this way. 'People tend not to think in terms of library concepts/flows, i.e., bib searching and then using multiple additional tools to find out where the material is and to access it. They want fast, accessible results which will suffice (good enough) not a fragmented utility for deep and exhaustive research'. Libraries and library systems tend to categorise and provide access to resources such as books, print journals, e-journal, thesis, databases etc by *format*, which is not the way users typically view the world.

One of the first barriers put in front of users is the need to 'sign-on'. 'Staff and students don't understand why we "need" so many logins!' complained one college. Users are then confronted with a great complexity of resources and 'Too many separate tools and interfaces which are not easy to use.' And as noted above even if they find a relevant resource they may find it is not licensed by the institution and so not available to them. Users may find the lack of a UK wide approach to this problem of licensed resources confusing and surprising. The JISC supported National e-Journals Initiative (Nesli) is a 'national initiative for the licensing of electronic journals on behalf of the higher and further education and research communities'[55] and is worthy of note but is far from addressing the problem from a user perspective.

Lowering Barriers

Libraries report three main tactics in overcoming the barriers to resources: ensuring easier sign on to resources, simplifying and unifying access and improving information literacy.

Single sign on - Some libraries are integrating sign on with VLE and Portals but there appears to be much room for improvement.

Access - Metasearch is seen as a key tool in unifying and simplifying access. Vertical Search products are also aimed at unifying and simplifying access (and will subsumed Metasearch) but were not mentioned at all in this context by libraries. They are probably too new in the market for most libraries to be able to consider their value. A major Scottish university reported that, 'since implementing WebFeat we have seen a significant increase in our use of resources. We feel this is because of better access to content and less issues with finding items' However a major northern university complained that, 'federated searching hasn't delivered. Large union catalogues including A&I data would be better'. Another university qualified the success of Metasearch by commenting: 'The use of e-resources is increasing exponentially since the introduction of Metalib/SFX; however significant numbers of students dislike it and would prefer a Google type approach to all resources. Training by either librarians or academics into how to

[55] http://www.nesli2.ac.uk

access e-resources is essential. The information literacy sessions we put on for students pay dividends.'

Information Literacy - A minority of respondents supported this claim for the value of Information Literacy. A London university respondent was optimistic. 'There is a tendency to go to Google but I believe with good training and support there is no reason why students should not recognise the importance and relevance of Library resources.' A CURL university explained. 'Clearly students do not necessarily start their research based around the library systems/resources. We have a good, embedded, Information Literacy program which is intended to help students make informed decisions about the information they are finding, and the mechanisms for finding it'

Exposing library resources - In addition to these main tactics some libraries are also beginning to look at how they can 'expose' library resources outside conventional library based systems. A Russell Group university put it this way. 'The library has to recognise the wider context in which students (and staff) are working and expose resources via a variety of different routes (search engines, portals, VLEs, PLEs, etc.)'

4.4.4 The influence of studying a particular discipline

Libraries were asked to comment 'on the extent to which issues with students' interaction with library resources may be specific to particular disciplines'. Some respondents warned against generalising with a major research university adding: 'also worth noting is the split between teaching-led requirements and research-led requirements.

Nevertheless most perceived a clear gap between science and humanities, with users in science related discipline interacting predominantly electronically, and humanities and arts still relying to a large extent on print. Observations included:

- That a large proportion of Art and Design students may be dyslexic, which can have a serious impact on their effective use of library resources
- That Arts and humanities based users still have a heavy reliance on printed materials which may be in danger or being overlooked as the emphasis of the discussion moves towards e-resources

4.5 Library engagement with vendors

Nearly half the respondents reported that their libraries are engaged with their LMS vendor in terms of basic focus groups and forums and this is the route they use to address the needs for new functionality. There is little strategic engagement and this is where JISC and SCONUL could potentially play a helpful role.

The interviews with vendors revealed a positive attitude towards better engagement with the market as a whole, including JISC and SCONUL. JISC and SCONUL might have the opportunity to leverage their impartiality (as a result of not being direct customers of the LMS vendors) to promote the common interests of all stakeholders (inc. the commercial vendors) in the domain.

Some specific recommendations are made below, in particular the section on developing new services.

4.6 Library LMS plans

As stated earlier the 'churn' in LMS replacement is slow. There was a peak in replacement up to the millennium (as might be expected) but as libraries have now replaced their end-of-life,

typically text based, systems, there ought to be little need to go through another costly procurement process.

There is a perception that in terms of the core LMS there is little now to differentiate systems 'Choosing a new ILS is a lot like choosing a rental car. Like the ubiquitous four-door sedan, any ILS is going to get you where you need to go'[56].

Some will review their position as their fixed contract come to term and roughly 20% were looking at a possible replacement between 2008 and 2012. In view of the present state of the market libraries should carefully consider whether an expensive procurement exercise is the appropriate response in a market where products are not strongly differentiated.

Libraries are also planning to purchase Metasearch, Open URL and ERM products but even here, in the immature market for e-resource products, growth will not be dramatic with even fewer respondents reporting plans to purchase in these areas than the core LMS.

4.7 Library development of new services

In the past LMS were 'stand-alone' systems and there was little requirement or opportunity for integration with external systems. This has changed significantly with, for example, the development of VLEs. Global developments such as Service Oriented Architectures (SOA) are designed to enable better (real time) interoperability and they have aroused considerable interest in the library world.

The JISC seeks to leverage these technologies for libraries through the Information Environment (IE), which specifies a set of standards and protocols that support resource discovery as part of learning, teaching, and research activities. JISC is developing components within this architecture to test out and promote the use of these standards and to help provide appropriate services to the community, so a seamless and flexible experience is available to learners and researchers.

Whilst libraries are one of the central providers of services that can help to achieve these aims, libraries report almost no serious intention to integrate with the JISC IE with their local services. This is also the case with LMS vendors, as evidenced by the Vendor Interviews. Integration with MIS services, VLE and even VRE are planned but they do not appear to be seen as part of the JISC IE.

Nevertheless both local and wider service integration is clearly on the agenda, with over 40% of respondents reporting some Web Services integration activity and over 50% reporting developments involving Web 2.0 features. Libraries also listed 'integration' as one of the 'missing' parts of LMS functionality, although there is recognition that this is not just the LMS: As one university commented, 'I do not blame the LMS for lack of integration; this is just as much the fault of other systems.'

In order to better engage with the domain (libraries *and* vendors) JISC might usefully consider its role in helping to define the domain application of web services; for example:

- A common *schema* for interoperability with the LMS reading list function and the VLE
- Schemas for new discovery tools to interoperate more *deeply* with the LMS, such as placing requests (holds) for material

Such initiatives might open up the market to more competition, leverage the skills of a new breed of 'mashers up' and so reduce costs for libraries. There is certainly a need for an organisation that can gain the trust of, and work with, both the commercial vendors and libraries themselves.

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[56] 'Interoperability the only solution.' By Andrew K. Pace. Library Journal, 1st February 2004. http://libraryjournal.com/article/CA374953.html

4.8 Library attitudes and plans regarding Open Source and Web Services

4.8.1 Open Source

Open Source *components* are in wide use in libraries (e.g. Apache web servers underpin many OPACs) and more widely in HE.

However, no respondents thought that it was likely that they would adopt an Open Source LMS. Half thought such an adoption unlikely and nearly 20% had no interest in Open Source. One library commented 'I think any product we went for would have to have a substantial user base which might be a worry with the new open source systems.' Another said that Open Source was' 'not an institutionally favoured approach'.

This is not the case in North America where the last 18 months have witnessed a small but growing band of Open Source LMS installations and the growth of companies specifically aimed at supporting and developing Open Source applications in libraries[57]. This growth of companies supporting a variety of LMS applications means that libraries do not necessarily have to devote their own staff resources to developing and supporting an Open Source LMS.

4.8.2 Web Services & Service Oriented Architecture

There is more engagement with Web Services and Service Oriented Architecture with nearly one quarter claiming they are engaged already in some form of Web Services development. Only a small number (3) said they were *not* interested in Web Services.

Significantly, there are now real products on offer to meet some of the interoperability needs of libraries, with vendors claiming Web Services / SOA as a key component of their offering to libraries.

4.9 Summary of key points

Key point	For more detail see section(s)..
The library survey got a high response	4.1
The LMS market is mature and dominated by four vendors	4.2.1
The market for solutions to provide access to and manage electronic resources remains fractured with a variety of components systems and vendors	4.2.3
No major shifts in spending are anticipated and the appears to be little opportunity for growth in the LMS market	4.3.1 4.3.2
New approaches such a Software-as-a-Service are worth investigating as a means to reducing costs	4.3.2
From a staff perspective there is little strong dissatisfaction with LMS vendors	4.4.1
Improvement to the user experience and integration with other systems are seen as the major gaps in the current Library Systems environment	4.4.2
Librarians recognise that their systems are not meeting the needs of students and other users	4.4.3
Librarian are adopting a number of tactics to improve the usability of library systems, such as adoption of Metasearch products and Information Literacy programmes	4.4.3
Users would welcome a UK wide approach to the licensing of	4.4.3

[57] E.g. CARE Affiliates launched in 2007. http://www.care-affiliates.com/

electronic resources to avoid the frustration of locating a desired resource but it not be freely available through their particular institution	
The broad discipline being studied affects the way student use the library and library resources. Books remain important for Arts and humanities students	4.4.4
There is an opportunity for JISC/SCONUL to improve the strategic engagement between libraries and vendors	4.5
A significant proportion of libraries are considering replacing their LMS in the near term. They might consider the value of this approach in a mature market with little product differentiation	4.6
Libraries see integration with the wider environment important but the JISC IE is not the motivating factor. There is opportunity for JISC and SCONUL to work with libraries and vendors on domain specific schemas to promote interoperability	4.7
Libraries remain sceptical about Open Source LMSs but many are monitoring developments	4.8.1
There is a small but significant engagement with web services/SOA with some specific library products now available	4.8.2

Section 5 – Vendor Perspectives

Contents

5.1 Introduction

In the UK, there are just over 180 institutions delivering some form of Higher Education[58]. All have a Library Management System (LMS or ILS 'Integrated Library System' in US parlance).

The study established, for the first time, a complete picture of the LMS providers to each HEI, dated autumn 2007. In addition, we used a common set of questions and enquiries to interview the four main LMS vendors, who share almost 90% of the UK HE market. The aim was to understand their businesses, in particular in UK HE, and to establish their views on key trends, product directions and their engagement with the UK HE community.

Extensive detail from this series of dialogues is presented with kind permission from each vendor in Appendix 2.

5.2 The UK HE market for Library Management Systems

5.2.1 A mature and consolidating market

In terms of core functionality, basic components and workflows, today's systems are the recognisable descendants from the systems of the 1980s and most have a legacy that goes back to that time. It is not surprising therefore to find a UK HE LMS market that is well developed and mature. The study established that libraries spend approximately £13,100,000 annually with the four main vendors who have nearly 90% of the market. This makes the total market worth just over £14,000,000. Of course this excludes library spending on systems from other vendors, such as RFID based self-service.

Vendors typically derive most of their revenue from annual maintenance (especially in the current market with few new sales). This is a stable and attractive business model: customers pay in advance helping vendor cash-flow and giving highly predictable revenue. The (primarily US) global market in all sectors (not just HE) was estimated to be worth around £285 million in 2006[59]. By comparison Google (defined in its own mission statement as a 'library' company[60]) had revenues of over USD $16 *billion* for 2007.

In HEIs the churn in LMS replacement is very slow, as most institutions have already replaced their end-of-life systems. Many customers retain long-term loyalty to their LMS vendors, despite changes in ownership and confusion over product direction after mergers.

Opportunities for dramatic growth are therefore quite limited. Vendors with a global reach and a large international customer base still see opportunity for organic growth. Neil Block, for example, described Innovative's strategy in the following terms:

> *[It] is all about organic growth— [we] don't want a bunch of customers, acquired through a merger for example, who didn't select us. We still see strong new name account*

[58] HERO Website. Listing http://www.hero.ac.uk/uk/universities___colleges/hei_listing.cfm

[59] 'The industry grew at a healthy pace in 2006, with overall revenues expanding from an estimated $535 million in 2005 to about $570 million in 2006. In 'An Industry Redefined'. By Marshall Breeding. Library Journal. April 1, 2007. http://www.libraryjournal.com/article/CA6429251.html.

[60] 'Google's mission is to organize the world's information and make it universally accessible and useful'. http://www.google.com/corporate/

growth. Of course the market is mature but we dispute the characterisation that all LMSs are the same.

Vendors naturally seek to grow by 'up-selling' add-on products to their own LMS customers. Innovative is particularly successful here with a large portfolio of 'add-ons' and this no doubt accounts for its high revenues relative to its market share (see the table in 5.2.3 below). Vendors also seek to 'cross-sell' their add-on products to libraries with competing systems. ExLibris started this trend with products such as SFX (Open URL resolver/knowledge base) and MetaLib (federated search).

Private equity investment now plays an important part of the ownership picture with two (ExLibris and SirsiDynix) of the four main vendors now owned by private equity companies. This represents nearly half the UK market. The priority of the new owners is to get a good return on their investment before selling or refinancing. Their business horizon is between three and seven years. Inevitably, therefore, we will see further changes in ownership, which may be attended by further product rationalisation if the ownership change embraces a merger of LMS vendors.

2007 also saw Open Source LMS win some significant HE institutions in North America but this trend is still far from mainstream[61].

5.2.2 Development trends - Electronic Resources

The main driver in terms of library system developments over the last few years has been the need to manage and provide access to an increasing range of electronic resources (primarily electronic journals). This has focused attention on enhanced search and delivery mechanisms and new Electronic Resource Management (ERM) systems and features. The ERM market is clearly not as mature as the LMS market and remains fragmented.

The LMS survey confirmed this picture of fragmentation. Only a small number of institutions has invested in integrated off-the-shelf ERM systems. Most have a patchwork of solutions to solve specific aspects of the overall problem.

In terms of e-content the rise of Open Access (OA) means that HE libraries are playing a growing role in managing (via some kind of institutional repository) the scholarly output of their institution. Institutional repositories however are not part of the scope of this study.

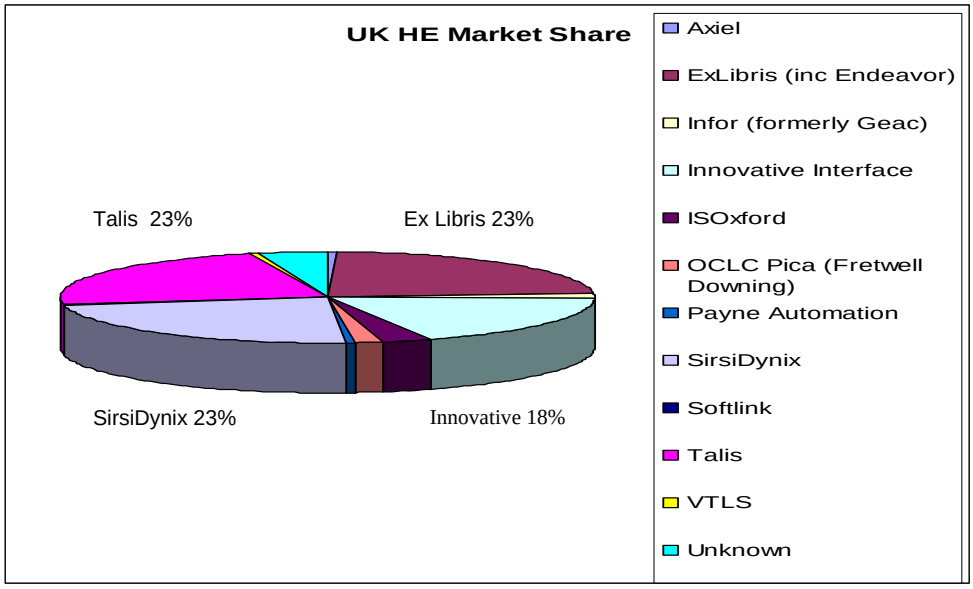
5.2.3 The vendors

The main players in UK HE libraries are Ex Libris, Talis, SirsiDynix and Innovative Interfaces. Together they have almost 90% of the market and are therefore the only vendors considered in detail in this study.

[61] 'The LMS: an open or shut case'. By Ken Chad. CILIP Library+ Information Gazette, 24th August 2007. http://www.kenchadconsulting.co.uk/images/stories/lms_an_0pen_or_shut_case_24_aug_07.pdf

Vendor	*LMS System(s)*	*Estimated revenues for UK HE*	*Main UK library market sectors*
Ex Libris	Aleph and Voyager	£3.5m	HE, National
Innovative Interfaces	Millennium	£4.5m	HE
SirsiDynix	Unicorn and Horizon both merging to Symphony. A few customers still using Dynix Classic	£1.8 m	HE, FE, Public, Government and Special
Talis	Alto (staff functions): Prism (OPAC)	£3.3 m	HE, Public

The overall market share of all UK HE LMS vendors is illustrated as follows:



5.2.4 Changes in ownership and consolidation

Generally within the HE (and public library) market the last two and a half years witnessed a considerable change in ownership amongst the global/UK vendors and significant consolidation, which is summarised for the UK below: [62]

- June 2005: Sirsi and Dynix merge and become SirsiDynix
- November 05: Geac (now Inform) announces its acquisition by Golden Gate Capital, a private equity company.
- November 2005 OCLC Pica acquires Fretwell Downing (OLIB LMS)
- December 05: Ramesys becomes RedSky through a management buyout
- February 06: Talis is 'reconstructed': the owners (BLCMP Ltd and an Employee Benefit Trust) vote to transfer ownership to a new company called Talis Group
- July 06: ExLibris acquired by Francisco Partners, a private equity company
- December 06: Endeavor acquired from Elsevier by ExLibris and Francisco Partners
- January 07: SirsiDynix acquired by Vista Equity partners, a private equity company

[62] From 'Unsettled Forecast. ' By Ken Chad. CILIP Library+Information Gazette. 9th March 2007. http://www.kenchadconsulting.co.uk/images/stories/unsettled_forecast_9_march_2007.pdf

- February 07: ISACSOFT (owners of Bibliomondo) announces it is 'evaluating strategic alternatives' including but not limited to, a sale of the company
- June 2007 Bowker (a Cambridge Information Group company that also owns ProQuest Serial Solutions) acquires MediaLabs (AquaBrowser)
- October 2007 OCLC acquires remaining shares in OCLC PICA

This picture of ownership changes and consolidation should not surprise us in a mature market. Businesses mature and it is normal to find that the original founders and owners of companies cash in their investment. In order to get a market return on their investment the new (sometimes private equity), owners make it their priority to improve financial performance. Indeed LMS companies would not be attractive unless there was clear room for improvement [63]. Private equity operates by purchasing an entire company, improving its business performance and maintaining ownership typically for three to seven years. It then sells it or takes dividends by refinancing it.[64]

Low levels of profitability mean companies can only support low levels of investment in new products and services. Therefore improved levels of profitability could benefit libraries. However, private equity owners may simply see their mature LMS businesses as 'cash-cows' where the reward is primarily directed to the investor.

Private equity is not the whole story. Innovative is wholly owned by its founder, Jerry Kline. The UK has a distinctive local vendor in Talis which began as a cooperative. A significant number of UK HE institutions (around 30) are shareholders of Talis Group so have both a customer and shareholder perspective.

Therefore, with the rapid changes over the last two years, libraries will need to pay close attention to the ownership and financial health of their LMS vendors. Some suggestions about how HE might work collectively to open up the market are described further on in this section.

5.3 Key trends influencing the vendors

Vendors were asked to comment on what they saw as the main factors or trends influencing their strategy for the UK HE library market

5.3.1 Thinking global

The development of the web and global web based services like Google and Amazon have become driving forces influencing strategy. These wider trends are now more important than narrow library domain factors. Together with social networking sites like Facebook, they set the standards by which users judge the usefulness and ease of use of systems. They have changed user behaviours and expectations. LMS vendors are looking for ways in which their offering can continue to add value.

Oren Beit-Arie, Chief Strategy Officer for Ex Libris, put it this way*:*

> *As users' needs and expectations are determined and derived from their overall Internet experience, the solutions that we design should be on par with other, non-library, on-line*

[63] 'As a rule of thumb, unless a business can offer the prospect of significant turnover growth within five years, it is unlikely to be of interest to a private equity firm'. An introduction to private equity. The British Private Equity and Venture Capital Association

[64] Stephen Schwarzman of the Blackstone Group. Quoted in Sunday Times on 18th February 2007

services. Perhaps the most important aspect of that is the fact that most users are not very likely to use and utilise systems/ solutions that require them to learn query languages (e.g. CCL….), thesauri (e.g. LCSH…) or classification schemes. They are also not too interested in internal library structures and collection types – e.g. whether a particular resource is held locally or accessed remotely or whether it is available to them through paid subscription or through open-access arrangement, etc. We need to "shield" the users from internal library decisions.

Stephen Abram, Vice President of Innovation at SirsiDynix, said this:

> *The need in HE to read for insight still needs to be addressed in better way. It's not good to expect current students to have the same approach to text and reading as students 30 years ago. Faceted and visual displays are well accepted by many user segments.*

It's not just global technology trends that are influential. Stephen Abram also pointed out that the wider economic outlook is critical and he was pessimistic.

> *Global economic trends mean library budgets will become even more constrained. The US dollar is falling and US economy has major problems—national debt, war funding, sub-prime mortgage crisis, etc. Oil prices are way up so we might start preparing for an economic slow down. This will trickle down to publicly financed institutions, which will have problem. ILS companies will need to help their clients adjust.*

5.3.2 Web 2.0

Some of the influences described above have been characterised as part of 'Web 2.0', which has a domain counterpart in 'Library 2.0'. Whilst eschewing any precise definition of these concepts, their importance is recognised.

ExLibris commented:

Perhaps the two most important ones that we've identified are:

- *User contribution: users are no longer only passive consumers of content. They are also active contributors. Moreover, enticing them to do so adds significant value to the whole community of users*
- *Mash-up opportunities: building systems in a web 2.0 'spirit' enables mash-up of services that increases the value and the ability of library services to better integrate with user spaces*

Vendors recognise that their products and services are now, more than ever, part of a much bigger environment. Oren Beit-Arie put it this way:

> *End users (researchers, educators and learners) have their own user spaces where they spend most of their time. They may use a variety of social network tools, learning and teaching applications, research tools etc. So in terms of library services we need to get out of silos and embed services. The user's experience doesn't begin or end in a library space –the library is just part of the process. We won't have total ownership of the information space. So we have to work with other players including Google scholar, MSN live Academic, and social spaces like Facebook etc.*

Neil Block at Innovative sees the library as having continuing value:

Research often initially does take place in Google but the library has a role in giving authority.

5.3.3 Standards and interoperability

Web-based standards such as those developed through global bodies such as the World Wide Web Consortium (W3C) and the Organization for the Advancement of Structured Information Standards (OASIS) are becoming more important than specifically library standards (like Z39.50). Two of the four vendors (Talis and Ex Libris) are members of W3C.

The increasing take-up of Service Oriented Architectures employing web services is enabling better interoperability between disparate systems from multiple vendors (e.g. between the LMS and internal and external 'admin' systems).

Dave Errington, CEO at Talis, sees the picture like this:

The break up of monolithic systems to interoperate involving loose coupling of applications with each other requires non-domain specific standards such as web services. It doesn't matter where the data is.

In the library domain these developments are at an early stage. Ex Libris said:

We are probably at the geek phase at the moment so there so there is a need for some 'hands-on' technical skill amongst people working in libraries and more widely in HE

Stephen Abram from SirsiDynix commented:

Using standards to enable the LMS to be developed and integrated with the wider environment is putting stress on users (libraries). They will need cross-functional teams to develop stuff. This emerging sector reorganization will challenge HE institutions.

HEIs may need to ensure many more librarians have a degree of 'technical' aptitude embedded in their skill set. Indeed these skills may simply be viewed as normal rather than 'technical'.

Despite the growing trend towards interoperability and the linking of 'processes', we have not seen much progress in the so-called 'disaggregation' or 'disintegration' of the LMS[65]. Most new 'add-on' products claim interoperability with competing LMS but at the 'core' of the LMS we still see a monolithic structure and no obvious trend to break it up.

Talis saw a potential role for JISC in expanding the take up of a web services approach in the library domain

Maybe JISC could bring together the community and remove friction. Or how about establishing common web services schema guidelines and best practice to enable something like OCLC's World Cat local to interact deeply (e.g. reservations/holds and

[65] 'Taking apart the library system.' By Ken Chad. CILIP Library+Information Gazette. 1st June 2007. http://www.kenchadconsulting.co.uk/images/stories/taking_apart_the%20_library_system_1_june_2007.pdf

other user account activities/transactions). Because the JISC is a non-vendor body it could have a valuable role in this way, which would have the result opening up the market, increasing competition and so reducing costs

5.3.4 Aggregation, shared services & consortia

One of the key technology factors in the success of services like Google and Amazon is data aggregation. Goggle 'crawls' web sites and 'harvests' content for indexing. It does not make a z39.50 or other 'federated' search of web sites. Aggregation enables much faster responses, more results and potentially improved relevance and less duplication, especially over massively large information sources such the web.

Many services also aggregate user behaviours as manifested in their 'clickstreams'. For example Amazon uses this approach to recommend titles of interest on the basis of user behaviour. The ability to aggregate user behaviour on a global scale improves the relevance of the services because there is a much larger data set to work on and this helps weed out 'false' connections. This approach will have only limited success if based upon a *single* HE library site, so libraries will need to aggregate to benefit.

Vendors see value in libraries working together more to share resources. Innovative described their experience in the US and elsewhere:

> *[It] ties together individual libraries and uses a patron initiated (rather than a library mediated) model in circulation. Primarily this is being done by a physical (not distributed, for example, as per Z39.50) shared resource.*

ExLibris also commented on the lack of consortia in the UK and identified the potential for JISC and SCONUL to assist:

> *Around 60% of Ex Libris' US customers are part of a consortium of some kind. In product terms there are very sophisticated consortia products that don't compromise local needs*. *Why isn't UK HE good at this? Why isn't it following good practice elsewhere? Is this something for JISC/SCONUL to help with?*

From a circulation point of view systems can be decentralised, allowing each institution to retain flexibility in terms of its loan rules and other specific arrangements. Sharing has now moved beyond the physical print resources to e-journals, dramatically reducing costs. Savings might increase over time as new hosting technologies (e.g. Software as a Service - SaaS) are adopted, so that HEIs do not have buy server hardware or run their own LMSs. Stephen Abram noted that SirsiDynix has made major investments in the creation of server farms to support this, and that libraries working in this way could reduce the total cost of ownership by up to 40%. He also saw another important possibility for a consortia approach:

> *Consortia could take a real leadership role. It would have some critical mass. Most consortia work on a servant collaborator model at present and not leadership one. They fail to focus on some of the real infrastructure opportunities beyond content licensing. HE needs a leadership model that means decisions can be made in a timely fashion.*

Resource sharing has clearly become an important strategic initiative in some geographies outside the UK. In the UK the lack of any significant move towards a shared LMS for resource sharing is, at least in part, due to the particular nature of the UK library infrastructure where a centralised ILL and document delivery service run by the National Library (British Library) is embedded firmly in UK HE practice and workflows. Another barrier may be that, the cost

savings achieved through shared services/LMS consortia may not be viewed as significant enough at the moment in the context of the HE Institution as a whole. It is easier to make savings elsewhere. Hardware costs are dropping and the annual costs of an LMS and the systems staff is relatively small in terms of the overall HE budget.

Nevertheless from a library perspective there may be worthwhile efficiencies that should not be ignored. Users could benefit from having better access to a bigger library resource. Sirsi Dynix's Stephen Abram was adamant and advised that the UK [JISC and SCONUL] should be tackling the development of real consortia. In summary vendors see potential for JISC and SCONUL to help libraries achieve costs savings and improved user services through sharing and aggregation.

5.3.5 Value in 'context'

The aggregation of user behaviour/click streams exemplifies the potential value of the data. Companies now offer 'tracking' services to enable almost any web site to collect click streams. This enables better personalised services but concerns have been raised about loss of privacy. HE has barely begun to realise its value as a 'trusted' domain and the potential for this data.

Dave Errington, CEO at Talis, made the following observation:

> *Google isn't presently solving the entire problem. It doesn't yet provide enough 'context', for example to students and researchers. What's the best stuff? What stuff should the institution licence? If we knew this it would result in an improved use of resources. It's about the user's context (e.g. university student). Your profile gives better results. The better the context is defined the better results will be. The context problem is not solved in HE, which has an opportunity here because its users are (relatively anyway) well defined—with a particular goal anyhow.*

5.3.6 Open Source

Yochai Benkler of the Law School at Yale University views open source software (OSS) as '…the quintessential instance of peer production'[66]. He sees this as one of the key attributes of what he describes as the new Networked Information Economy into which all the above trends are subsumed.

All vendors view open source systems as an important trend but most see its value in reducing costs by providing low cost components for their applications. The number of open source components has grown and their extent widened, from Apache web servers (which underlie most library OPACs in HE) to databases and search engines. At present most vendors do not see open source as a serious challenge to full-bodied library system applications.

This view is summarised by Neil block at Innovative:

> *We remain sceptical about its capability, at present, to deliver large-scale library applications. As part of an overall integrated solution it works and so III supports it. So our approach to OSS might be characterised as tools based rather than code based.*

[66] 'The Wealth of Networks. How Social Production Transforms Markets and Freedom'. By Yochai Benkler. Yale University Press. 2006

Talis, alone amongst the vendors, takes the opposite and perhaps more radical view. Dave Errington explained it as follows:

> *Open source is about distributed innovation. Will distributed innovation increase? Yes, it will become dominant. …. it enables recombination of innovation …. Talis is already distributing open source'.*

The Talis LMS is however not yet available as an open source system. It is worth bearing in mind here that open source is famously 'free like kittens not free like beer' and is not necessarily a way to immediately reduce costs for libraries.

Open source library system components (e.g. VuFind, an OSS Portal/OPAC) and LMSs (e.g. Koha[67] and Evergreen[68]) have made progress in HE in geographies outside the UK, notably in North America. In France, System Integrator, who play a significant role in that market are increasingly seeking open source LMS solutions. Their business model is based around services not software, so the OSS model has potentially a good fit.

It is clear from the US experience that open source does not mean a cheaper LMS. The costs shift from the code itself to other aspects of the overall package (support, development etc). In the last year or two, commercial companies such as CARE Affiliates[69] have sprung up in the library domain to profitably provide such services. Indeed open source strictly describes the 'open' peer-to-peer nature of software development process where the source code is exposed to all. It does not necessarily imply zero cost, although OSS is typically free at present. In additional it is not a given that an open source LMS will be any more *interoperable* that a conventional one; for example, a Koha circulation module does not interoperate with an Evergreen cataloguing module.

Open source LMSs appear to be replicating the core modules and may be just as much a 'silo' as their conventional counterparts. If an interoperable and 'decoupled' LMS is the goal (see the 'Decoupling systems' section below) then open source has not yet demonstrated it is the way to proceed. Nevertheless it is still early days and this is certainly a trend to watch.

5.3.7 Open Data

Related to OSS is the issue of Open Data. A campaign to 'Free our data'[70] was launched in 2006 inspired in part by an article in the Guardian. It was not expressly about library metadata but some of the same principles apply. Talis has been campaigning on this for some time. In practice catalogue data is re-used widely but there remain some licensing restraints.[71] It is argued that, if libraries (such as the BL) or services (such as COPAC, Talis or OCLC) were to give their library catalogue metadata away more freely, this would enable public and commercial organisations to use new technology to re-use it (mashup) in order to deliver new and perhaps innovative low cost or free services.

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67 http://www.koha.org/

68 http://www.open-ils.org/

69 http://www.care-affiliates.com/

70 http://www.freeourdata.org.uk/ 'The argument is simple: government-funded and approved agencies such as the Ordnance Survey and UK Hydrographic Office and Highways Agency are government-owned agencies; they collect data on our behalf. So why can't we get at that data as easily as we can Google Maps or the Xtides program?'

71 For example OCLC see http://www.oclc.org/support/documentation/worldcat/records/guidelines/default.htm

For example, LibraryThing is a social networking site that leverages MARC records from the Library of Congress (amongst others). In February 2008 Talis and Library Thing partnered[72]. In return for giving LibraryThing users access to two core databases (The British Library catalogue and a union catalogue of over 6 million records, catalogued by public and academic libraries in the UK), Talis customers will gain access to LibraryThing book jackets and ratings data.

5.4 Product Directions

The overall trends in the market are clearly influencing the product investments that the vendors make. The following are seen as the most important product directions.

5.4.1 Vertical Search

To address issues of an improved environment for users of library resources, vendors have begun to develop what have been characterised as 'Vertical Search' products. In his review of the 2006 LMS market in the USA[73], Marshal Breeding commented that, 'ExLibris channeled much of its energies into the development of Primo' and Innovative 'focused much of its effort on Encore, characterized as a new discovery services platform for library patrons'.

Vertical search is a relatively new tier in the Internet search industry consisting of search engines that focus on specific businesses. Niche search engines are not new. Web sites that help users find people, shop and get business information have existed for years. But the number of these search engines has greatly increased in recent years. The rationale for vertical search is that, although users are sometimes looking for all the information they can get, (and for that the likes of Google and the Yahoo search engines are used), often they are looking for something very specific related to their businesses.

In the library domain, new products such as Encore (Innovative Interfaces), Primo (Ex Libris) and AquaBrowser (MediaLabs) are characterised as 'vertical search' applications. Whilst they are not targeted at a specific *topic*, they are targeted at a specific *business channel* of (in HE) undergraduate and postgraduate research. Google Scholar and Microsoft's Live Academic Search can also be considered as vertical search applications.

Google et al have not solved the problem of discovery and delivery of the *best* material for students and researchers, taking into account the particular context of the user in the academic environment. This is because not all relevant content is harvested and the user interface remains too generic. This rationale leads to the proposition that users will value services that are specifically designed for their 'vertical' market or 'business channel'.

The argument goes that students and researchers will benefit from a specifically 'academic' or 'scholarly' library oriented approach. This is not to say such a service might not be 'embedded' elsewhere, in a VLE or Portal for example, in much the same way users embed a Google toolbar. Primo for example offer just this opportunity. Equally it does not mean that libraries should not expose or embed (as some do already) their data and/or services into a VLE, Portal and other environments such as Google or Live Academic Search.

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[72] 'Talis and LibraryThing partnership brings more open bibliographic data to the library community' Talis Press Release 7 February 2008. http://www.talis.com/applications/news_and_events/index.shtml#no091

[73] 'An Industry Redefined'. By Marshall Breeding. Library Journal 1st April 2007. http://www.libraryjournal.com/article/CA6429251.html

By launching vertical search products, the LMS vendors are banking that their approach provides sufficient added value over Google or Microsoft approaches to find favour with students and other users who, in the end, will be the final arbiters.

Products such as Primo (Ex Libris) and Encore (Innovative Interfaces) are designed for a hybrid (i.e. print and electronic) environment and use technologies such as aggregation combined with federated search (because not all resources can be harvested and so aggregated). They build on the traditional strengths of library systems (e.g. structured metadata) to deliver features like faceted search and combine it with new 'Web 2.0 features such as 'tagging' (adding keywords) by users. Importantly these products are designed to appeal to all libraries irrespective of their underlying LMS.

5.4.2 Universal Resource Management

To address the growing trend towards electronic resources, vendors introduced Electronic Resource Management (ERM) systems. Like vertical search these products are also available to libraries that don't use the vendor's own LMS. They are less tightly integrated with their own LMS than the traditional 'core' modules (e.g. cataloguing, serials, circulation and acquisitions). We therefore have a situation where the print and electronic resources are managed by two separate 'library management systems' that have some areas of duplicated functionality.

Already some vendors are talking about the move to a more integrated 'Universal (or Uniform) Resource Management' (URM) approach. This is most likely to be an evolution from the newer ERM systems to include the management print resources rather than the other way round, as ERM systems are based on newer technologies.

Take up of ERM systems in the UK so far is minimal. Partly this is a function of the relative newness to the market but the lag also suggests that libraries are not convinced about the return on their investment. Vendors may therefore see URM as an opportunity to motivate libraries to invest in new core systems. Certainly any library looking to replace its LMS should bear this in mind and hesitate about buying a system that only manages one aspect of its resources.

5.4.3 Decoupling systems

There is a noticeable trend towards the 'disintegration of the integrated LMS[74]. In one sense this is a return to the situation in the early days of library automation when libraries had different systems to manage different functions (typically cataloguing and circulation).

No LMS vendor can develop everything needed to deliver a complete solution and all have established partnerships with a range of companies providing what they view as complimentary solutions, ranging from self service terminals to federated search and the management of e-journals. Vendors also have looser relationships with other providers in the wider 'scholarly' landscape. Speaking from a SirsiDynix point of view Stephen Abram identified them as follows:

> *The big players in my mind are mostly from a North American perspective. Some examples are EBSCO, ProQuest, (Serial Solutions), Gale, Reed (web of science), Google, The MS/Yahoo/ Open content Alliance, MuseGlobal,. Canadian libraries are*

[74] See: 'Taking apart the Library System'. By Ken Chad. CILIP Library+ Information Gazette. 1st June 2007. http://www.kenchadconsulting.co.uk/images/stories/taking_apart_the%20_library_system_1_june_2007.pdf

> *doing digitisation in competition with Google (Allouette Canada[75]). MS has an initiative for open source scholarly publishing.*

The current phase of 'dis-integration' really began when companies that did not have an LMS (e.g. Serials Solutions) began to address a critical library problem (the management of e-journals) ahead of LMS vendors. Along the way they have had to find ways to integrate with the various LMSs on the market. LMS vendors have also realised that new standards for interoperability could enable them to sell their 'add-on' products to more than their own LMS customer base.

In a relatively slow moving market for the core LMS, this offers a significant way to grow their businesses. Nowadays most new product offerings are designed to work with a variety of LMSs. However the level of integration is still below that of the traditional 'core' modules (such as Circulation or Acquisitions) and progress in interoperability remains slow. Libraries have begun to use web services to integrate their LMS processes with university portals or admin systems but this remains the exception rather than the norm.

The walls surrounding the *core* LMS remain tightly guarded. It is only with the OPAC that progress has been made and even here integration goes little beyond search/discovery functionality with users needing to access the 'native' OPAC to use functionality like placing requests or viewing their account details. The vendors were asked about their attitude to partnerships with other LMS vendors. Innovative were typical.

> *No. Our aim is to provide best of breed across the whole range of library needs. Of course we don't stand in the way of libraries that wish for example to add AquaBrowser or Endeca. However we want to provide solutions that are better. To date, we haven't seen a big groundswell for these types of products…for all of the press and interest it has received; products like Endeca haven't made a major dent in the marketplace.*

In ExLibris's view, 'there are practical and pragmatic barriers to a genuine and totally open 'best of breed' approach.' Talis is currently alone amongst the vendors in advocating a different approach. With a relatively small and geographically bounded customer base, it has perhaps less to lose and more to gain from the more open market that such a decoupling might achieve and sees opportunity for standards to open up the market. Nevertheless it has not yet opened up its core LMS. The possibility of the cataloguing or acquisitions module from one LMS vendor interoperating with the circulation module of another (common in the early days of library automation in the 70s and 80s) still seems some way off. Not even the Open Source LMS systems seem yet to be taking that approach.

From a library perspective there are certainly real gains to be made. If the LMS vendors themselves are not able to deliver on core interoperability, then perhaps there is potential for others to help open up the market (and hence reduce costs) through providing standardised web services schemas. Certainly doing more to decouple the OPAC would be a starting point to bring economies (potentially at least) to the library and improved services to users.

[75] Alouette Canada http://www.alouettecanada.ca. 'AlouetteCanada will aggregate current digitized content in ways useful for Canadians'

There is some track record in this. In 2007 COPAC contributed to the development of a 'community profile' for the NISO Open URL standard to facilitate inter library requests[76]. Perhaps the time is ripe to reactivate the stalled activity first of VIEWS and then NISO[77]. However, the NISO Web Services and Practices working group was disbanded with the statement that:

> *They have determined that while there are future opportunities for standards efforts in web services for library applications, the current landscape is still too early in its development to narrow the focus*[78]

5.5 Engagement with the UK HE community

Talis does not operate outside the UK and Ireland, so UK HE is central to its business. The three global LMS vendors also consider the UK HE market strategic with practices and aspirations similar those in other major markets such as North America.

There are some local UK differences but clearly these have not proved insuperable barriers; for example, in Inter Library Loans where the British Library still has a major central role and the management of 'short loans'.

One characteristic that may have more significance, especially in comparison to the US, is the dominance of state funded provision in UK and the absence of a significant sector of rich privately funded institutions. Dave Errington from Talis commented that this might affect levels of innovation and that this 'means different adoption curves' ass the UK does not have 'the rich institutions that can risk spending on innovation'.

5.5.1 The rules and means of engagement:

Engaging with customers

The vendors have well-established tools and processes engage with their UK customers. The nature of their customer base is changing. Not all are *LMS* customers. For example ExLIbris has MetaLib and SFX customers that use a competitor's LMS. Similarly Innovative has customers that use its ERM only. This makes the customer base less homogeneous.

The classic User Group remains but has been supplemented by other channels. Changes in technology in how products can be developed facilitate customer involvement in the development process itself. Neil Block from Innovative for example said:

> *A key part of Innovative's engagement is with development partners. There is nothing necessarily UK-centric about this, however, Glasgow University is especially notable for its involvement as a dev' partner for ERM and, more recently, Encore.*

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[76] For more detail see 'Request Transfer Message: a Community Profile of OpenURL' http://www.oclcpica.org/content/1409/xsd/RequestTransferMessage_v5.doc

[77] 'Best Practices for Designing Web Services in the Library Context'. By the NISO Web Services and Practices Working Group. NISO. 2006

[78] NISO Web Services and Practices Working Group. http://www.niso.org/committees/Services/Services_story.html

As well as responding to specific 'enhancement requests', vendors are aiming to engage at a strategic level. Ex Libris described their customer strategy group in the following terms.

> *They deal with wider environment. They are deliberately not constrained to specific areas where it is felt ExLibris must play in a product sense. That keeps us involved and aware of the wider HE environment.*

Other channels include focus groups, forums and conferences. Talis has opened some of these channels (e.g. its forums and conferences) to non-Talis customers (indeed anyone) and has been actively blogging and agitating in the wider market, acknowledging the 'Cluetrain Manifesto' [79] thesis that 'markets are conversations'. They employ dedicated 'technology evangelists' who blog and present at conferences worldwide. Stephen Abram, VP of Innovation at Sirsi Dynix, is also a well known blogger and prolific library conference speaker. The SirsiDynix Institute reaches out beyond customers to the wider domain as 'an ongoing forum for professional development in the library community. By providing free access to industry-leading speakers and events, our mission is to support librarianship and advance the work of librarians around the world.' [80]

Strategic Engagement

Vendors therefore recognise that the Internet has not simply changed products and services but also the possibilities for engagement with their customers and the wider market. According to the Cluetrain Manifesto:

> *A powerful global conversation has begun. Through the Internet, people are discovering and inventing new ways to share relevant knowledge with blinding speed. As a direct result, markets are getting smarter—and getting smarter faster than most companies*

The information economy, in which libraries can play an important part, is unthinkable without the web and technologies such as web services. The JISC Information Environment itself is based upon this premise but it is not presented and communicated in a manner geared to influence or engage the vendors. Dave Errington at Talis summed this up as follows:

> *SOA web services are a wider software industry trend that Talis is responding to in order to enable loose coupling of applications. JISC's attitude is fine but isn't a motivation. [JISC and SCONUL] are not reaching out to vendors … presumably because they don't see this as contributing to their strategy? We are all stakeholders. We should be working together.*

The vendors generally observed that the community has not engaged with them as stakeholders. As is broadly the case in the public sector, there is a gulf between simply buying products and services and the possibility of collaborating with the commercial sector as partners, complicated by the range of actors from customers to agencies and funding bodies. ExLibris provided a typical perspective:

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[79] 'The cluetrain manifesto: the end of business as usual.' By Rick Levine; et al. Peruses Books, 2000

[80] http://www.sirsidynixinstitute.com/

> *Does JISC think about how commercial sector could engage with projects? This might lead to improved sustainability. For a commercial vendor JISC projects present a high business risk. Typically commercial returns are very low relative to the investments required, and requirements tend toward the ideal of perfection and dealing with all possible requirements instead of focussing on key deliverables that are 'good enough' and can be refined in use.*

However, ExLibris went on to say

> *There could be a great opportunity to deliver meaningful solutions if there was better working together. This needs a different management style based on real collaboration.*

This is evidenced by examples of collaboration at the coalface, where the drivers are not strategic models but rather local requirements. Vendors are actively working with libraries to integrate their LMS products with other institutional systems. At Nottingham the (uPortal based) institutional portal is being integrated with library services delivered through ExLibris's Aleph and MetaLib products. Talis has developed a product called 'Keystone' specifically based on a SOA to enable integration between the LMS and other institutional systems. As Neil Block from Innovative observed:

> *We work with libraries – these are the customers. We work one level removed from JISC. However, when a customer decides they want JISC IE products/services, then that's when we get involved and we build what they want.*

5.5.2 Procurement

An enduring point of engagement is the procurement process. The typical LMS procurement involves a costly, time consuming and complex European tendering process for which libraries may take several months to prepare a dauntingly detailed ITT. Innovative remarked that:

> *The process can be cumbersome. Many libraries still try to define processes and functionality at a very detailed level in hundreds or pages without appreciating that this does not affect the way a particular LMS works*.

Ex Libris commented:

> *The complex tender process has invaded the decision making process for relatively inexpensive add-on product such as MetaLib and SFX. This makes the whole process unnecessarily long-winded and expensive for all parties. Is this really justified when we are often talking about sub £20K products?*

Vendors observed that, for the LMS, the average time from the publishing of an ITT to contract was around 3 months with a further 6 months being taken up in moving from contract to initial implementation. Technology is however challenging traditional approaches to procurement, as acknowledged at a 2006 JISC OSS Watch conference [81].

[81] 'Crossing the Chasm: open source software comes of age'. A report from the OSS Watch conference, Open Source and Sustainability, held at the Said Business School, Oxford, 10-12th April 2006, by Paul Anderson, Intelligent Content. http://www.oss-watch.ac.uk/resources/sustainability06.xml

> *As Jim Farmer said: 'Procurement processes have to change…'. This was seen as an issue that requires policy development within the education and public sectors.*

ExLibris observed that:

> *[The purchasing community is] very wary of commercial companies. The needs tend to get expressed in a very detailed specification that seems to be seen as a key instrument of 'controlling' the 'supplier'. This spec' is then controlled by what seem to be endless committees which deliver constant changes of mind. There appears to be a belief that the appropriate methodology should be to create an all-encompassing spec – every possible need without a firm understanding of the business case for the library/institution. Not all 'wants' are business justifiable 'needs'.*

SirsiDynix added:

> *[Requests for Proposals (RFPs)] are an abomination that cost the entire sector too much for very little ROI from the process. They are based on distrust and not on partnerships.*

Innovative commented that there is a noticeable trend to avoid the RFP process in the US. Vendors would clearly welcome opportunity to work with the community towards a better process that is effective, efficient, fair and less costly, although it has to be acknowledged that there are significant legislative and accountability barriers. As Talis commented:

> *We welcome anything that would remove cost and friction (for all parties) from the process. The Core Spec is a start but we are sure more could be done.*

5.5.3 A new paradigm for engagement across the domain

The challenges of a small and mature LMS market characterised by entrenched processes and procedures facing the large-scale global disruptive forces of the web suggest that a new paradigm is required for engagement across the domain. Talis CEO Dave Errington said:

> *[JISC] does have a role to play in our view. Get out and talk to vendors, establish a dialogue based on mutual respect… We need to find a better a way of working …There needs to be a focus on common shared needs … We think there could be value in an HE organisation bringing together the common interests of the community.*

This will not be easy as there are entrenched positions and potential conflicts of interest. The need to address service challenges that are no longer local in terms of domain or geography could however provide the catalyst for engaging vendors as part of the wider information services community. In this respect, JISC and SCONUL can act as brokers in a number of ways, not least as the community considers the realities of what might become 'Library 2.0' and the specification of a new service models through the international e-Framework.

5.6 Summary of Key Points

Key point	Section(s)
Library market characteristics	
For the first time we have a detailed view of the HE LMS market	5.1
The HE LMS market is relatively small and mature Growth opportunities are limited and further consolidation/rationalisation can be expected	5.2.1
The main product direction is towards providing access to, and managing electronic resources	5.2.2
The market is dominated by four main vendors	5.2.3
The last two years have seen big changes in the market characterised by significant changes in ownership, consolidation and involvement from Private Equity investment	5.2.4
Key trends influencing vendors	
Global web-based trends characterised by Google, social networking and Web 2.0 are the market drivers now rather than any narrowly conceived conception of the needs of libraries. LMS vendors are establishing where they can add value in this new information economy	5.3.1, 5.3.2
Web services/SOA is seen as a key enabler of better interoperability but take-up is slow.	5.3.3
The value of libraries aggregating their resources and sharing services in consortia is an opportunity to be explored	5.3.4
User behaviour as manifested in search and other online activity ('clickstreams') is potentially highly valuable but remains to be fully exploited	5.3.5
Most vendors see the value of Open source to be in low cost *components* for their own applications rather than in an OSS LMS. One vendor however sees Open Source as next major global development paradigm for all major developments in and outside the library domain	5.3.6
There is more to be done in liberating library metadata to drive innovation in the domain	5.3.7
Product directions	
Vertical search is the next major LMS related development. It is where LMS vendors hope to demonstrate their major value add over Google	5.4.1
LMS and ERM development may converge into a URM (Universal Management System)	5.4.2
Vendors are reluctant to invest in 'de-coupling' their core LMS. JISC/SCONUL could look at ways of opening up the market through standards	5.4.3
Vendor engagement with the UK HE community	
New technology is offering new opportunities for open engagement between vendors, their customers and the wider HE market	5.5.1
The JISC and the Information Environment per se are not motivating factors for vendors	5.5.1
Vendors welcome a fuller engagement with JISC and SCONUL as stakeholders rather than simply suppliers	5.5.1
The current LMS procurement process is problematic and the interested parties should work together to reduce costs and alleviate tensions	5.5.2
JISC and SCONUL should work with vendors to establish a new, more open, paradigm for engagement in the domain	5.5.3

Section 6 - Reference Group Feedback

Contents

6.1 Introduction

6.1.1

To ensure that the LMS study was informed by current thinking in the sector and the perspectives of key agencies, a Reference Group was established of consultants and senior librarians from the UK and international community. The main aims of the Reference Group were to:

- ensure the study is informed by current thinking in the sector and the perspectives of key agencies;
- validate the interim findings;
- inform the work as it progresses; and
- confirm the broad conclusions and recommendations.

6.1.2

Members were asked to comment on the general context of the study, and in particular to help shape questions and issues for further exploration through the library survey and to comment on early findings and interim reports. In particular they were invited to shape and refine the final report and recommendations to JISC and SCONUL.

6.1.3

The members of the Reference Group were:

Anne Bell	University Librarian, University of Warwick and Chair of SCONUL
Kerry Blinco	e-Framework and Standards Manager, University of Southern Queensland and Technical Standards Adviser to the DEST, Australia
Richard Boulderstone	Director of e-Strategy and Programmes, British Library
Peter Burnhill	Director, EDINA, University of Edinburgh
Professor Peter Brophy	Director, Centre for Research in Library & Information Management, Manchester Metropolitan University
Adam Cooper	Assistant Director, CETIS
Professor Jane Core	Director of Library and Learning Services, Northumbria University
Lorcan Dempsey	VP of Research, OCLC, United States
Ian Dolphin	Head of e-Strategy and e-Services Integration, University of Hull
Professor Jeff Haywood	Vice Principal, Knowledge Management and Chief Information Officer, University of Edinburgh
Dr Liz Lyon	Director, UKOLN
Gill Needham	Head of Strategic and Service Development, Open University Library and Learning Resources Centre
Dave Pattern	Library Systems Manager, University of Huddersfield
Andy Powell	Head of Development, Eduserv Foundation
Stephen Pinfield	Chief Information Officer, University of Nottingham
Owen Stephens	Assistant Director: e-Strategy and Information Resources, Imperial College London
Julie Snelson	Director of IT Services, University of Wales, Bangor

6.2 Communication and Dialogue

6.2.1

A secure Moodle environment was established for the Reference Group to engage in discussions, post messages and access documents. This was actively used by several members throughout the study to provide comments on interim reports and other documents posted by the study team, and also for strategic discussions on more general international LMS-related issues.

6.2.2

The LMS study team held a series of initial telephone discussions with members of the Reference Group in September 2007. The main purpose of these interviews was to explain the background to the study and the planned approaches, and to explore with Reference Group members particular issues of interest that might inform the LMS study. The discussions took place concurrently with the Horizon Scan and ongoing vendor consultation exercise. They were not intended to explore or endorse specific findings from these elements of the LMS study, but to provide an opportunity for informal triangulation with these emerging results, as well as an informed and informative 'reality check'.

6.2.3

Respondents were asked to comment on three broad questions:

- What have been the significant changes to university Library Management Systems over the last five years or so?
- What are the main requirements and challenges for library systems at the moment?
- What do you think will be the main challenges over the next five years or so, and what role do you see for development agencies in supporting the profession to meet these challenges?

Discussions were free-ranging within these broad parameters, consistent with the main purpose of the interviews in surfacing the key issues for practitioners and experts. Occasionally, prompts were given and supplemental questions asked in order to explore specific areas in more depth.

6.2.4

Fourteen members of the Reference Group were interviewed. The average interview duration was around 40 minutes, totalling more than eight and a half hours of expert input from the Reference Group. Interview transcripts covered some 30 pages and totalled almost 13,000 words. The transcripts were analysed on an ongoing basis as the series of interviews progressed, and comments were categorised under headings that emerged from the interviews themselves as areas of particular interest and significance to the Reference Group. Each respondent was allocated a number and their comments tagged with this number in the summary document, which showed the extent to which a particular point was of interest to multiple respondents.

6.2.5

A face-to-face meeting of the Reference Group took place in October 2007, and discussed themes and key issues emerging from these interviews as well as the preliminary Horizon Scan and vendor survey. This summary report offers a brief synopsis of the key points made under those emerging headings. These headline issues are illustrated by direct (occasionally slightly paraphrased) comments which represent views expressed by a number of respondents, and/or points that seem potentially contradictory or controversial.

6.3 Historical development of LMS

6.3.1

Most respondents felt there had been a period of great change in library systems over the past ten years. Significant developments in purchasing and acquisition, cataloguing systems, standards and access protocols were discussed. Systems are getting bigger, better and faster.

6.3.2

There seems to be a consensus that the time is right for a fundamental rethink about the systems and processes that need to be managed. Several respondents discussed a context of changing perceptions of what a library collection is and does, including collection and circulation, resource discovery, changes in ownership and control, personalisation and seamless access to resources.

6.3.3

There was also a suggestion of stagnation in some potential development areas, and a sense that while LMS were in many ways ahead of other institutional systems and service areas in their use of technology some ten years ago, other areas and their systems have caught and overtaken LMS.

6.3.4

A key factor in the historical development of LMS is ‘lock in’ to a particular system or product range, which has had considerable benefits in terms of a single system that meets the needs of the service and its users, but many perceived dis benefits.

6.3.5

Underpinning these comments is a recognition that the world is changing and that libraries need to change too, but without being bludgeoned down a particular road and in a realistic appraisal of the complex systems ecology within which they operate.

> *Integrated library systems have made great strides and changes over the last twenty years, some good, some tardy… The problem is that the word 'integrated' tends to be defined as a suite of products that knit well for a vendor. Librarians have gone along with this because it offers one single system that does what they need, but this has resulted in getting locked into certain product ranges, and some are not 'best of breed'.*
>
> *What has been happening is a process of add-ons to achieve key objectives rather than fundamental rethinking of what LMS is about.*
>
> *Since around 2000 there has been a growth in the perception of the library collection not as something physical that you hold, but as something you organise access to. This represents a major shift in terms of what LMS are doing. A lot of what we do now is providing access to external resources. This changes both the way we manage systems and the jobs we do.*
>
> *There have been lots of changes in the last ten years, and we are now realising that our systems were not particularly sophisticated. Now libraries are not leading technology developments as they have in the past, instead we are playing catch-up. Information searching has become big business, and the types of material we are dealing with have changed.*
>
> *Library systems were quite advanced in adopted an unbundled model, but developments in service-oriented architecture have caught up and overtaken them, and we are in danger of being left behind.*
>
> *Around five years ago there was a sudden realisation that we were out of kilter with the ways people were information searching in the wider community.*

6.4 Vendors

6.4.1

Respondents were not asked to comment directly on specific vendors or systems, but some key themes emerged. A recurring issue was vendors perceived as making false promises for their systems, or over-promising functionality that the system subsequently fails to deliver.

6.4.2

There is a concern that vendors seem relatively unresponsive to institutional development needs, and that the small number of providers means that the sector has very little leverage over the system developers. This is of particular significance in the context of the drive for corporate systems integration. There is also a concern that the business models of some LMS providers mitigate against their responsiveness to the development demands of the sector.

> *You get what you pay for. But some vendors may be guilty of over-promising, so you don't always get what you think you've paid for. They tend to paint a rosy picture.*
>
> *Libraries are a very tiny part of a big systems market.*
>
> *Vendors can be unwilling to break out individual services, and this can serve to exaggerate silos within institutions.*
>
> *Recent upheavals and mergers have impacted on the ability of providers to deliver the developments and functionality we require.*
>
> *The market for LMS is quite concentrated, there are only 3 or 4 major players, and this makes me nervous about how much leverage we have actually got.*
>
> *Some providers are owned by private equity groups….this has implications for their readiness to respond to sector needs.*

6.5 Institutional context

6.5.1

The integration of the LMS with other business systems was by a long way the most significant institutional issue identified by nearly all respondents. Specifically these systems are the institution's virtual learning environment(s) (VLE), student records, human resource management and finance systems. There was a call for greater mutual understanding of needs and functions across corporate systems and functions.

6.5.2

A key issue for many is the extent to which the advantages of LMS purchasing and cataloguing functions justify continued independence from other business systems in an increasingly integrated corporate systems environment. This particular issue exemplifies a more general perceived tension in the extent to which institutions are actually concerned to embrace the library as a corporate function or are generally happy to leave it to its own devices (sic), and whether librarians wish to retain their autonomy.

6.5.3

Some respondents expressed a particular interest in developing library services as a core repository for all institutional documents and resources, including business information. Technical boundaries between libraries and repositories were identified as particular barriers to change. There has been some subsequent debate on the extent to which the library should fulfil the functions of a corporate intranet in Reference Group meetings and in the discussion forum in GEM.

6.5.4

Inter-institutional collaboration in the procurement, implementation and development of library services was identified as important by some respondents. Examples were offered of both successful and apparently problematic collaborative tendering processes.

6.5.5

There was discussion on the extent to which LMS service needs and expectations vary for different academic areas and subject disciplines, and on the age profile of principal service users.

> *The LMS is a tiny component in our institutional systems.*
>
> *The big issue is getting our library as a content system to link not just with the wider world but also to our own VLEs.*
>
> *We need integration with our corporate finance software…our activity in institutional reports is always behind the reality.*
>
> *There's been a lot of discussion internally about whether to store learning objects in separate repositories or in the library system… we've also been having conversations about electronic records and paper records and the role of the library as an integrated corporate content management system.*
>
> *We are moving away from physical stock to increasing our electronic resources. There are challenges in managing this transition, strong tensions between these worlds. The traditional user community is feeling increasingly squeezed…this is partly generational, and partly subject domain oriented.*

6.6 Librarians

6.6.1

Some candid reflections were offered on librarians as a professional group, and on the development of the profession. Librarians described themselves as conservative and expressed concern at the apparent dangers in professional development terms of failing to respond to technological innovations and possibilities. There was a suggestion that concern for economy led to a lack of development initiative in some contexts.

6.6.2

Conversely, however, it was reported that librarians have embraced social networking for professional communication in quite a significant way, and also as a group seem to be almost disproportionately involved in immersive worlds such as Second Life.

6.6.3

Some respondents commented that the opportunities presented by technological developments in LMS are actually encouraging the engagement of new, younger professionals who are in turn influencing the scale and pace of developments from within. There was a general awareness that changing user needs and expectations prompt a need to review the nature of the profession itself, and for a concerted community voice.

> *As a profession we have been supine… we are parochial, there is no national perspective, no common basis for understanding issues and solutions.*
>
> *Universities do not ask questions about library service, they see the libraries as specialists… there is a conspiracy of silence here because libraries are generally quite happy to retain their autonomy.*
>
> *The changing nature of information and user behaviour gives rise to some serious professional questions about the business we are, the nature of our expertise, and how*

much we are actually in a position to judge what is good for the user. All this prompts questions about how systems should develop.

We tend to resent the money we spend on our systems, especially paying for software to support functionality we think should be standard…but are we realistic about what it costs to do something well?

Librarians are full-on in Second Life, more so than educators.

We have had difficulty keeping good people in the profession, because of salaries and perceptions and how we sell it. But the bright young things are starting to come back.

We need people who can think broadly, can see connections, do the linking thinking… and we need techno-savvy capable information professionals.

6.7 International context

6.7.1

Comments on the international context for LMS development identified the US and Australia as key comparators. It was noted that the US library community is currently also debating LMS development. A key factor in US library development identified by a number of respondents is the role of private benefactors in financing and supporting both infrastructure and content acquisition. It was suggested that the UK library sector is more obviously concerned than the US with efficiency measures and value for money.

6.7.2

Contextual information service developments in the National Library of Australia were highlighted in terms of their potential significance in the UK.

6.7.3

While the UK remains a small player on the world stage, some respondents highlighted the JISC e-Framework for technical interoperability as a positive and enviable development in the international context in terms of an enterprise architecture promoting shared services and common processes. Others were more circumspect about the current and projected significance of the e-Framework for library systems development.

People in the world are doing some fantastic thinking that could lead to some exciting developments. There are some great opportunities if people are prepared to take risks, and really encourage vendors to take advantage of new technology infrastructure developments.

There's been some fighting talk from US institutions who are unhappy with their vendor. This is a key driver for some open source communities.

The Mellon Foundation is supporting work towards a redevelopment of service-oriented architectures for library systems to support research in the humanities.

The UK community is more concerned with efficiency measures and comparison. The US does not have that same sense of public sector value for money.

The rest of the world can learn a lot from enterprise architecture developments in the UK.

We need genuine collaboration on a worldwide scale, to make the most of potential opportunities for development.

6.8 Vision for change

6.8.1

There was a collective will among respondents for concerted and constructive dialogue in the profession about the business processes that a library is expected to manage, as a basis for specifying the optimum system for managing these processes.

6.8.2

A key factor in the vision for LMS development is the changing nature of information searching; with users increasingly expecting intuitive, workflow-related and personalised systems for searching and discovery. There is increasing interest in reviewing models from other sectors and services as a basis for library service development.

6.8.3

There was some discussion about Library 2.0 and the role of library services in supporting the development of, and providing access to, collaborative, web-supported, user-generated content – with a note of caution about the extent to which institutions should attempt to formalise essentially informal communication and interaction methods.

6.8.4

The dis-aggregation of LMS services and integration of components with other corporate systems for learning and teaching, research and administration was an important element in the operational context for change. A wider implication is the emerging drive towards outsourced system provision and records management.

6.8.5

A national push for trans-institutional repositories was also identified as an important element in the vision for LMS development.

> *We are on the cusp of another big change in what we want from our systems. There is a growing discussion among the enthusiasts and trailblazers that the OPAC is not what people want.*
>
> *We need to think about changing business processes within institutions. Scholarly processes are changing fast in learning and research.*
>
> *The thing we have to crack is the LMS as a corporate enterprise system, run as a core corporate activity and not in an ad hoc way by library staff.*
>
> *At what point do you say you don't need a local catalogue?…I can see potential for a UK national catalogue that implements a powerful search engine filtering to specific libraries, a kind of local WorldCat model-based service you can buy into.*
>
> *Librarians should not rush headlong into new areas just because they are there. They need to step back and think about the services they offer in a generic sense and where it's appropriate to deliver.*
>
> *Web 2.0 is a big topic, at the heart is interactivity. It all comes back to ways of surfacing library materials, print and electronic, into people's workflows and environments. We have to find ways to make resources available and accessible, enable people to use content more flexibly, search for information and resources in a more integrated way, using the tools they are comfortable with and not inventing new tools.*
>
> *One of the interesting things about Web 2.0 is that students may see social networking sites as their domain. The case for institutional or sector involvement in Second Life or Facebook or Youtube is not clear. They don't want grown-ups in there, it's embarrassing.*
>
> *We're competing with Google. Users increasingly rely on information that's generally available on the web. We need to offer systems they can use intuitively, align the information resource so they don't have to find things by accident.*
>
> *We need to start from the perspective of the academic user, what they want to see aggregated and disaggregated on their desktop.*

People are looking more widely for good ideas to implement, to publishing and distribution models.

The problem is with the LMS as a box, operating on its own server. But it is a series of modules operating together in an integrated way. Why can't I buy one piece of software for cataloguing and another for my OPAC?...There is talk in the profession of a more modular approach, this has not happened yet, but it is in the interest of the suppliers to open things up.

Monolithic systems will be gradually unbundled.

Maybe the traditional integrated library system is not the right way. Libraries want more choice and flexibility, the fundamental idea behind new search systems is that search does not have to be connected to the catalogue, and this opens up new ways of thinking about how data is managed.

People will ask increasing questions about return on investment and accountability. From an institutional perspective we need to demonstrate that our systems are cost-effective. By the same token we need to demonstrate the cost-effectiveness of new economic models using more open source tools, lighter business systems, increasing systems integration.

Over the next five to ten years institutions may farm out email and other business systems. Other people will hold our records in massive resilient machine rooms, and there will be no reason for an in-house LMS.

Books will still circulate, there will still be inter-library loans…new system developments need to take account of core business.

6.9 Barriers and challenges

6.9.1

Respondents identified and discussed a number of key barriers and challenges to developing library management systems and services to meet emerging needs and the vision for change. These include challenges in adapting relatively inflexible legacy system to meet increasing user expectations of flexibility and speed of response. Most respondents highlighted internal capacity and professional development needs to meet changing services and user expectations as a significant challenge, particularly given the perceived speed of change.

6.9.2

Particular challenges were identified with regard to capability and understanding of the technologies underpinning Web 2.0 developments. User skills development in information searching was also identified as problematic. Libraries are exercised by financial pressures and the need to demonstrate efficiency, value for money and return on investment.

6.9.3

Barriers to effective communication between and among various professional groups and agencies across specialist development fields were noted. Libraries are also faced with the challenges in the extent to which it is possible to engage and empower users in planning and implementing system developments. Some perceive a tension and potential danger in institutional interference with the personal learning environment and processes that users develop for themselves.

The 'always beta' aspect of the new web can be a major challenge. There is potential conflict in trying to be dynamic and have the latest software, and at the same time run a robust business critical enterprise system.

In a word, the key challenge is flexibility. Students want to know why it doesn't work like Amazon, show what's available in the local bookshop on campus as well as on the shelf.

We are nowhere near understanding how our catalogues might shift to accommodate user-generated content, folksonomies and community tagging using things like del.icio.us

There is not a lot of discussion around open URL as a technology, as a standard that all systems should support. What we got wrong with the early Information Environment was developing an architecture around a set of standards and protocols that were not particularly web friendly. Libraries need to think about the things they have to expose. Library 2.0 means adopting a set of technologies that are in line with what the rest of the web is doing.

We need to find ways of encouraging the development of information searching skills.

There are financial constraints on HEIs, we can't just throw money at systems.

We struggle at an institutional level to articulate what we want and to explain this to providers.

We need to think about the degree to which the users are able to influence system design, and review our processes for engaging the customers.

Community boundaries can be a major barrier. Learning technologists, librarians, cataloguers, archivists, academics all talk different languages…this is frustrating when trying to develop a converged service.

6.10 Open source developments

6.10.1

Respondents were divided on the significance of open source LMS developments. Most agreed that in the current climate the procurement and implementation of an open source LMS is not workable for most institutions, largely because of the staff capacity and support overheads, but also because the mission criticality of library systems requires users and procurers to have confidence in a robust system. A further complication is the perceived tension between generic systems and over-contextualisation through customisation.

6.10.2

However, there is growing discussion about the potential value of open source alternatives to systems and system components which are not perceived to be meeting current needs. Several respondents highlighted the value of open source developments as a catalyst for systems change through demonstrating possibilities. Emerging software support and business services around open source products are also seen as positive developments for future LMS implementation.

It's not workable, we can't get involved in developing and supporting open source systems…we have to hold down the staff overhead. A big driver in a corporate institution is managing staff costs and we do this by outsourcing technical development and support.

Open standards yes. But we do not want to built it ourselves, that is too resource heavy and relies on too few individuals. Also there is a danger of over-customising, of making systems too institution-specific.

As a comparator, open source development models for e-learning systems are not proven.

It's a brave institution in the UK that would make the jump to open source. But we are more open to this that we were a few years ago…open source systems may be the option of choice for some institutions in two or three years. Senior IT staff are getting more comfortable with using open source software in other contexts.

As a catalyst for change, open source developments can explore possibilities, push the boundaries of mainstream systems… ginger group developments can be really useful.

What will make the difference is the availability of external support. Software and business support services have already built up around Sakai.

6.11 Role for JISC, SCONUL and other agencies

6.11.1

The Reference Group identified and discussed some quite specific potential interventions by JISC, SCONUL and other agencies to support LMS development. Almost all respondents specifically identified a role for JISC and SCONUL in promoting communication and networking between and among institutions. A key focus for dialogue is the facilitation of a business process review for libraries to scope the nature of the systems that are to be managed. This involves identifying the problems and specifying solutions, and gathering, articulating and consolidating user needs, workflows and information flows. There is also an identified role for external agencies in forecasting and horizon scanning. A further focus is a future skills requirements specification for library staff.

6.11.2

Strength in numbers and a consortium approach to UK engagement in the international development context was strongly advocated. There was also support for a representative role for JISC and SCONUL in helping to provide a voice and support the development of a UK community with some international weight. A vendor liaison and lobbying role was also suggested, with a view to stimulating suppliers to be more responsive to user needs in the UK HE context. A particular role for SCONUL in lobbying external funding sources was also proposed.

6.11.3

The role of JISC in funding projects to develop models of practice and exemplars of services was noted, and the important dissemination function of accessible reports and case studies. Several respondents also highlighted the importance of JISC work on open technical standards and specifications, shared services and enterprise architecture. Others urged a cautious approach to the development and promotion of a particular architecture in the context of open web developments.

6.11.4

There was also an identified need for some concerted dissemination and awareness-raising to address the extent to which innovative developments actually impact at an operational level in institutions.

Academic library services could get together to develop the ultimate LMS specification, and reach a shared understanding of what we want in UK academic libraries.

JISC has access to expertise that helps people through decision-making processes for procurement and systems development.

There is a role for JISC to fund activities that help libraries and the community to understand and prepare for the role of libraries in the future.

We need case studies of people who have made the early jump to an open source system and some handholding for others who are considering this.

Strategically links with vendors need to be strengthened.

Individual libraries will struggle with the world catalogue… this will have to be centrally supported, a UK consortium with weight.

Forecasting and horizon scanning is particularly important in looking at what we can learn or redeploy from other sectors.

SCONUL and CURL are the main places where discussions take place about the changing role of the library.

What's interesting is whether we as a community can wield some power.

There is some fantastic work going on with the JISC Information Environment, but for most practitioners this is silo stuff…there is a huge issue about JISC work not meaning anything at the local level.

The shared services agenda is really important in terms of general efficiency and collaboration in the public sector.

The processes of constructing the e-Framework and the e-Learning Programme and so on help to shape thinking and reach common understandings about ways of working, common agreed standards, challenges that can be debated and worked through.

Section 7 - Making Decisions (A Guide for Librarians)

Contents

7.1 Introduction

The Terms of Reference for the joint JISC and SCONUL commissioned LMS Study called for a 'short document for dissemination that will aid institutions in decision making in relation to LMS/ERM (and other major systems) provision'.

This section offers a short guide to support librarians in making decisions about library systems, outlining responses that libraries can consider in the light of the report and the evidence collected during the study.

It focuses on providing guidance on what libraries and organisations supporting libraries can do right now. It aims to be useful as a stand alone document and consequently there is some duplication with other parts of the LMS study. Nevertheless readers will get most value from it if they use it in conjunction with the more detailed information and evidence provided in the rest of the study.

7.2 The current LMS market: Where are we now?

The UK HE LMS market is well developed and mature and four main vendors have almost 90% of the market. Many customers retain long-term loyalty to their LMS vendors despite changes in ownership and confusion over product direction after mergers.

Private equity investment now plays an important part of the ownership picture with two (ExLibris and SirsiDynix) of the four main LMS vendors now owned by private equity companies. The priority for the new owners is to get a good return on their investment before selling or refinancing. Their business horizon is between three and seven years. Inevitably, therefore, we will see further changes in ownership and this may be attended by further product rationalisation if that change involves a merger of LMS vendors. This section suggests ways in which libraries, individually and together, may respond.

7.2.1 Avoid a costly LMS procurement process

In the Library Survey a significant proportion (around 20%) of respondents reported plans to replace their LMS at some time between 2008 and 2012. However the study also showed that only a small handful of institutions had LMSs that are 'end-of-life' and therefore *must* be replaced on business continuity grounds. In many cases the perceived need to change will be because the contract comes up for renewal or termination after a set term.

In mature markets products typically lack significant differentiation and so changing systems can be a poor return on investment. In 2004 a US librarian wrote, 'Choosing a new ILS is a lot like choosing a rental car. Like the ubiquitous four-door sedan, any ILS is going to get you where you need to go'[82]. Whilst this characterisation was disputed by one vendor in the study (Innovative Interfaces), it does have support within the vendor community. Commenting on the procurement process, in a 2005 Library Journal article, two vendors commented. 'The waste involved in these processes is enormous. It is generally agreed, even among vendors, that ILS products all basically do the same things and do them rather well'[83].

Market consolidation and ownership changes have accelerated in the last two years and more change is likely. Libraries that selected a particular vendor have subsequently found themselves a customer of a different vendor after a buyout or takeover. Indeed, in the last two years over 60% of UK HE libraries have witnessed a change in the ownership of their LMS vendor. Bearing

[82] 'Interoperability the only solution.' By Andrew K. Pace. Library Journal, 1st February 2004. http://libraryjournal.com/article/CA374953.html

[83] 'The Dis-Integrating World of Library Automation.' By Roland Dietz & Carl Grant. Library Journal. 15th June 2005. http://www.libraryjournal.com/article/CA606392.html

in mind these factors, libraries are well advised to focus instead at investments in time and resources that will achieve a more significant return.

7.2.2 Review the contract with your LMS vendor

Suggesting that libraries should not replace their LMS is not to say systems cannot deliver better value. At a simple level the library may be able to get the same for less. In the same way that individuals renegotiate their mortgage or mobile phone contracts, librarians can renegotiate the contract for their existing system. Clearly there are differences. The barriers to switching a mobile phone or mortgage are relatively low so consumers can change vendors quite easily.

Switching LMS is much more disruptive and more expensive. Nevertheless for libraries with expensive maintenance contracts it may be worth seeing what the incumbent vendor can offer. This will be especially true if the contract has ended its fixed term. This can be a 'win-win' situation and, in return for a secure further term, vendors may be willing to cut a deal.

7.2.3 Get more value from your LMS investment: 'Sweat the assets'

Many libraries have had their LMS for several years and workflows and processes tend to get ossified over time. In these circumstances it is highly likely that are options for simplifying and streamlining procedures to make savings; for example:

- Is the library still creating original catalogue records?
- Can EDI (Electronic Data Interchange) be used more widely and more effectively to reduce book acquisition costs?
- Can the system itself be administered in a more efficient way?

In this latter context Software-as-a-Service (SaaS) has emerged as the latest incarnation of externally hosted services and there is potential to use this approach to reduce costs. In the SirsiDynix vendor interview Stephen Abram said savings of up to 40% could be made.

7.2.4 Increase Interoperability

One way of increasing the value of the core LMS is to make it more *interoperable* with other institutional systems. Embedding library services in an institutional Portal increases the value of the Portal to students and demonstrates how library services can add value to the wider institution to meet its wider goals. Interoperability with finance and student record systems means that the value of student and financial data is increased as it is used to support more institutional processes. At the same time students have a better experience of their college/university systems.

The nature of interoperability is changing. For decades student records have been loaded into library systems from registry systems. Most of this integration remains based on batch transfers of data in proprietary formats. Routine systems upgrades can sometimes cause the scripts managing the transfers to 'break'. In addition there are inevitable time lags as files are loaded and processed. So a student updating their mobile phone number with registry may find a library overdue alert still goes to the 'old' number, generating overdue fines.

Service Oriented Architectures, using technologies such as Web Services, provide dynamic and flexible approaches to system integration and form a core component of the JISC Information Environment for UK HE. Libraries are beginning to use Web Services based interoperability but progress has not been dramatic.

A 2006 report on Web Services in libraries said: 'Web Services and the Service-Oriented Architecture have become well established in the broader information-technology industries, yet adoption of Web Services within the library arena has been less than aggressive. Although there have been many examples of library-related functions being implemented as Web Services, they are not pervasive in the library field—at least not yet.'[84] Despite work amongst

[84] 'Web Services and the Service-Oriented Architecture'. By Marshall Breeding, Library Technology Reports. May/June 2006. vol. 42 / no. 3. American Library Association. ISSN 0024-25862006

the vendors themselves (subsequently transferred to NISO [85]) becoming stalled, there is indication of recent progress involving UK HE libraries, of whom over 40% reported some Web Services development in the LMS survey, often in conjunction with corporate IT services. This is a vital development.

This study has shown that the influence of the JISC IE architecture on libraries and LMS vendors has been minimal and has not catalysed rapid progress, despite uptake of IE services on the ground (such as those operated by MIMAS and Edina). A change of tactics looks appropriate. The study suggests that JISC and SCONUL might both have a role in working with all the stakeholders (including vendors) to helping to lower the barriers to this kind of interoperability, especially addressing mutual 'pain points', and in doing so open up the market, reduce costs and improve services to students.

7.2.5 Add value to the existing core LMS investment

Not investing in replacing the 'core' LMS leaves more opportunity to look at ways to save costs and improve services by adding features around that core. For example, some HE libraries have made substantial investments in RFID (Radio Frequency ID) based self-service systems to enable longer opening hours without increasing staff costs.

The market for complimentary products is widening as the LMS vendors have realised it is to their advantage that their 'add-ons' work with LMS from other vendors; for example:

- Non Ex Libris LMS customers have adopted Ex Libris SFX (link resolver) and MetaLib (federated search) products.
- Talis List (reading/resource list) software is similarly in use in libraries that don't use the Talis LMS.
- Electronic Resource Management and Vertical Search products have been designed from the start to interoperate with a range of LMS products.

The degree of integration varies. Products from the same vendor are likely to integrate more fully, but at least libraries are not completely locked-in to a single LMS vendor. However market consolidation can also cause problems. For example libraries that bought the (Endeavor) Meridian ERM now have to migrate to (Ex Libris) Verde following the takeover of Endeavor by Ex Libris.

Some libraries, of course, argue that these products represent 'core' LMS functionality and should be included at little or no extra cost in the core product. The commercial realities of the market have dictated otherwise. The key determining factor for libraries in choosing such products is, once again, Return on Investment (RoI). Although ERM was one of the major functional 'gaps' reported in the library survey, the survey revealed a fairly slow uptake of ERM systems. In part this may be because the library (or the institution providing the funding) simply does not as yet view them as providing sufficient RoI.

7.2.6 Work with others: consortia and shared services

In a mature LMS market with relatively undifferentiated products, HE institutions will *not* derive competitive advantage from their *core* LMS. Therefore some form of cooperative shared provision (as is already done around networking via JANET for example) could be a productive way forward in reducing costs.

This can be achieved through sharing services within a consortium. There is some successful history to this approach. As long ago as 1994 the University of Wales in Bangor and North East Wales Institute purchased, and continue to share, a single LMS. In UK public libraries this approach is slowly gaining momentum and library consortia sharing LMS are not uncommon elsewhere in the world, including in the HE sector.

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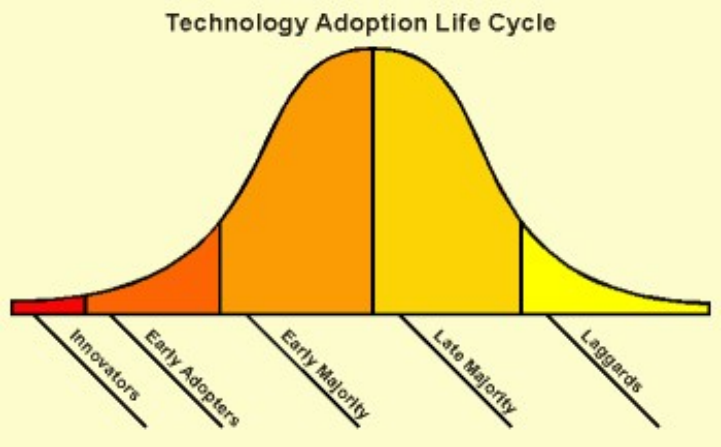
[85] 'Best Practices for Designing Web Services in the Library Context'. By the NISO Web Services and Practices Working Group. NISO. 2006. http://www.niso.org/standards/resources/rp-2006-01.pdf

UK HE has, for some time, supported union catalogues (e.g. M25, COPAC) but these are layered above existing LMSs and represent an additional cost. A number of HE library consortia already exist (e.g. CURL, based on type of institution and NoWAL, based on region) that might form a basis for deeper systems cooperation around the LMS. Additionally HE libraries already using an LMS from the same vendor have an opportunity to share a system without necessarily incurring the cost of significant staff retraining. Some libraries in the Scottish Endeavor Consortium manage their own Voyager systems, whilst others share. Heriot-Watt is one of the latter and the librarian, Michael Breaks, has noted that: '...for a relatively small library like ourselves, the management overheads of installing and running our own library system can be disproportionately high. By joining the Consortium, we were only required to purchase some additional space on an established server environment for our data, and to purchase additional software licences at the reduced Consortium rate[86].'

It seems that the current state of the market gives added strength to the business case for consortia and shared service arrangements and there is scope for SCONUL and JISC to help develop the potential. Apart from the benefits of sharing a core LMS there could be even greater value in sharing subscriptions for electronic resources and collection management of printed resources, although here there is more of an issue around an institution's competitive advantage and ability to attract students and research.

7.3 The future LMS Market: Where are library systems going?



In looking to how libraries might approach the adoption of new technologies as the LMS market changes, the 'technology adoption life cycle' is a helpful tool[87]. In this model, few libraries (as opposed to individual librarians) are pioneering, risk taking 'innovators' or 'early adopters.' Indeed the funding of UK HE and its libraries may reinforce this characteristic.

In explaining what is different about the UK LMS market, Talis CEO Dave Errington commented that 'it is a smaller market, public not private, which means different adoption curves – with less rich institutions that can risk spending on innovation.'[88]

UK HE libraries are certainly more homogenous that those in the US and we should expect most to fit with the 'early' and late majority'. For the individual library, however, the key to the cycle is the timely and efficient exploitation of innovation and early practice, which is where SCONUL can play an especially important role.

This section identifies trends to watch and recommends responses in the context of the LMS study.

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[86] 'Shared endeavour. Clare Whittaker explains the collaborative working within the Scottish Endeavor Consortium'. By Clare Whittaker. Information Scotland. August 2004 Volume 2 (4). http://www.slainte.org.uk/publications/serials/infoscot/vol2(4)/vol2(4)article3.html

[87] See especially 'Crossing the Chasm. Marketing and selling technology products to mainstream customers'. By Geoffrey A Moore. HarperCollins. Revised edition 2002. (31 Dec 2002)

[88] From the Talis Vendor Interview undertaken as part of the study

7.3.1 Open Source Software

Such analysis of the technology adoption life cycle in libraries may account for a clear difference between North America and the UK in the adoption of Open Source Library Management Systems.

According to the survey, no UK libraries had plans to adopt an Open Source LMS, in itself a sensible approach. Companies set up to support Open Source LMS only really emerged in the US 2007. In addition current Open Source products are tending to simply replicate the conventional modules and there is little evidence that they are any more interoperable than current vendor products. At present then there is little to be lost in much to be gained by simply watching this trend. Certainly no clear cost or functional advantage has yet emerged from an Open Source LMS.

The JISC funded OSS watch[89] is a helpful advisory service on OSS in general and is aware of OSS LMS developments. It would be a good time for it to monitor OSS LMS activity more closely.

7.3.2 Open Data and Platforms

Much of the value in some of the new global 'Web 2.0' services is their capability to bring data into a 'platform' so it can be more easily and cheaply shared and re-used. For example, map data is now readily available from Google for 'mashing-up' with other web based applications. Meanwhile, LibraryThing uses library metadata to drive a Social Networking site based around books.

Libraries can do much more to open up their catalogue metadata for re-use. Business enterprises (for example, OCLC and Talis) already offer 'platforms' that enable library data to be re-used. OCLC's WorldCat, for example provides the default platform that enables the 'Find this book in a library' link from Google Scholar. This kind of approach begs the question of the necessity for 180 or so separate OPACs for UK HE alongside union catalogues such as M25 and COPAC. The costs of this duplication must be considerable. The appearance to the user searching globally must be infuriating.

JISC and SCONUL could help unlock considerable value and promote significant innovation by working to help promote the liberation of library metadata from their LMS and union catalogue silos.

7.3.3 Clickstreams and context data

The book recommendation service from Amazon is based on aggregating and mining user activity on a massive scale using 'clickstreams'. In general, the more you use the service and the more books you buy the better (more relevant) the recommendations.

UK HE has yet to exploit this kind of approach in any major way. In addition to clickstreams, it is possible to collect explicit 'context' data. Amazon does this by asking users to 'rate' their purchases. 'Context' in HE could be a lot more straightforward and powerful as students are all enrolled of specific courses/modules. This data is not currently being used to improve the search performance of library systems and yet there is significant potential if it can be aggregated on at least a UK basis, whilst recognising there are clearly privacy and identity issues about how this data might be used.

It is certainly beginning to attract the attention of LMS vendors as evidenced by this recent comment. 'One aspect of Library 2.0 ….. has been using activity information to provide services such as who-borrowed-this-borrowed-that and most popular books etc. ….Imagine the activities of other users being used to help return results relevant to a searching user; or that the subject of study of a University student could have a similar effect … For instance if students are

[89] http://www.oss-watch.ac.uk/

identified as being on a certain course, with set reading lists, this could influence the relevance ranking of their search results.'[90]

The time looks ripe for a constructive dialogue between all the stakeholders to look at how this potential could be released.

7.3.4 Vertical Search

Exposing library data and services to Google Scholar, Windows Live Academic, or any similar search service may satisfy some expectations of 'Google generation' students.

Library vendors are banking on recognisable user benefits in a more library centric approach. They are in good company as 'vertical search' is a fast growing area of Internet search. The rationale is that, although users are sometimes looking for all the information they can get (for which the likes of Google and the Yahoo are used), they are often looking for something very specific (such as the 'right' car insurance, as opposed to 'any' car insurance company).

In the library domain we can characterise new products such as Encore (Innovative Interfaces), Primo (Ex Libris) and AquaBrowser (Media Labs/CSA) as 'vertical search' applications. Whilst they are not targeted at a specific *topic* they are targeted at a specific *business channel* - undergraduate and postgraduate research in the HE context. Google Scholar can also be considered a vertical search application. Library vertical search aims to capitalise on one of the key assets of libraries; their collections, both purchased and licensed.

Library vertical search products are new and therefore few libraries are using them. Although they have some 'Web 2.0' features such as tagging and user reviews they do not yet appear to have taken advantage of the clickstream/context data. In any case this would only deliver real value if aggregated on a large scale (as argued above) and so far Vertical Search appears to be only employed on a single institution basis in the UK (though ExLibris certainly claims Primo be used in a consortium context).

Vertical search is a key component of LMS vendor strategy in attempting to meet the Google challenge and warrants considered watching. The market as a whole would probably benefit if some, less risk adverse, institutions took the plunge and shared their experiences.

7.3.5 Universal Resource Management (URM)

URM is essentially a merging of the ERM and LMS into a coherent system for managing the totality of library resources.

Vendors have begun to discuss it but no products are on the market. If there were there would be little point in investing in a new LMS or ERM system. So for vendors this is a risky play. It disrupts the LMS market and makes current ERM systems redundant at a relatively early stage in their product life cycle. For this reason alone, it is likely that URM systems will emerge slowly (probably out of ERM systems) and once again this is an area to monitor.

7.4 Wise investment at a time of disruptive change

7.4.1 The nature of change

We are at a major point of disruptive change in the wider Information Economy of which library systems are just one part. The web and associated technologies are maturing and have been at the heart of this fundamental change just as printing was centuries earlier

What has been happening with library systems in the last twenty years has largely been about sustaining existing models of library use and operation. However, according to David W. Lewis, Dean of the Indiana University-Purdue University Indianapolis University Library, we are in a new phase that,

[90] Talis Library Platform News. January 2008. Issue 6. http://www.talis.com/newsletters/library/0108/index.shtml

> *…began in the early 1990s with the development of full-text databases, the Internet, and the Web. Libraries are still in the early part of this transition and it is likely to run another decade or two. Many, but not all, of the technologies that are driving this transition are disruptive.*

Lewis goes on to point out that 'they are cheaper and faster even though at the outset they do not seem powerful or sophisticated enough to meet current needs. The technologies involved are often developed outside of libraries and their established vendor community. In many cases, the services or products are marketed directly to library users. Finally - and this is probably the clearest warning sign - in most cases libraries and their most important users haven't asked for the new products and are quick to make a case for the superiority of current practices'[91].

7.4.2 A recommended response

Clearly this is not a time for doing nothing. However at these times it is tempting to adopt a binary mode of thought, such as "Google will displace library systems" or "e-books will replace printed books".

A sense of history can be useful. TV did not displace radio, just as radio did not replace newspapers. The world is full of more complex and interesting interactions. Business models will change as they have done in the past. The next few years should provide additional clarity on the impact of Google and similar services and on the validity of library vertical search. This time period will separate the Web 2.0/Library 2.0 wheat from the chaff and we will have more clarity on business models for electronic content.

Libraries therefore need to invest with caution but not complacency. Whilst is clear that the library 'function' has continuing and growing value based upon a basic human motivation (Google after all is a company with a self declared 'library. mission), it is not clear what role 'conventional' libraries will play.

Librarians themselves have to face a major challenge.

> *Librarians, like many others in established markets, love to plan. In the old world, this was a critical skill. In a world full of disruptive technologies, excessive planning can be a waste of time. It is more important to try different approaches, to anticipate failure and learn from that failure. In this mode of exploratory development; it is better to have a year's worth of experience, regardless of the success of this experience, than to spend that year producing a comprehensive plan of action.*[92].

Therefore, it has been the intention here to position a set of short-term investment recommendations relating to Library Management Systems. These recommendations are geared to build and benefit from that 'exploratory experience' amidst disruptive trends, where there is no certain path to follow.

7.5 Summary of Key Points

Libraries will not be in a position to act on all these recommendations in parallel. This 'Key Points' summary provides a menu to assist the necessary action planning process.

Key Point	Section(s)
Avoid a (costly) LMS procurement process	7.2.1
Review the contract with your LMS vendor	7.2.2
'Sweat the assets' to get more value from your LMS investment	7.2.3
Make the LMS interoperate more effectively with other systems	7.2.4

[91] 'The Innovator's Dilemma: Disruptive Change and Academic Libraries.' By David W Lewis. Library Administration & Management 18(2): 68-74 Spring 2004. https://idea.iupui.edu/dspace/bitstream/1805/173/2/Lewis%20Innov%20Dilemma.pdf#

[92] Op Cit

Look at ways to save costs and improve services by adding features around the core LMS	7.2.5
Lower the barriers to consortia working and shared services*	7.2.6
Keep a watch on Open Source LMS developments*	7.3.1
Liberate library metadata for re-use	7.3.2
Work together to see how clickstream and context data can be used to improve services such as search*	7.3.3
Implement vertical search to explore 'business specific' search requirements	7.3.4

* JISC and SCONUL can play a particular role in these areas

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Appendix 1 - Survey Data

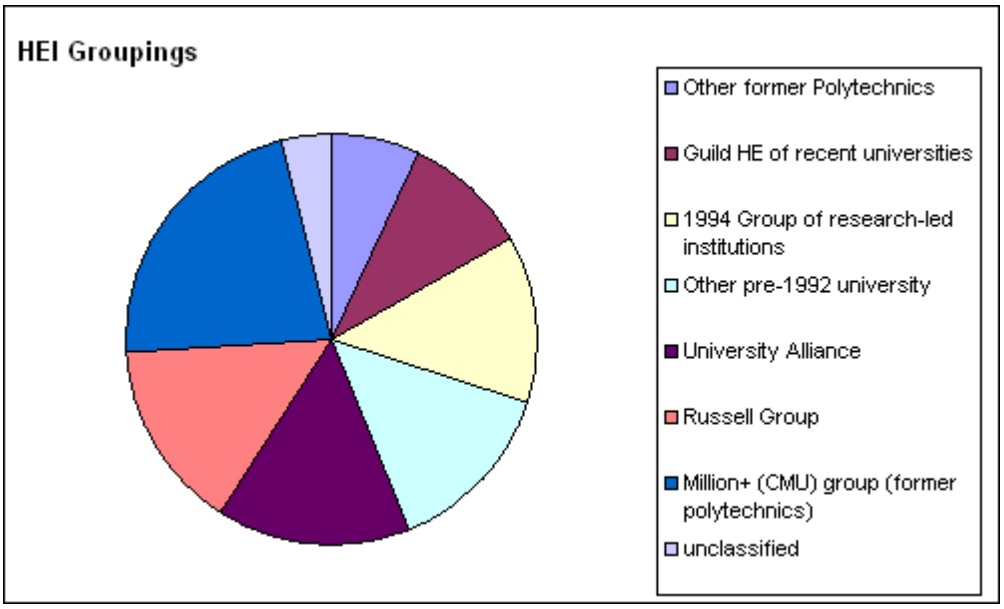
Contents

A1.1 Respondents

The JISC & SCONUL LMS Study survey (November 2007) was completed online by exactly 100 HEIs, representing over half the total of UK HE institutions.

Table 1 HE Institution Groupings of Survey Respondents

HE Institution Groupings	
Other former Polytechnics	7
Guild HE of recent universities	10
1994 Group of research-led institutions	13
Other pre-1992 university	14
University Alliance	15
Russell Group	15
Million+ (CMU) group (former polytechnics)	22
Unclassified	4
Total	100



A1.2 Vendors & Systems

Table 2 LMS Vendor UK HE Market Share

Note - This is the only set of data collected outside the 100 survey responses, drawing on the whole UK HE sector.

LMS Vendor UK HE Market Share

Sector wide data collected outside survey

LMS Vendor	UK HE Clients	% UK HE
Axiel	1	0.50%
ExLibris (inc Endeavor)	43	23.40%
Infor (ex- Geac)	3	1.60%
Innovative Interface	33	17.90%
ISOxford	6	3.30%
OCLC Pica (ex- FDI)	3	1.60%
Payne Automation	1	0.50%
SirsiDynix	42	22.80%
Softlink	1	0.50%
Talis	42	22.80%
VTLS	1	0.50%
Unknown	8	4.30%
Total	**184**	**100.00%**

Main players (ExLibris, Innovative, SirsiDynix, Talis)	160	87.00%

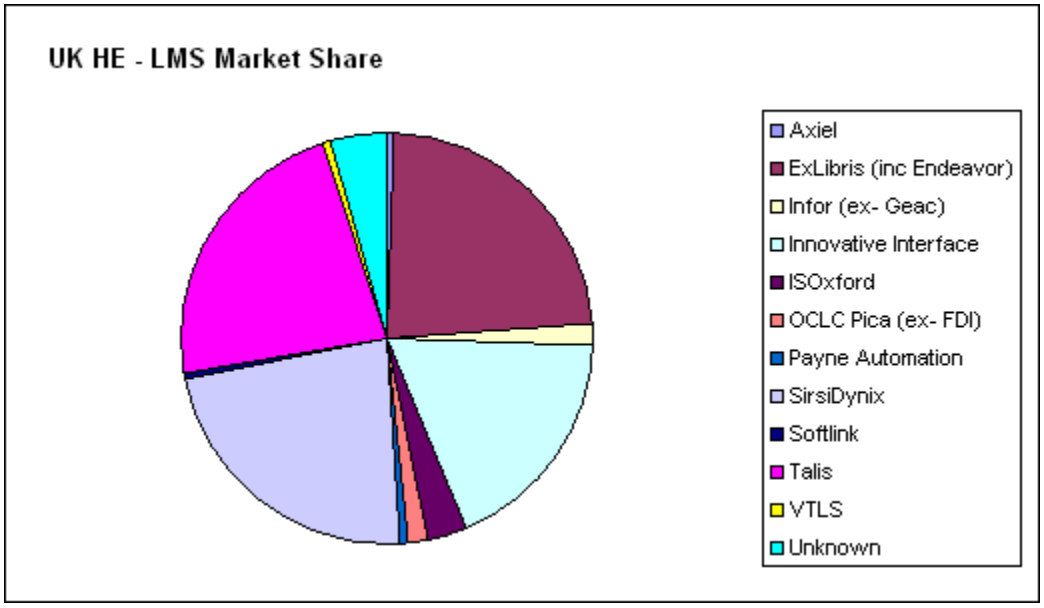
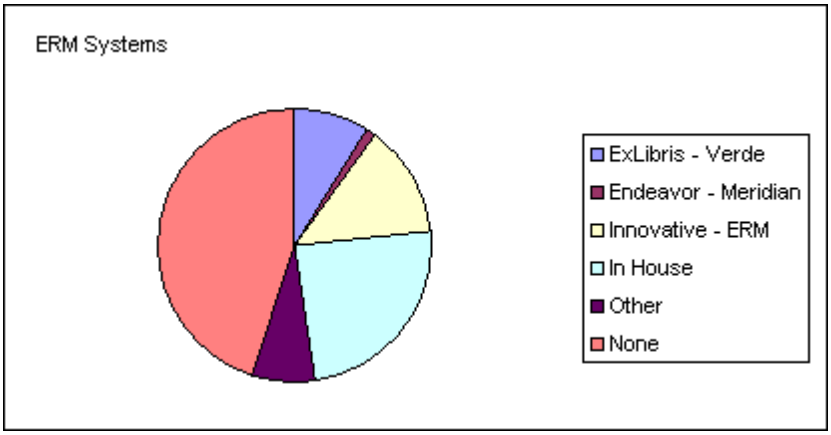


Table 3 Take up of LMS Add-on Modules

This sections comprises 6 tables covering ERM, e-Journal Management, e-Journal / e-Book & OPAC integration, OpenURL Resolvers, Metasearch, Vertical Search

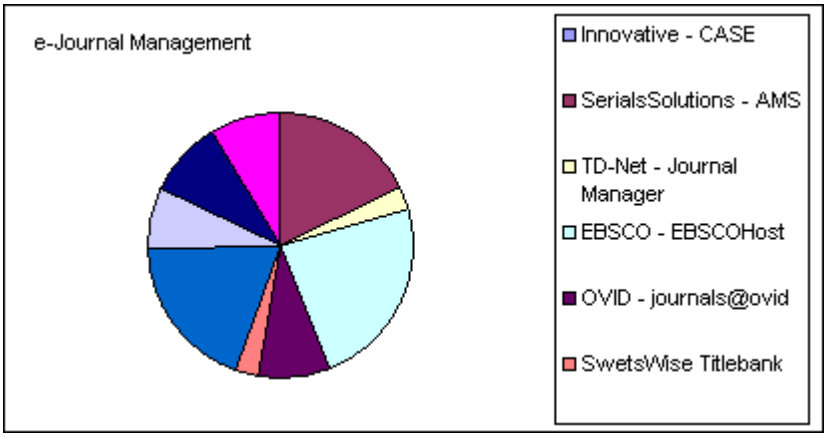
Q5 **ERM systems**

ExLibris – Verde	9
Endeavor – Meridian	1
Innovative – ERM	13
In House	23
Other	7
None	44
Total	**97**



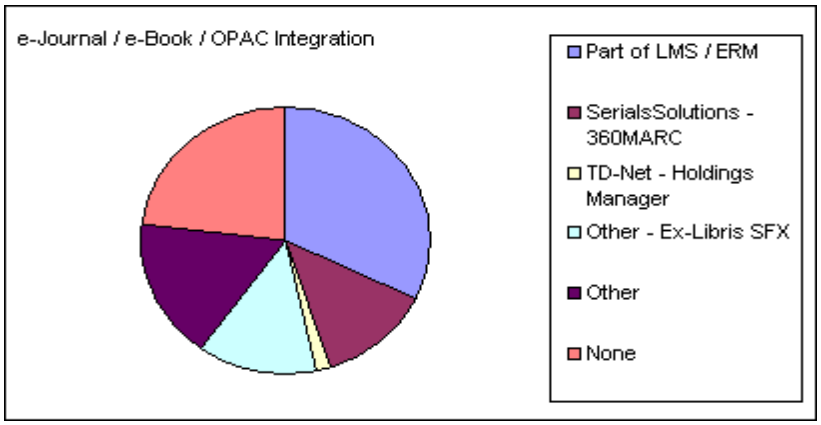
Q6 **e-Journal management**

Innovative – CASE	0
SerialsSolutions - AMS	25
TD-Net - Journal Manager	4
EBSCO - EBSCOHost	32
OVID - journals@ovid	12
SwetsWise Titlebank	4
SwetsWise Online	26
Other - Ex-Libris SFX	11
Other	13
None	12
Total (Multiple per HEI)	**139**



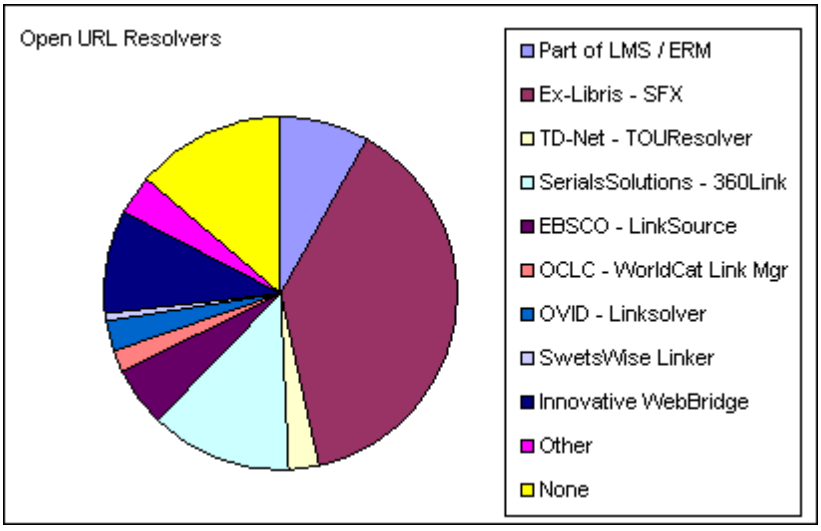
Q7 **E-Journal / E-Book / OPAC integration**

Part of LMS / ERM	36
SerialsSolutions - 360MARC	14
TD-Net - Holdings Manager	2
Other - Ex-Libris SFX	15
Other	19
None	26
Total (multiple per HEI)	**112**



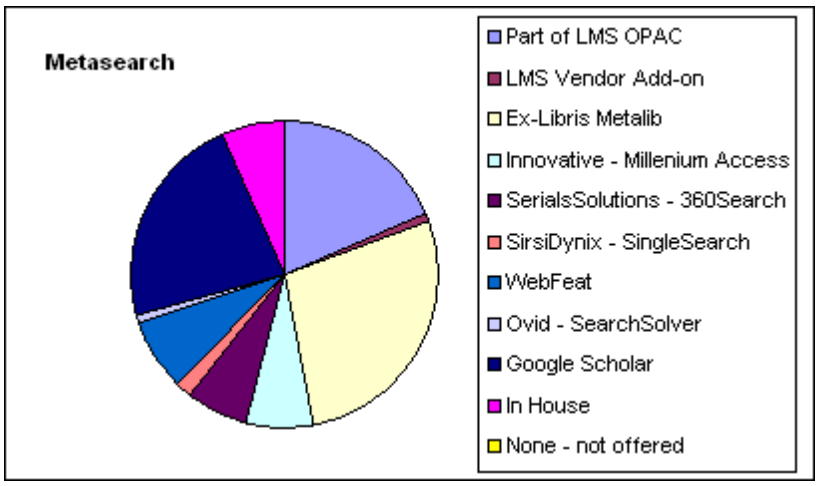
Q8 **Open URL Resolvers**

Part of LMS / ERM	9
Ex-Libris - SFX	41
TD-Net - TOUResolver	3
SerialsSolutions - 360Link	14
EBSCO - LinkSource	6
OCLC - WorldCat Link Mgr	2
OVID - Linksolver	3
SwetsWise Linker	1
Innovative WebBridge	10
Other	4
None	15
Total (Multiple per HEI)	**108**



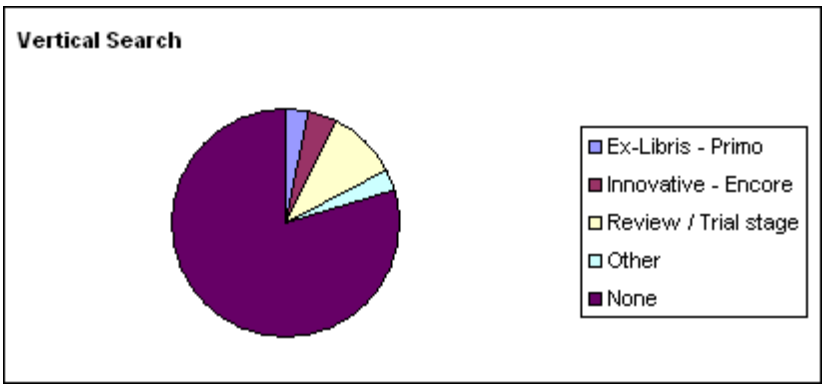
Q9 **Metasearch**

Part of LMS OPAC	22
LMS Vendor Add-on	1
Ex-Libris Metalib	33
Innovative - Millennium Access	8
SerialsSolutions - 360Search	8
SirsiDynix - SingleSearch	2
WebFeat	9
Ovid - SearchSolver	1
Google Scholar	27
In House	8
None - not offered	
Total (Multiple per HEI)	**119**



Q10 **Vertical Search**

Ex-Libris - Primo	3
Innovative - Encore	4
Review / Trial stage	9
Other	3
None	73
Total	**92**



A1.3 Procurement Patterns

Table 4 System Procurement History & Plans

Q14 **Procurement Years Grouped**

	LMS	ERM	Open URL	Metasearch	Vertical	Total
<=1997	39	0	0	0	0	39
1998-2007	49	26	63	55	7	200
2008-12 Plans	21	16	15	15	11	78
Not sure	11	4	3	5	8	31
No plans	51	29	44	45	18	187

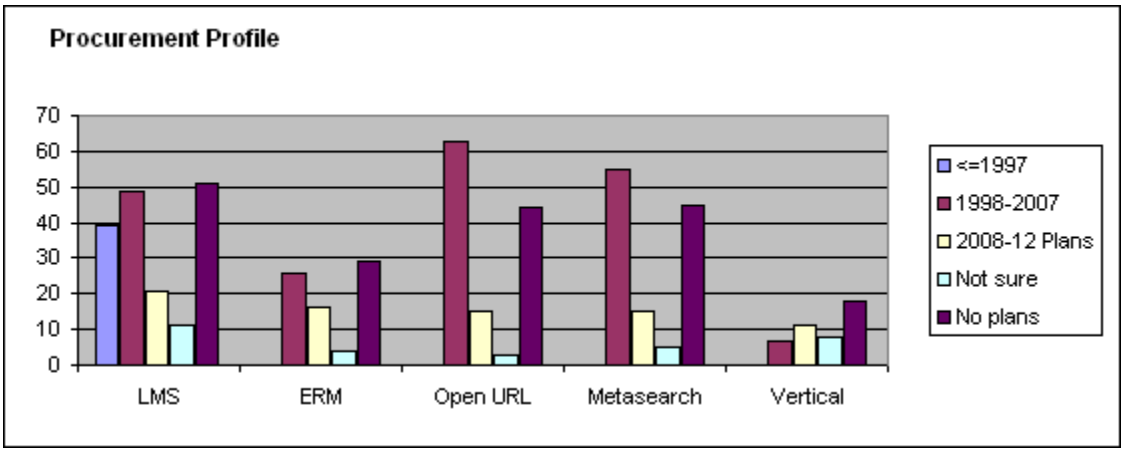
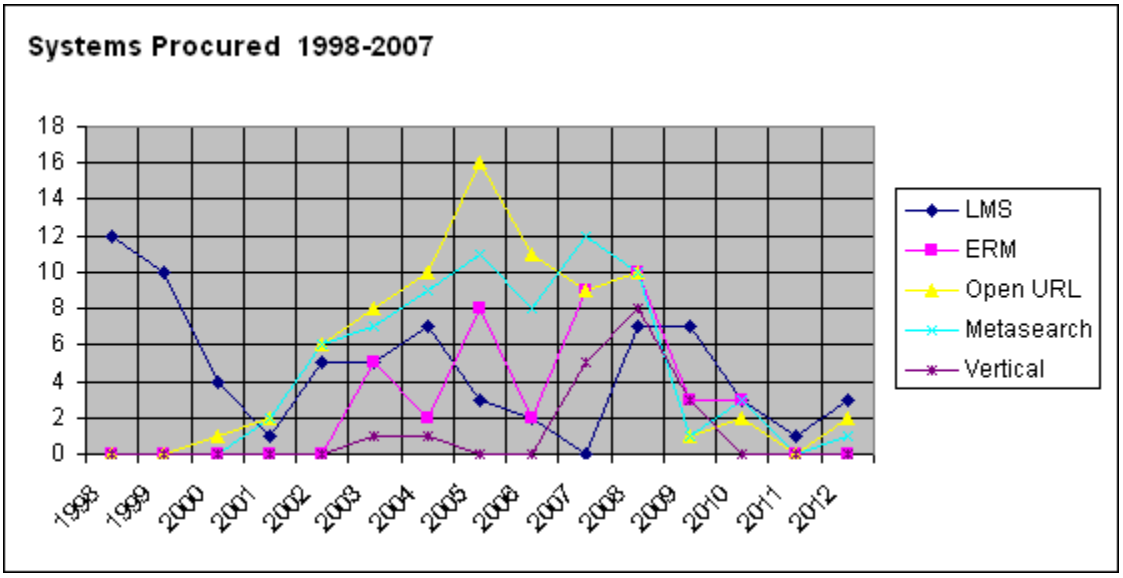


Table 5 System Procurement History & Plans by Year

Q14 **Last / Next Procurement Year**

	LMS	ERM	Open URL	Metasearch	Vertical	Total
1998	12	0	0	0	0	12
1999	10	0	0	0	0	10
2000	4	0	1	0	0	5
2001	1	0	2	2	0	5
2002	5	0	6	6	0	17
2003	5	5	8	7	1	26
2004	7	2	10	9	1	29
2005	3	8	16	11	0	38
2006	2	2	11	8	0	23
2007	0	9	9	12	5	35
2008	7	10	10	10	8	45
2009	7	3	1	1	3	15
2010	3	3	2	3	0	11
2011	1	0	0	0	0	1
2012	3	0	2	1	0	6
Annual Ave over life	4.7	4.2	6.0	5.8	1.8	18.5



A1.4 Opinion of LMS

Table 6 LMS Advantages & Disadvantages for users

Note - like all questions in the survey, this was answered by the designated staff respondent in each HEI

	Advantages & Disadvantages – Users	
	ADVANTAGES	
Q17	Finding specifics	70
	Availability Info	84
	Relevance	59
	Related Materials	66
	DISADVANTAGES	
Q18	Low visibility	-67
	Catalogue only	-67
	Hard to use	-53
	Clunky	-64

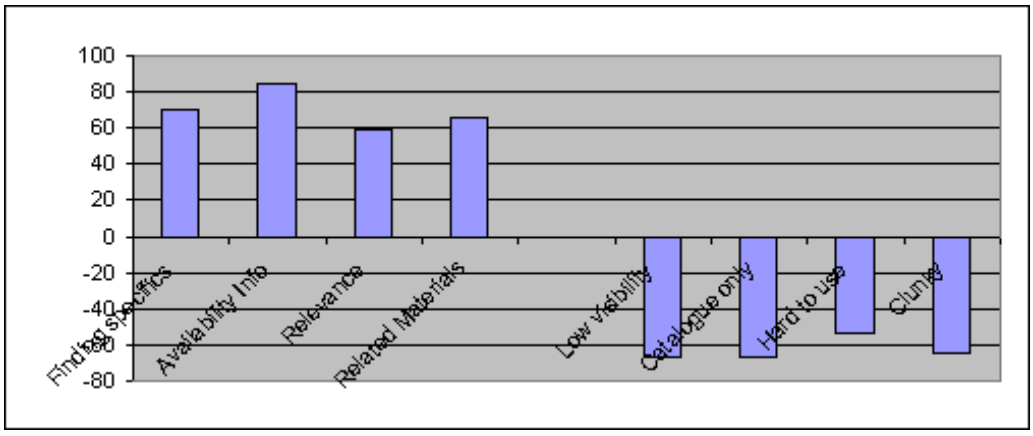


Table 7 LMS Advantages & Disadvantages for Library Staff

Note - like all questions in the survey, this was answered by the designated staff respondent in each HEI

	Advantages & Disadvantages For Library Staff	
	Advantages	
Q21	Reliable	84
	Efficient processes	66
	Functional	61
	Easy to use	42
	Disadvantages	
Q22	Corporate integration	-70
	New staff demands	-46
	New student demands	-58

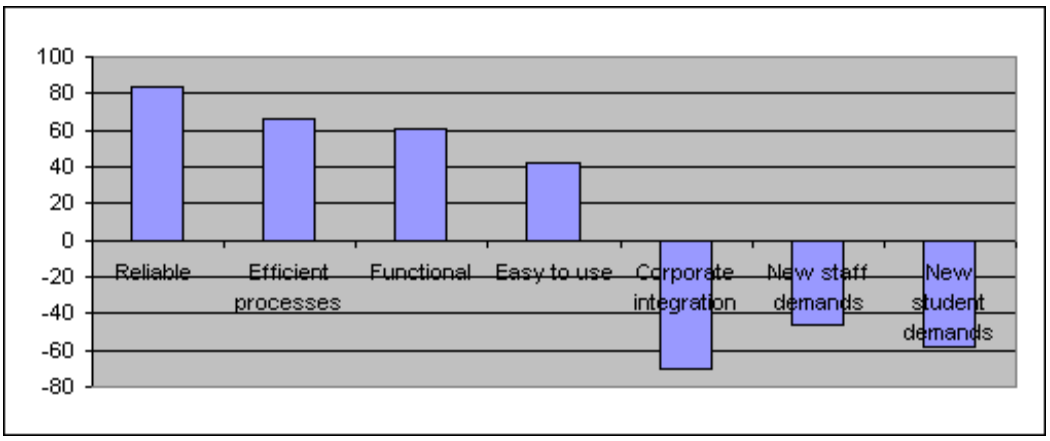


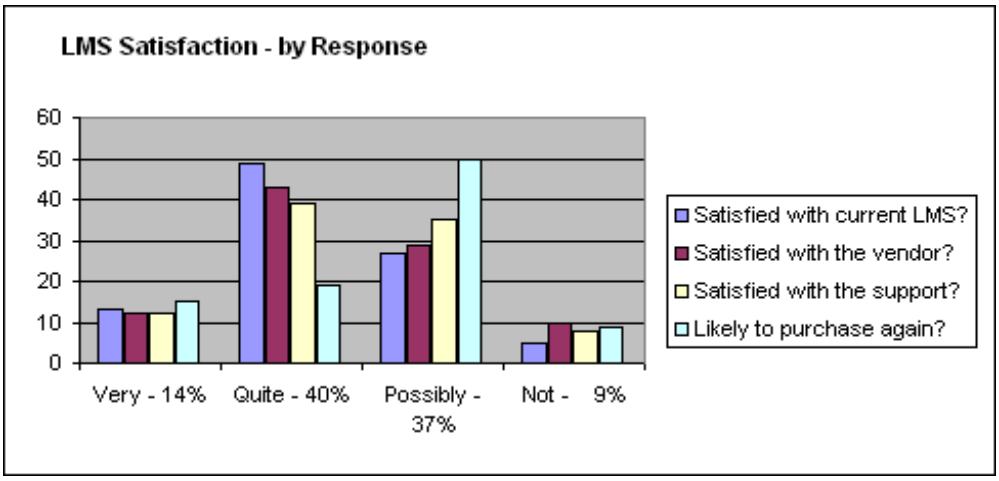
Table 8 Library Satisfaction with current LMS

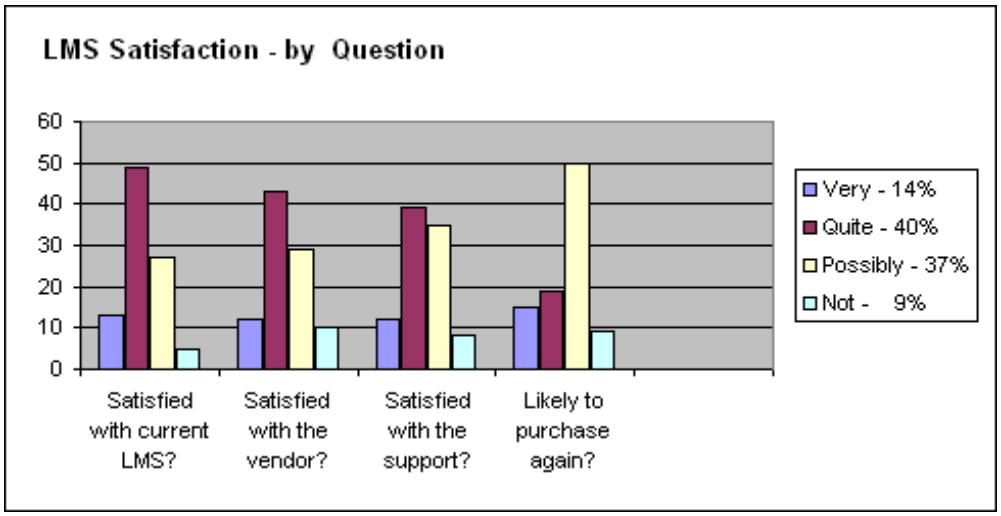
Note - like all questions in the survey, this was answered by the designated staff respondent in each HEI

Q23& **Satisfaction with current LMS**

Q26a

	Very	Quite	Possibly	Not	Total
Satisfied with current LMS?	13	49	27	5	94
Satisfied with the vendor?	12	43	29	10	94
Satisfied with the support?	12	39	35	8	94
Likely to purchase again?	15	19	50	9	93
Average % Satisfaction	14%	40%	37%	9%	100%





A1.5 Expenditure

Table 9 Overall Spend

Q11 **Overall Spend - 3 Years**

See also Q12 / 13 – detail of Technology Spend

	< 50k	51-100k	101-250k	251-500k	> 500k	Total
Materials 2006-7	9	4	10	9	57	89
Materials 2007-8	8	5	9	9	58	89
Materials 2012-13	4	4	7	4	59	78
Technology 2006-7	29	36	21	2	1	89
Technology 2007-8	27	37	22	2	1	89
Technology 2012-13	11	30	32	2	1	76
Staff 2006-7	9	22	15	16	23	85
Staff 2007-8	8	22	16	14	25	85
Staff 2012-13	3	19	14	13	26	75

Q11 **Overall spend - 2006-7**

	< 50k	51-100k	101-250k	251-500k	> 500k	Total
Materials 2006-7	9	4	10	9	57	89
Technology 2006-7	29	36	21	2	1	89
Staff 2006-7	9	22	15	16	23	85

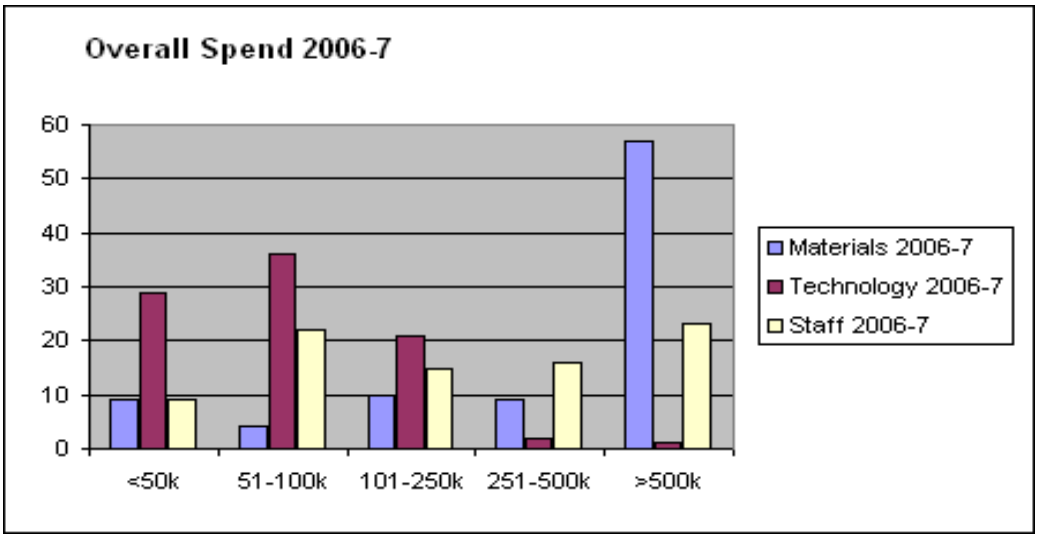


Table 10 Technology Spend

Q12 & Q13 **Annual Technology Spend**

Q12	**Capital Budget Areas**	**<25k**	**26-50k**	**51-75k**	**76-100k**	**101-150k**	**151-200k**	**201-250k**	**251-300k**	**301-400k**	**401-500k**	**501-600k**	**601-700k**	**Total**
	LMS	5	11	2	5	12	11	12	1					59
	ERM	14	8											22
	Metasearch	23	13	2										38
	Vertical Search	0	4											4
	Open URL Resolvers	34	4											38
	Other Capital Costs	16	4	2	1	2		1	1					27
Q13	**Annual Budget Areas**	**<25k**	**26-50k**	**51-75k**	**76-100k**	**101-150k**	**151-200k**	**201-250k**	**251-300k**	**301-400k**	**401-500k**	**501-600k**	**601-700k**	**Total**
	Support	17	30	16	8	6								77
	Consultancy	34												34
	Other Annual Costs	14	5	1										20

Q12 / 13 **Budget Area Totals**

		<25k	**26-50k**	**51-75k**	**76-100k**	**101-150k**	**151-200k**	**201-250k**	**251-300k**	**301-400k**	**401-500k**	**501-600k**	**601-700k**	**Total**
	Total Overall	5	6	7	8	9	12	6	10	13	3	1	1	81
Q12	Total Capital	7	9	8	1	9	8	6	10	8	1	1		68
Q13	Total Annual	17	21	20	12	6	1							77

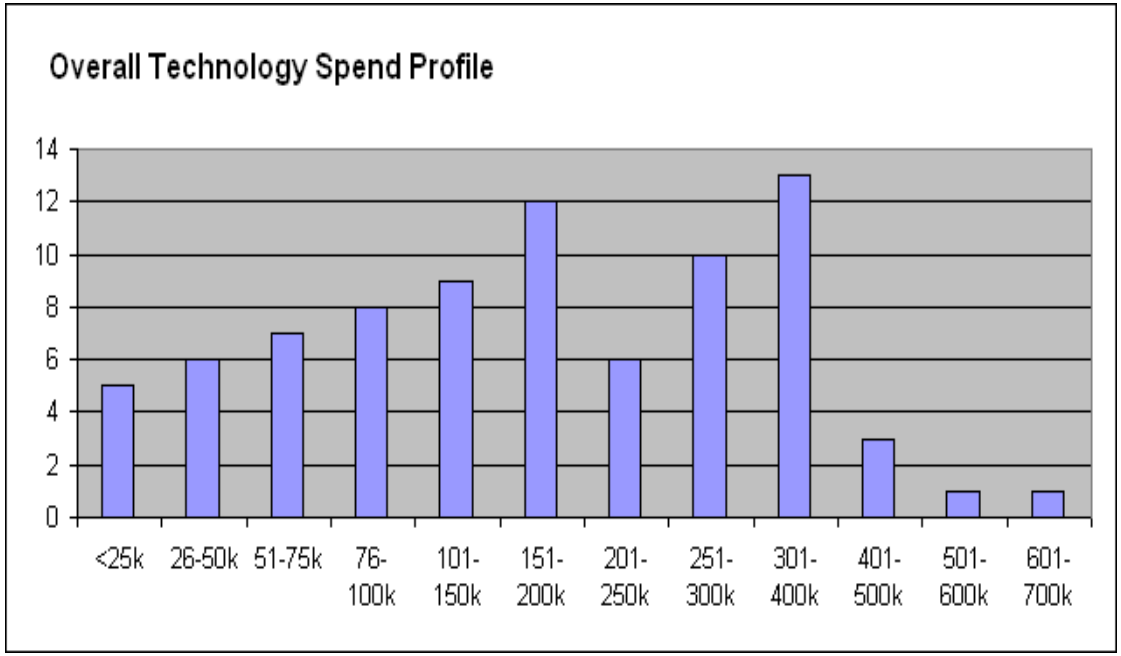
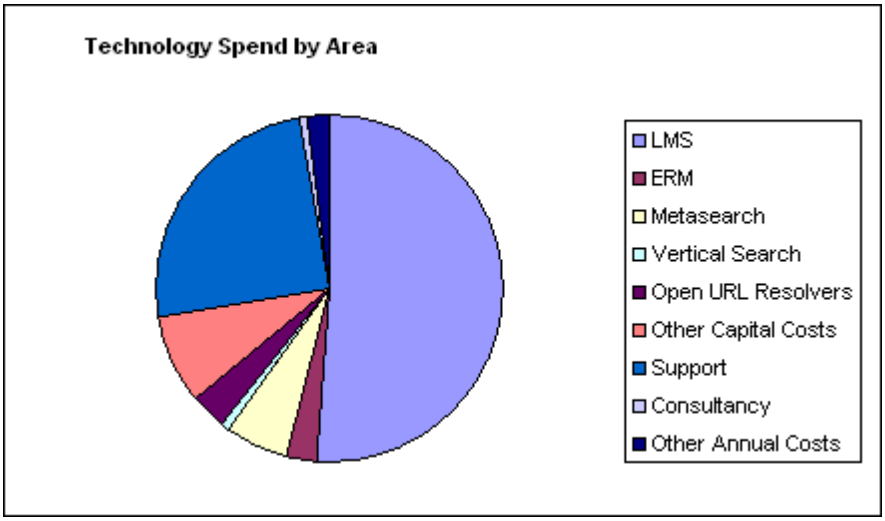

Overall Technology Spend Profile
14
12
10
8
6
4
2
0
<25k
26-50k
51-75k
76-100k
101-150k
151-200k
201-250k
251-300k
301-400k
401-500k
501-600k
601-700k

Table 11 Technology Spend by Budget Area

Q12 / 13 **Budget Area Percentages**

	Budget Area	£000s		% Overall	% Capital	% Annual
Q12	LMS	8042		51.0	70.5	
	ERM	457		2.9	4.1	
	Metasearch	915		5.8	8.0	
	Vertical Search	142		0.9	1.3	
	Open URL Resolvers	536		3.4	4.6	
	Other Capital Costs	1309		8.3	11.5	
Q13	Support	3926		24.9		90.0
	Consultancy	126		0.8		2.9
	Other Annual Costs	315		2.0		7.1
	Total	**15768**		**100**	**100**	**100**



A1.6 Systems Development

Table 12 Service Development & Integration

Q15 **Service development**

15a **Breakdown by approach**

	Search Exposure	VLE Int	VRE Int	JISC IE Int	MIS Int	Web 2.0
No plans - in house	9	2	5	5	1	3
No plans – vendor	6	4	8	9	1	2
No plans – combination	7	3	19	17	3	4
No integration yet - in house	12	12	18	16	8	14
No integration yet – vendor	6	6	6	3	6	9
No integration yet - combination	7	10	11	10	6	13
Some integration - in house	18	28	9	9	27	17
Some integration – vendor	20	17	1	2	12	15
Some integration - combination	11	14	1	5	29	13
Full integration - in house	2	4	0	0	0	0
Full integration - vendor	1	0	0	0	1	1
Full integration - combination	1	0	0	0	0	1
Total	100	100	78	76	94	92

15b **Totals regardless of approach**

Int = Integation	Search Exposure	VLE Int	VRE Int	JISC IE Int	MIS Int	Web 2.0
No plans - total	22	9	32	31	5	9
No integration yet - total	25	28	35	29	20	36
Some integration - total	49	59	11	16	68	45
Full integration - total	4	4	0	0	1	2
Total	100	100	78	76	94	92

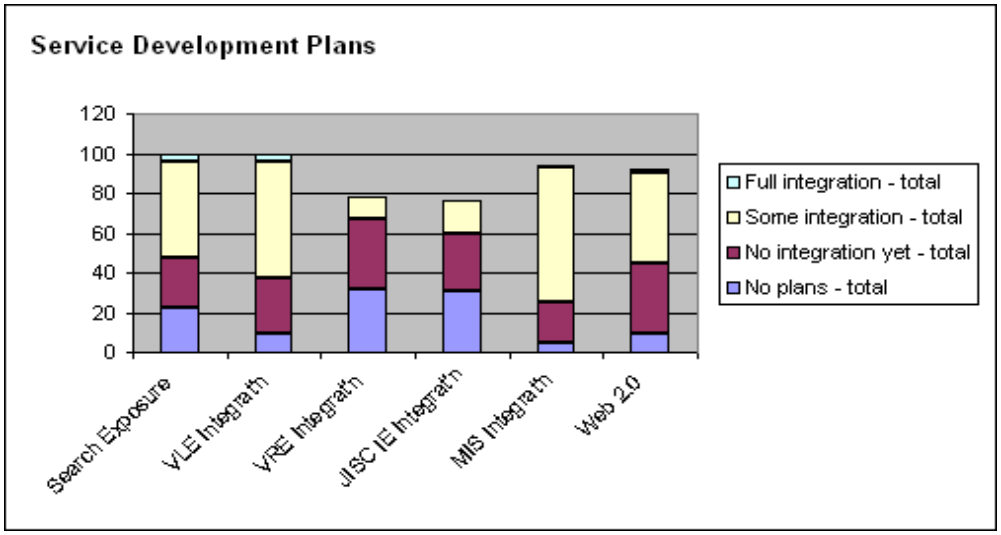
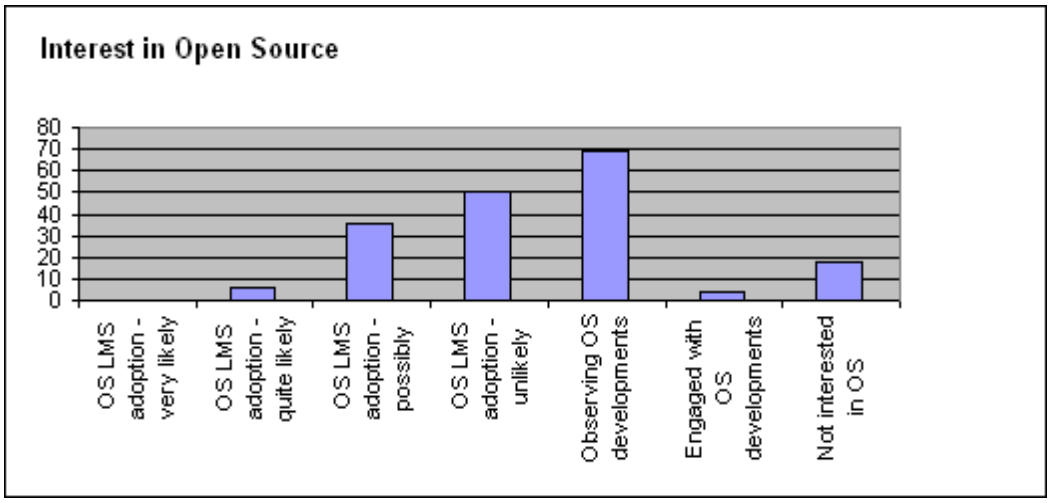


Table 13 Interest in Open Source & Web Services

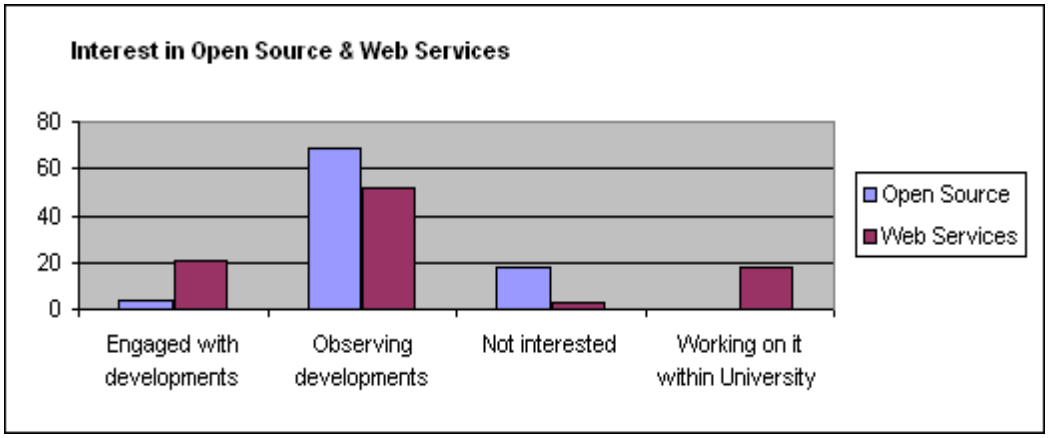
Q26b / 27 **Interest in Open Source**

Q26b	OS LMS adoption - very likely	0
	OS LMS adoption - quite likely	6
	OS LMS adoption – possibly	36
	OS LMS adoption – unlikely	50
Q27	Observing OS developments	69
	Engaged with OS developments	4
	Not interested in OS	18



Q27 / 28 **Interest in Open Source and Web Services - Comparison**

	Open Source	Web Services
Engaged with developments	4	21
Observing developments	69	52
Not interested	18	3
Working on it within University		18
Total	91	94



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Appendix 2 - Vendor Profiles

Contents

A2.1 UK HE Market Overview

The LMS study identified vendor market share in UK HE as follows

Market Summary	Number of customers	% share
Total number of HE institutions	**183**	**100**
Axiel	1	0.55
ExLibris (incl. Endeavor)	43	23.50
Infor (formerly Geac)	3	1.64
Innovative Interfaces	33	18.03
ISOxford	6	3.28
OCLC Pica (formerly FDI)	3	1.68
Payne Automation	1	0.55
SirsiDynix	41	23.40
Softlink	1	0.55
Talis	42	22.95
VTLS	1	0.55
Unknown	8	4.37

Therefore just four vendors enjoy a closely balanced 88% market share

Market Summary	Number of customers	% share
Total number of HE institutions	**183**	**100**
ExLibris (incl. Endeavor)	43	23.50
Innovative Interfaces	33	18.03
SirsiDynix	41	23.40
Talis	42	22.95
The four UK HE market leaders	**159**	**87.88**

Within the scope of the JISC & SCONUL LMS Study, Ken Chad engaged in dialogue with Directors and senior managers from these four vendors in autumn 2007.

We gratefully acknowledge this significant input from the vendor community, which is reported here with permission.

Note therefore that *text in italics* **in this Appendix indicates content taken directly from the vendor interviews, the voice of the vendor.**

A2.2 ExLibris

Interview with:

Oren Beit-Arie, Chief Strategy Officer

Mr Beit-Arie, who joined the Group in 1988, is one of the primary developers of the OpenURL standard and has been deeply involved in the design of ALEPH 500, the creation of MetaLib and SFX, and the overall research activities of the Company. Mr Beit-Arie holds a BSc in Mathematics and Computer Science from The Hebrew University of Jerusalem and an M.A. in Theoretical Linguistics from Tel-Aviv University.

Additional information:

Julie Booth, Managing Director, Ex Libris (UK) Limited

Ms Booth joined the Group in 2000 as UK Sales Manager and was subsequently promoted to the position of President of Ex Libris (UK) Limited. Ms Booth has concluded major agreements with customers in the UK, including the British Library. Prior to joining Ex Libris, Ms Booth was a senior sales consultant for Dynix.

A2.2.1 The Business

(Adapted from Breeding 07[93] with changes and additions)

Ex Libris Group

Bldg. 8-9 Malcha Technological Park, Jerusalem, 91481, Israel
Tel: +972 2 649 9100
www.exlibrisgroup.com

UK Office - Ex Libris (UK) Ltd

1 The Long Room, Coppermill Lock, Park Lane, Harefield, Middlesex UB9 6JA
Tel: 01895 824440

Company Profile

ExLibris was acquired by Francisco Partners, a private equity firm based in Menlo Park, CA, in July 2006 for $62 million. The company went on to purchase Endeavor in December 06

ExLibris is the largest global LMS company focused almost exclusively on academic research and national library automation and the second largest overall, behind SirsiDynix. The addition of Endeavor libraries concentrates about half its customer base in the United States, and the combined company has software in 80% of Association of Research Libraries (ARL) member institutions.

[93] 'An Industry Redefined. Private equity moves into the ILS, and open source support emerges. Automated System Marketplace 2007'. By Marshall Breeding. Library Journal 1st April 2007. http://www.libraryjournal.com/article/CA6429251.html

The scale of the operation (2006)

Global revenues in the £30m-£35m ($60-$70) million range

Global staff:
410

UK HE Annual revenues

3.5m (Estimated). *('About right'* Julie Booth UK MD)

Estimated as follows: Talis has £3.3m (estimated from 2006/06 accounts from Companies House) from 23% market share of UK HE. ExLibris also has 23% market share. A reasonable revenue estimate is 3.5m as there are higher revenues from new business and MetaLib/SFX add-on sales. Annual maintenance revenues are probably a little less than Talis, which has a much more mature customer base

UK based staff

15

Presence in UK HE

The now combined ExLibris and Endeavor has the largest share (just over 23%) the UK HE market –but only just above Talis and SirsiDynix

A2.2.2 Strategy

Current trends

In principle, we look at general trends then map them to our domain (national, academic and research institutions).It's vital to look beyond library space—in terms of technology and also information access & delivery landscape. So we adopt and integrate the wider trends into the library domain

User needs

For many years we, as a library vendor, focused on the needs of the library and its staff. This changed a few years ago when we realized that users are under-served in the then-current library services offerings. This led us to put a focus also on user-centric solutions. In simple terms it's about putting the user in the centre and building solutions around their needs and expectations. As users' needs and expectations are determined and derived from their overall Internet experience, the solutions that we design should be on par with other, non-library, on-line services.

Perhaps the most important aspect of that is the fact that most users are not very likely to use and utilize systems/solutions that require them to learn query languages, thesauri or classification schemes. They are also not too interested in internal library structures and collection types – e.g. whether a particular resource is held locally or accessed remotely or whether it is available to them through paid subscription or through open-access arrangement, etc. We need to 'shield' the users from internal library decisions.

At the same time, users do need sophisticated, intelligent and accurate tools to help them achieve their goals. In most cases, in our domain, the users goal is to use (access, download, cite) a scholarly resource (we call it Get-It!). Finding it is just a means to an end. Getting it and using it is typically the goal. And in most cases, users would prefer to be able to do all this in context of their work – be it as a learner or a lecturer or a researcher – which means that users expect those services to be fully integrated with their 'native' environments – be it their LMS, RMS, or even their desktop suite of applications (e.g. MS office). Another important aspect of that is that users are typically indifferent to where they should search. They certainly don't want to navigate through a dozen different indexes and/or repositories of content…

In order to best address user needs, ExLibris implemented and supports a de-coupled architecture: de-coupling user services from back-office, library management services.

Trends in how staff interact library systems

A key need is for integration with other corporate systems and a need for management information. Past focus was mostly about librarians then switched to user but it NOT either/or The next generation people are getting more and more involved in libraries so library staff need same engaging tools. They need to get more and more tasks done but not with more and more people –so it's about streamlining.

Influence of Web 2.0

Perhaps the two most important aspects that we've identified are:

1. *User contribution: users are no longer only passive consumers of content. They are also active contributors. Moreover, enticing them to do so adds significant value to the whole community of users*
2. *Mash-up opportunities: building systems in web 2.0 "spirit" enables mash-up of services that increases the value and the ability of library services to better integrate with user spaces*

It is important to note that these come to play both is front-end, user services as well as in back-office, library management services.

Interoperability

End users-researchers educators and learners-- have their own user spaces where they spend most of their time. They may use a variety of social network tools, learning and teaching applications, research tools etc. So in terms of library services we need to get out of silos and embed services. The user's experience doesn't begin or end in a library space---the library is just part of the process. We won't have total ownership of the information space. So have to work with other players including Google Scholar, MSN, Windows Live Search Academic, and social spaces like Facebook etc. To embed service in these environments and spaces is strategic for ExLibris.

We are probably at the geek phase at the moment so there so there is a need for some 'hands-on' technical skill —but benefits need to be to the general audience –hence the community approach. Developments are available to everyone in the ExLibris community.

The continuing value of library and its community

There are a lot of unique resources in institutions so there is still a big role in making these available—through remote access, physical copy, digital etc. Libraries are in a good position to understand their (closed) user community needs and match specific services to them. We believe that one of the most important value propositions of libraries is through offering contextualized services. Libraries can fine-tune a tool/service for their community. ExLibris will be active in helping customers integrate their library services with other services and approaches. Web 2.0, SOA and adherence to standards are some of the key components to enable the degree of openness and extensibility that is required to achieve these context specific needs.. This may involve in more consulting services.

ExLibris see themselves as having responsibility for the whole process even though they don't have all the components—it means working beyond simply the APIs to get involved in the actual mashing up of services. So we create systems that are open and provide platforms to enable mash-ups and collaboration—community collaboration. We want applications that can evolve and that can support development by the community. Among other things, this demands a high adherence to standards. We don't see a complete move to Open Source--for the whole LMS. However an important part of the SFX source code is open – to enable easy customization and extensibility.

So we worked with Google scholar – we worked on OpenURL support, to enable users to link directly to library resources. Google is a legitimate access tool but does not cover all needs of scholars and learners. In particular, it is hard to see how it could meet the need of finding and getting the less popular, less cited, yet not less important body of scholarly and cultural content that many libraries have. We believe it would be fair to say that Google is misaligned in that task –it's not their biz, which is driven by advertising.

So Primo is part of the mix. It's about complimentary products and services (not secondary) --what I mean here is that it will be one of the access points, not the only discovery point. But it does provide a key aspect of relevance to the community it serves regardless of the format of the resource. It's about services for a specific audience. Another point –existing library systems don't deal well with non-print paradigms. There will be an increasing role of usage data in guiding collection development. Libraries should be tracking user data –so should NOT give this role up to Google (et al)—or rather they should make sure they benefit from the treasure of usage log files. From usage manifested in click streams, libraries could derive various metrics and have the basis for recommendations etc. This is valuable data for the library in terms of developing its services and collections (print and electronic)

Primo is about unification of access-- unification of library collections from a users point of view. It's a stand-alone product but clearly this also will benefit from interoperability with back end systems. SFX too was a stand-alone product but is interoperable. Another key trend is the increasing move to de-coupling of systems –esp. backend (library) systems

Primo right now tightly integrated with MetaLib but it's open to other federated search approaches. There are practical and pragmatic barriers to a genuine and totally open 'best of breed' approach.

Unification of access & Resource discovery

Primo represents a first step towards a new architecture of library information systems. Primo unifies the user services across all types of resources regardless of format and location. The next step for us in the new architecture is unification of the management of all library resources, regardless of format and location. We refer to this new architecture and framework – URM (for Unified Resources Management) framework. Our goal is to revolutionize back-office library management tools in the same way we've revolutionized end-user discovery and access tools through primo. It's about providing library management tools that breaks down the ILS/ERM/DAM silos, that moves from point solutions to a unified framework.

One of the key goals is to provide a solution for the full business process—front end and back end (library management)-and this needs to cut across all format types. Solutions that can't look across all formats are incomplete –and it's not just about electronic. Print remains important

Standards

The ExLibris view is to map the process and then fit the library system well into that overall process. So we need interoperability standards. I [Oren] see the adoption of Open URL by Google as one of ExLibris' greatest successes, but this is an exception for a library standard. There is a need to profile general standards for the library domain. There needs to be community specific profiles and the library is just one of these communities

ExLibris is closely involved in the NISO Architecture Committee (Oren is the representative). The role of W3C is important as they are integrating with the whole web community. RDF, SOAP, etc are increasingly important

SOA and web services

Newer products have web services embedded from the start. We have also developed a suite of web services based APIs (X services) for core Aleph LMS. This enables web services interoperability with, for example, student registry, finance, payment systems, and authenticate and authorisation systems. In the Uk for example they can now deliver a generic web services API to SITS. At Nottingham MetaLib and Aleph services are integrated with the University Portal (uPortal)

With the latest ExLibris product offerings- e.g. Primo- web services is built in right from the start so that it can work with other user interfaces.

Open Source

Open source is reducing the costs of development and therefore the costs to consumers. Open source components are embedded in Ex Libris products. For example Primo uses the Lucene (from Apache) search engine. ExLibris products themselves however are not distributed as open source

Where is the future investment going?

Key two spaces (see above). There is of course much emphasis on Digital – creation of local outputs and repositories that store and share that output

preservation. This includes national libraries and other special collections. This is the 'third' realm. Expenditure is shifting from print to electronic and now to digital. This is a key area for change. Increasingly boundary lines will have to be redrawn - don't have to be single institutional, could be shared across institutions. So this brings libraries more into contact with non-library players.

Growth opportunities for LMS/ERM

There are still some geographic spaces to exploit, which means having systems that can truly address different cultures. This has benefits to all - e.g. Chinese literature is not just of value to the Chinese. No short terms plans on other sectors.

Differentiators in and approach to, the UK HE market

There are more central licences, some minor stuff on biz process and different vendors but really UK strategy is simply part of a global strategy. In product terms there are some minor UK specific differentiators in things like short loan and ILL but nothing major.

The UK is major world player in HE and for example has a significant proportion of the world's top universities. It is, therefore, a key strategic market for ExLibris. Its needs play a big role in how we develop our products and services. Our global positioning and presence helps our UK customers connect to the global scene and benefit from global trends and best practice. We also ensure we deliver to UK functional specifics in our products (e.g. UK ILL has some unique characteristics because of the place of the BL)

A2.2.3 Market offering

The main components/modules in the offering to the HE library market:

(Adapted from various sources including the company website)

LMS

ALEPH 500

Includes modules/add-ons:

Web OPAC
ADAM (enhanced cataloguing of and linking to digital objects)
Cataloguing Acquisitions/Serials
Circulation
Resource Sharing
Interlibrary Loan
Reporting Center

In 2006 ALEPH 500 got to release 18, 67 new sales in 2006, bringing the total installed base 1,941;

Voyager 12 new in 2006

Installed base 1,175 libraries

ALEPH 500 and Voyager therefore have 3,116 combined installations.

The UK installed base is 43 (approx 1.4% of global total)

Resolver

SFX

SFX - the original OpenURL link resolver - is a tool for interconnecting library-controlled resources and services. SFX provides users with context-sensitive links to services that librarians define on the basis of their institution's e-collections and policies. Such services, which are dynamically created, can include links to the full text of an article, the OPAC (for local holdings), preferred document-delivery suppliers, related Web-based resources and services, local information repositories, and a range of other services.

'Continues to see strong sales' (Breeding 2007).

'In 2006 SFX got its 1000th customer'

The UK Installed base is 58. (Julie Booth UK MD)

Metasearch

MetaLib

MetaLib provides a consolidated search environment for remote information resources. MetaLib streamlines the discovery process by presenting users with content from multiple information providers in one user interface

'Continues to see strong sales' (Breeding 2007).

The UK installed base is 44. (Julie Booth UK MD)

ERM

Verde

The Verde system is designed to be a powerful single point of administration for all of a library's e-resources, taking into account the complex, multidimensional nature of electronic resources. Verde uses its own global knowledge base and builds on the power of the SFX® link server to provide access to hundreds of thousands of electronic products. Electronic resources present many new challenges to library administrators, in the areas of subscription management, licensing, user permissions, and ongoing post-subscription access. Verde supports the service requirements of e-resources by complementing, not replacing, the systems currently deployed by libraries. Verde uses Web Services to share its information with a range of applications, including other staff tools such as acquisitions and cataloguing systems, and end-user applications such as OPACs, A-Z lists, Metasearch tools, and link servers.

'Endeavor-developed Meridian will fall away in favour of Verde, which had significantly higher sales prior to the merger. The two products have combined installations of 103 libraries, with 80 new sales in 2006'. (Breeding 2007)

The UK installed base is 13 (in addition 2 Meridian sites will migrate to Verde in next few months) (Julie Booth UK MD)

Vertical search

Primo

Primo is a one-stop solution for the discovery and delivery of local and remote resources, such as books, journal articles, and digital objects. Primo assists libraries in exposing the richness of their collections and engaging users with an up-to-date

discovery and delivery experience. Interfacing with library applications from Ex Libris and other vendors, Primo is a stepping stone in the transformation towards a new information system architecture—unifying front-end user services and back-end management of all types of library resources, regardless of format and location.

'In 2006, Ex Libris channelled much of its energies into the development of Primo, the company's next- generation interface, a new discovery and delivery tool' (Breeding 2007).

The UK installed base is 2 (Julie Booth UK MD)

Digital Content Management

Digitool

DigiTool® is an enterprise solution for the management of digital assets in libraries and academic environments. DigiTool enables institutions to create, manage, preserve, and share locally administered digital collections. It can improve the integration of digital collections with institutional portals and e-learning systems

(In UK Digitool is being targeted as a solution for Digital Repositories)

The UK installed base is 7(Julie Booth UK MD)

How do ExLibris products interoperate with products those from other LMS/ERM vendors?

We interoperate with our own products first (e.g. Primo and MetaLib) but all new products designed to interoperate more widely by means of standards

Does ExLibris have partnerships with other LMS/ERM vendors?

With Talis for Verde

A2.2.4 Engagement with Customers

Customers doesn't mean exclusively Aleph/Voyager LMS customers. For the UK we have territory based User Groups that focuses mostly of product detail – enhancement etc. Also have specific product based groups. There is also a strategy group for UK Library Directors (cf ARL Director Group in USA). The underlying need for Primo and Verde was identified in this strategic process. They deal with wider environment. They are deliberately not constrained to specific areas where it is felt ExLibris must play in a product sense That keeps us involved and aware of the wider HE environment.

If there is output that can be developed into appropriate products then this will go to focus groups/advisory boards—but these are deliberately not just UK based. They will start to develop a general scope and then work with system people. Ex Libris also uses specific library development partners, but again this is not on a narrow UK basis—we deliberately don't have development partners from just one geography. In addition we will pick dev partners outside our core Aleph/Voyager LMS base to ensure any new products and services can interoperate with non Ex Libris LMSs.

So the underlying need that was later expressed in product terms with Primo came out of strategy meetings. As well as development partners we set up a 'charter' group for Primo. These are the 'early' adopters—wider than dev partners. They get involved with the fine tuning—e.g. around documentation or implementation processes. In terms of UK only specifics these tend to be around services. However we did have a recent UK specific focus group on ILL because the ILL landscape in the UK is different because of the special role the BL plays.

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A2.2.5 UK HE customers

New LMS accounts in UK HE since January 2005

- 2005 University of the Arts (Talis to Voyager)
- 2005 Nottingham Trent (Dynix Classic to Aleph)
- 2006 University of Gloucestershire (Unicorn to Aleph)

ExLibris LMS Customers - January 2008

Institution	LMS	OPAC
Aberdeen, University of	Aleph	WebOPAC
Anglia Ruskin University	Aleph	WebOPAC
Bristol, University of	Aleph	WebOPAC
Canterbury Christ Church University	Aleph	WebOPAC
Courtauld Institute of Art	Aleph	WebOPAC
Coventry University	Aleph	WebOPAC
Dundee, University of	Aleph	WebOPAC
East Anglia, University of	Aleph	WebOPAC
Gloucestershire, University of	Aleph	WebOPAC
Goldsmiths, University of London	Aleph	WebOPAC
King's College London	Aleph	WebOPAC
Lancaster University	Aleph	WebOPAC
Liverpool John Moores University	Aleph	WebOPAC
London, University College (UCL)	Aleph	WebOPAC
Loughborough University	Aleph	WebOPAC
Napier University	Aleph	WebOPAC
Newcastle University	Aleph	WebOPAC
Norwich School of Art & Design	Aleph	WebOPAC
Nottingham Trent University	Aleph	WebOPAC
Nottingham, University of	Aleph	WebOPAC
Royal Holloway, University of London	Aleph	WebOPAC
Westminster, University of	Aleph	WebOPAC
York, University of	Aleph	WebOPAC
Abertay, University of	Voyager	WebVoyage
Aberystwyth University	Voyager	WebVoyage
Cambridge, University of	Voyager	WebVoyage
Cardiff University	Voyager	WebVoyage
Edinburgh College of Art	Voyager	WebVoyage
Edinburgh, University of	Voyager	WebVoyage
Falmouth, University College	Voyager	WebVoyage
Heriot-Watt University	Voyager	WebVoyage
Hertfordshire, University of	Voyager	WebVoyage
Kent, University of	Voyager	WebVoyage
Lampeter, University of Wales	Voyager	WebVoyage
London School of Economics and Political Science	Voyager	WebVoyage
Open University	Voyager	WebVoyage
Plymouth, University of	Voyager	WebVoyage
Richmond - The American International University in London	Voyager	WebVoyage
Royal Welsh College of Music and Drama	Voyager	WebVoyage
Strathclyde, University of	Voyager	WebVoyage
Swansea University	Voyager	WebVoyage
University of the Arts London	Voyager	WebVoyage

Wimbledon College of Art (University of the Arts London)	Voyager	WebVoyage

A2.3 Innovative Interfaces

Interview with:

Neil Block, Vice President of Worldwide Sales

and

Gene Shimshock, Vice President Marketing

A2.3.1 The Business

(Adapted from Breeding 07[94] with some changes)

Innovative Interfaces, Inc.

Emeryville, CA; +1 510-655-6200
http://www.iii.com

UK Office

3 York Court, Upper York Street, Bristol BS2 8QF
Tel 0117 910 8100

Company Profile

Innovative Interfaces, a privately held company wholly owned by cofounder, Chairman and CEO, Jerry Kline, ranks as the third largest in the industry and has retained its market standing broadly without mergers and acquisitions. The only M&A activity was in 1997 when it took over the UK based LMS provider SLS which had a significant share of the UK HE market. The company prides itself on its corporate stability and has been profitable every quarter since its founding.

Innovative operates globally and operates in the academic and research, public and schools sector. About 70% of the company's 2006 business was from U.S libraries. Millennium, the company's flagship LMS, saw 67 new sales, more than any competing

[94] 'An Industry Redefined. Private equity moves into the ILS, and open source support emerges. Automated System Marketplace 2007'. By Marshall Breeding. Library Journal 1st April 2007.
http://www.libraryjournal.com/article/CA6429251.html

product. Millennium is very strong in US research libraries having a first-place ranking of 38 out of the 123 ARL institutions. It has well-developed products for consortia resource sharing. In the UK its focus was for many years solely in academic libraries. It now has two UK public library customers.

The company has focused much of its current effort on a vertical search product 'Encore', which it characterises as a 'new discovery services platform for library patrons.' The company launched Research Pro, a new federated search product, which replaced its earlier offering, MetaFind.

Innovative's ERM system was the first commercial system available in this product category and continues to hold the lead in number of installations; version 3 was released in 2006 and includes support for the new SUSHI standard for automatically retrieving usage statistics from publishers. Innovative has 201 ERMS customers, up from 180 last year.

The scale of the operation (2006)

Global: Revenues $70-$80 million

Global: staff: 295

UK based staff

10

Presence in UK HE

Innovative is number four in terms of market share in UK HE with 18% of the market.

UK HE Annual revenues

Innovative reports its total UK revenues at £ 5,645,354 (the 2006 revenue figure from the filed company accounts for Innovative Interfaces Ltd).

There is a small number of non-UK HE customers (Irish HE, FE, public) but the UK HE is very much the large majority of the customer base. A UK HE figure is therefore probably around £4.5m which certainly makes Innovative the highest earner in UK HE despite not having the largest market share.

A2.3.2 Strategy

The company is very focussed on delivering a comprehensive suite of solutions to libraries. We take pride in our ability to take advantage of the wider trends and developments and bring them, often ahead of other vendors, into the library space—e.g. ERM, Encore. Why is this? It's because we don't have the distractions of VC, mergers and other ownership changes. So we are very focused on getting products out the door. We focus on product, customer and service. Our continuing profitability keeps us strong.

Our global and UK, strategy is all about organic growth—we don't want a bunch of customers, acquired through a merger for example, who didn't select us. We

still see strong new name account growth. Of course the market is mature, but we dispute the characterisation that all LMSs are the same. Libraries recognise there is still a clear difference. So, customers still find strong tangible reasons to switch to Millennium.

Current trends

Much more focus by libraries on the user experience. That has fed directly into product development and hence Encore –which is about streamlining that experience and making it a rich web-based experience.

Integration of e-resources – bringing them in with everything else

Why not make it all available in Google? We acknowledge that research often initially does take place in Google but the library has a role in giving authority (in an Innovative products context via Webridge and Research Pro, for example).

Resource Sharing

Increasingly we see groups of libraries sharing resources via, for example, INN-Reach –in US, Australia but not much in UK yet. INN-Reach ties together individual libraries and uses a patron-initiated (rather than a library mediated) model in circulation. Primarily this is being done by a physical (i.e. not distributed via z3950 for example) shared resource –i.e. INN-Reach is also a peer-to-peer system. Libraries are often surprised by the lack overlap in collections –finding for example 70% unique. From a circulation point of view systems can be decentralised. Sharing has now moved beyond the physical print resources to e-journal and is why Innovative developed 'ArticleReach'. So we see resource sharing has become an important strategic initiative. It dramatically reduces costs.

Trends in how staff interact library systems

It's about providing a more streamlined system that also interacts easily with external (e.g. Admin) systems. Our approach is to use web services to make links to outside services to improve staff productivity to deliver enhanced services to users. For example our 'Program creation and registration' software enables the dynamic linking of events (conferences etc) to other resources displayed in the OPAC. For example if the student searches for they will see print, e-resources etc combined with relevant events in their subject field.

Trends in wider technology -

SOA/Web services

A focus on web services to share data is a key emphasis—moving past the old batch file paradigm—so opens up sharing with non-library institutions such as registry, Amazon etc. One of our Web services based approaches is Inventory Express, an acquisitions module that offers dynamic linking by ISBN from the acquisitions module to vendors for price and availability. In addition we can import records - patron registration and updates, and fines and fees. But admin

systems can be the resistance point and many in library/university admin IT are still more comfortable with batch process.

In terms of portals Innovative supports single sign to enable a user to move from portal to LMS functions without the need to re-identify/authorise.

Also we can embed library data in the portal--fines fees etc--via RSS. So this is about opening more 'channels' to enable data to be available in portals, cell phones, etc.

Open source

Innovative has great deal of experience in leveraging value in open source –so we get best of breed utilities as components of a commercial library system offering. We use OSS within the overall context of our offering to libraries. We remain sceptical about its capability, at present, to deliver large-scale library applications. As part of an overall integrated solution it works and so Innovative supports it. So our approach to OSS might be characterised as tools based rather than code-based.

Many libraries remain challenged in having the resources needed to add development value back into the product. We see this even in our own product…it's sometimes a challenge to get libraries to actually make some of the changes they need to do to provide a more current and functional product. But a small percentage is developing tools; e.g. their own OPAC over the core LMS.

Currently, libraries are considering the OSS decision based on factors other than the functionality that is available in current product offerings. Due to the relatively early stage of the OSS offerings, they don't yet offer the functionality of current commercial offerings. We know that this will change over time but, at the current time, those looking at OSS are interested in the community aspects of this software rather than specific service or functional benefits.

Social computing, tagging, community (Web 2.0/Library 2.0)

Innovative has been very aggressive in getting this into products –e.g. user generated review, ratings and tags…and that will continue. . Encore is specifically designed to address this need with tagging and user initiated reviews, etc. But we still face conservatism of librarians to e.g. tagging, which is a barrier to the take up of these features.

Where is the LMS going?

Many competitors are still in the process of renewing their legacy products. Innovative's early move into Java means we've already done that --so it has allowed continued focus on functionality rather than focus on changes to accommodate underlying platform changes for the LMS. So for example in Acquisitions a web services approach means that as soon as you type in an ISBN the system can go out and provide price information dynamically from the vendor. As you order you can link into reviews etc…so this is about integration in the staff side. The 'LMS is the electricity of a library' so that it becomes the integration point of many other services. So it's about extending the LMS to

match the extended role of library as it moves, for example, to electronic material and web services integration with other systems or institutional repositories

Where is ERM going?

Innovative was very early on into ERM to manage e-resources and this now includes integration of usage statistics -SUSHI, COUNTER and mashing up with acquisitions data so libraries get some real analysis of usage and so can start to understand better the return on investment for these expensive electronic resources. Our ERM offering has broad market acceptance, is well developed, and already on Version 3.

ERM represents another way to expand our market by selling to libraries that use a competitor's LMS. In fact Innovative started by selling products to interface with other LMS so it's nothing new. What we are always trying to be is the best in the market.

Where is the future investment going?

(From Breeding 07).

'Innovative Interfaces focused on developing Encore, a new discovery services platform based on Millennium technology' Features planned for Encore include dynamically generated "popular choices," a tag cloud based on subject headings, and faceted navigation. Innovative enlisted 14 development partners to assist in the creation of Encore, including Binghamton University, Nashville Public Library, and Yale University's Lillian Goldman Law Library, among others'

Growth opportunities for LMS/ERM

Innovative still sees healthy growth via acquiring new name accounts. Our very concerted focus on being the best of breed for libraries also means we have substantial growth opportunities to up-sell to our existing customer base. The needs of libraries are constantly changing so there is demand for new products and services. We provide a very diverse and very library focussed, product stream. If we can do it better ourselves, then we will. For example we have a great patron self-check system called Express Lane, which is also cheaper than products from other leading (self service) vendors. New geographic areas will support growth. We do see growth in the Middle East for example. And once in a new geography our product range enables us to go deeper-- across sectors for example. We can start with academic libraries and go into public.

Differentiators in, and approach to, the UK HE market

The UK is very similar to America and Australia. There are some local peculiarities e.g. short loan and some aspects of ILL, but really overall requirements are much the same. However we do see a significant difference in the limited application in the UK of in depth resource sharing across libraries resources sharing. We believe this might change as the economies of scale are proven.

A2.3.3 Market offering

The main components/modules in the offering to the HE library market:

(Adapted from various sources including the company website)

LMS

Millennium

Millennium is Innovative's library management system (LMS) solution. It includes cataloguing, circulation, acquisitions, serials, a Web-based online catalogue (WebPAC Pro) and management reporting functionality. ILL is also available. The web OPAC has optional spell checking and RSS feed functionality. There are options for value-added content such as table of content displays, book jackets, reviews, and e-books.

E-journal Management

Content Access Service (CASE)

CASE) delivers e-journal coverage data –the CASE suite includes Coverage Data Service to complement link resolvers and ERM systems, MARC Record Service and the CASE HTML A to Z List for online browse.

ERM

Electronic Resource Management

The Innovative ERM system manages content, subscription, and licensing information for e-journals, information packages, abstracting and indexing (A&I) databases, and full-text databases. License and resource details display in the WebPAC in both staff and patron modes

Metasearch

Research Pro

Research Pro is a meta-search capability across the library's defined information resources. These information resources can include licensed full-text or citation databases, Web sites, search engines, Z39.50 databases, library catalogues, and local digital collections.

Non MARC (XML-based) cataloguing

MetaData Builder

MetaData Builder allows libraries to describe and store digital collections using Qualified Dublin Core and EAD as alternatives to MARC. The XML-based records created are fully integrated with the MARC records in the database.

Open URL resolver

WebBridge LR

WebBridge LR provides OpenURL linking to full-text article content from citations in external reference databases. It facilitates linking to the appropriate and available electronic copy by matching against the library's journals and their coverage dates

Data harvesting

XML Harvester

The XML Harvester is OAI-PMH compliant. XML harvester provides an automated cataloguing tool that can create MARC records from XML metadata stored on remote servers. These MARC records are loaded into the Millennium database with URL's that offer links to the digital objects stored on the external server where appropriate.

VLE Integration

Courseware Integration – Blackboard

This links WebPAC Pro and My Millennium to course management software. It enables sites using Blackboard community system (formerly called Blackboard Portal System) version 6.x or higher to provide WebPAC Pro and, optionally, MetaFind or Research Pro functionality within Blackboard.

Digital Repository

Symposia

Symposia liberate the 'grey literature' and digital assets regardless of format: Puff's, text, images, learning objects, or executable programs, within an organization's network. It includes a submission facility and searchers have access to a Web-based interface, accessible through its own portal and/or a Research Pro-enabled WebPAC.

Consortia Resource Sharing/Borrowing

INN-Reach

INN-Reach provides for resource sharing for libraries that want to partner with a group of libraries, whether or not they're part of a formal consortium. It connects multiple library automation systems and allows patrons from one library to request and borrow materials belonging to another library. The direct borrowing model provides resource sharing that can be faster and less costly than alternatives.

Article Reach extends the INN-Reach functionality by allowing patrons to request copies of journal articles from a central INN-Reach catalogue. It includes a web form for initiating requests, a staff module for responding to requests for copies of articles held by the supplying library, and access to statistical data to track performance and use of the product.

How do Innovative products interoperate with those from other LMS/ERM vendors?

Our history is rooted in providing products that interoperated with other products. This continues with ERM for example

Does Innovative have partnerships with other LMS/ERM vendors?

No. Our aim is to provide best of breed across the whole range of library needs. Of course we don't stand in the way of libraries that wish for example to add Aquabrowser or Endeca. However we want to provide solutions that are better. To date, we haven't seen a big groundswell for these types of products…for all of the press and interest it has gotten, products like Endeca haven't made a major dent in the marketplace.

A2.3.4 Engagement with Customers

Innovative holds an annual academic worldwide directors symposium. This is very strategic and includes contributions from independent individuals. To be strategic you need to be international and this provides UK libraries with opportunity to engage with their worldwide peers.

At the product level we make extensive use of focus groups, often around major conferences like ALA. The CEO Jerry Kline plays a very active part.

There is a European Users Group with very strong representation from the UK. Key high-level Innovative executives get involved with this user group and provide strategic briefings, etc.

A key part of Innovative's engagement is with development partners. There is nothing necessarily UK-centric about this, however, Glasgow University is especially notable for its involvement as a dev partner for ERM and, more recently, Encore.

The high global profile of UK HE means it is a strategic market for Innovative

A2.3.5 UK HE customers

New name accounts since January 2005

- UHI Millennium Institute (from OCLC (Fretwell Downing) –OLIB LMS)
- Aston University (from DS -Galaxy LMS)

Innovative Interfaces customers in UK HE – January 2008

Institution	LMS
Advanced Legal Studies, Institute of	Millennium
Aston University	Millennium
Bangor University	Millennium
Bedfordshire, University of	Millennium
Chester, University of	Millennium
City University, London	Millennium
Classical Studies, Institute of	Millennium
Commonwealth Studies, Institute of	Millennium
Durham University	Millennium
Edge Hill University	Millennium
Essex, University of	Millennium
Exeter, University of	Millennium
Glasgow, University of	Millennium
Heythrop College	Millennium
Hull, University of	Millennium
Institute for the Study of the Americas	Millennium
Institute of Germanic & Romance Studies	Millennium
Institute of Historical Research	Millennium
Keele University	Millennium
Leeds, University of	Millennium
Liverpool, University of	Millennium
London Metropolitan University	Millennium
London South Bank University	Millennium
London, University of (senate House Library)	Millennium
North East Wales Institute of Higher Education	Millennium
School of Oriental and African Studies	Millennium
Sheffield Hallam University	Millennium
St Andrews, University of	Millennium
St Mary's University College, Twickenham	Millennium
Stirling, University of	Millennium
UHI Millennium Institute	Millennium
Warburg Institute	Millennium
Warwick, University of	Millennium

A2.4 SirsiDynix

Interview with: (with some detailed additions from UK staff)

Stephen Abram, Vice President of Innovation

A2.4.1 The Business

(Adapted from Breeding 07[95] with changes and additions)

SirsiDynix

101 Washington Street SE, Huntsville, AL 35801-4827
Tel: +1 256 704 7000
www.sirsidynix.com

UK Office

The Chequers, Mary's Way, Chesham, Buckinghamshire HP5 1LL
Tel: 01494 777666

Company profile

By its June 2005 acquisition of Dynix by Sirsi, SirsiDynix ranked as the largest company in the industry, and employed 629 people at the end of 2006**.** The acquisition also acquired Sirsi Ltd (now trading as SirsiDynix), the UK company that ran Sirsi's European operations and was owned jointly by its UK Directors and Sirsi Corporation. In December 2006, SirsiDynix entered a new phase when it was acquired by Vista Equity Partners. Vista, a modest-sized private equity firm with about $1 billion under management, purchased 100% of SirsiDynix. Prior to the transaction, SirsiDynix was owned by Seaport Capital (about 80%), a New York based venture capital firm, and HM Capital (10%), with minority ownership by the current and previous executives and directors.

SirsiDynix has customers in 70 countries and serves approximately 4,000 clients in the following library sectors: public, academic, school, special, corporate, government, consortia, and state and national. Worldwide presence: Huntsville, Alabama, Provo, Utah, and St. Louis, Missouri, in the U.S.; Montreal, Quebec, and Waterloo, Ontario, in Canada; London, United Kingdom, Paris, France, Copenhagen, Denmark, Leiden, Holland, Madrid, Spain, and Hamburg, Germany, in Europe; Shanghai, Taipei, and Singapore in Asia; Auckland, New Zealand; and Melbourne in Australia. Distributors are

[95] 'An Industry Redefined. Private equity moves into the ILS, and open source support emerges. Automated System Marketplace 2007'. By Marshall Breeding. Library Journal 1st April 2007. http://www.libraryjournal.com/article/CA6429251.html.

located in Ireland, Greece, Portugal, the Middle East, Africa, Poland, Latin America, and Asia.

The company made 71 new sales for Unicorn in 2006 though sales have declined steadily since 2001.The total installed base for Unicorn and Horizon are remarkably similar, 1,583 and 1,597, respectively.

The scale of the operation (2006)
Global Revenues: approx £60 million ($120 million)

Global staff:

629

UK HE annual revenues.

£2,800,000 (Estimated - not verified by SirisDynix)
Estimated as follows: Talis has £3.3m (accounts 2005/06 from Companies House) from 23% market share of HE so SirsiDynix with the same market should be similar but for the fact that its customer base is more slanted towards smaller HE customers means revenues will be lower

UK based staff

56

Presence in UK HE

SirsiDynix , Talis and ExLibris all have an almost identical market share of 22/23%

A2.4.2 Strategy

Current trends

Global economic trends mean library budgets will become even more constrained. The US dollar is falling and the US economy has major problems—national debt, war funding, sub-prime mortgage crisis, etc. Oil prices are way up so we might start preparing for an economic slow down. This will trickle down to publicly financed institutions, which will have problems. ILS companies will need to help them adjust. But librarians can be fiscally illiterate. They often don't see the big economic picture and the impact of global trends on library success.

All systems in HE libraries need to be systems that integrate with learning and the overall mission and to do that more successfully they need to collaborate at a much higher level---nationally maybe even globally. Unlike most competitors SD, in North America at least, has systems from cradle to grave—so you move from high school, to university you see same patterns a 'scaffold approach to learning.

One of the technology implications of this is SaaS. So SD has built a huge server farm that could run all of their clients. SD has dealt with security issues—has

USA Navy and other major very security conscious clients on it. Libraries working in this way can reduce the total cost of ownership by up to 40%.

So libraries would be well advised to go to 'real' consortia and also to multi-type consortia involving public libraries, FE, schools, and NHS. Unfortunately, many HEIs have become more competitive rather than collaborative.

Trends in how staff interact library systems

Technology needs to be delivering increasing productivity. So increasingly ILSs should reduce staff and also keystrokes. (We aim for 25% reduction at each new release of our ILS.) But libraries resist this as it presents them with HR issues. They spend a lot of time discussing workflow strategies –and this takes time

Technologies like PDA's, RFID, Self-check, etc. also provide strong opportunities for productivity enhancements, especially when tightly integrated into an ILS.

The back end needs to reduce and front line needs to deal with Web 2.0 stuff.

User Experience and Web 2.0

There is a need to engage with end users (rather than just librarians). Librarians are often trying to make users 'text based' learners. Kids today are not the traditional 'scholars' and this is not in itself bad. HE business models are in need of extreme innovation in order to get the necessary revenues to fund education, libraries and R&D
Libraries need to integrate properly with their institution, which means integration at the lesson level - hence our Rooms and SchoolRooms product to contextualise content at this level. Rise in distance education means users experience their College at the lesson level so libraries need to be relevant there. The storage system for all this is the LMS.

SirsiDynix has had a portal solution in the market for many years. This product is now emerging as a key part of SD strategy and allows for the integration of any user experience / library 2.0 effort into a standard, tested template as well as in a portlet meeting the needs of ADA, PDA, XML, oriented future users. Our Enterprise Portal Solution is in all market sectors and has been adopted state-wide in about a half-dozen states for their SchoolRooms K-12 product initiative

Search needs to be improved. Federated search is a mild diversion unless tied to the user's specific context—known item searching is not the norm. Users want immersion technology (which is trying to improve the quality of the question) and want to be given options and in context flexibility.

The problem of so-called visual browsers (AquaBrowser, Endeca etc) is being able to work real time. They work off a fixed (dumped) database –so there are problems with holds (reservations) for example and other internal integration in circulation or ILL.

We need to get librarians past their desire to see just lists –i.e. very text based. The need in HE is to read for insight still needs to be addressed in better way. It's not good to expect current students to have the same approach to text and reading as students 30 years ago. Faceted and visual displays are well accepted by many user segments.

Data mining/business intelligence

What SD has done with its Normative Data project for public libraries could be done for HE. HE is not making enough use of its rich data on activity and users across the institution – web stats, ILS stats, IR usage.

Local Context and Social networks

For example BiblioCommons[96] *in Canada is a recommendation engine, Amazon on a local level. The question is: what's the best stuff for your community.*

Standards

Unicode is important especially in the context of a merged federated search / OpenURL functionality. The library market is typified by middle-aged unilingual people. Users will be multilingual, have needs to be addresses beyond 'English', or will need to search multilingual stuff (e.g. Japanese patents).

OpenURL 3: Need to link universal search with universal fulfilment. This will improve ILL/document delivery - hence the importance of Open URL 3 to deal with chapters, paragraphs, podcasts, etc. Resource sharing is a next level in this ILL evolution.

JSR 168 is vital to integrate with portlets, which must be editable. SD wants to create a 'library' of portlets. This is about deep integration of portal stuff--brings identity management into LMS. So then the individual institution can make it work locally. The SD approach to APIs is quite deep and having trained library staff for decades in the use of APIs and having one of the most open ILS is a key competitive advantage. SD has a large library of APIs.

Using standards to enable the LMS to be developed and integrated with the wider environment is putting stress on users (libraries). They will need cross-functional teams to develop stuff. This emerging sector reorganization will challenge HE institutions.

SD is not a member of W3C but is an active member of NISO.

SOA/Web services

Our Web Services API supports XML input and output options for SirsiDynix's APIs. SirsiDynix provides an API to all modules of the Unicorn system.

Open Source

SD uses Open Source components to solve the real problem. We encourage Open Source in portals to build customer experiences. We support AJAX and J2EE, etc. However our view is don't use Open Source to re-invent the minor ILS—concentrate of the REAL stuff.

[96] *http://bibliocommons.com/* 'We're completely re–thinking the online library experience. We've had our heads down building and delivering groundbreaking new services, transforming online library catalogues from searchable inventory systems into engaging social discovery environments'

Distributed development (Open Source) is not ok for military or financial transactions. So would you use Open source for inventory systems that are audited? Would you use Open Source for financial transactions? Can you trust the kindness of strangers to write code and backdoors for your systems? Can you let them write code that links to other key institutional systems? Are you ready to architect for real development (not application use) and testing and approvals? Will you hold OS software to the same RFP standards as you require of commercial developers?

Where is the LMS going?

A primary corporate direction is moving systems to SaaS. SD has had to set up various server farms to get around local issues and USA Patriot Act.

Our a portal solution is now emerging as a key part of SD strategy

Where is ERM going?

ERM is just marketing hype. Libraries simply need good systems to manage their resources and the distinction, especially now between print and electronic is artificial.

Where is future investment going?

SaaS is a key area that will deliver big cost of ownership improvements for libraries. SD has become biggest and most multinational company so there is still a lot of investment in new and developing markets and further internationalisation of product and services.

Where are the growth opportunities for LMS/ERM vendors?

International is 70% of growth beyond North America - China, new geographies. We have three Asian offices with mostly Asian staff. The challenge in international is the state (fully developed, emerging) of the local knowledge economy. Building portals in many languages and integrating the tools is a key direction.

Differentiators in, and approach to, the UK HE market

There are some minor differences in the UK approach that include Athens & LDAP Authentication, Academic Reserves (short loan bookings) and more Integration with VLEs.

Some of the elements of our solution that we believe are significant in the UK context are:

- *The Enterprise Portal Solution with its context management technology which allows users to build subject-based virtual "Rooms" to contextualise content from any source.*
- *Saas – attractive solution for all sizes of libraries – reduces cost of ownership*
- *The scalability of our LMS – suitable for < 6 users to > 1000*
- *Business Intelligence and Data Mining Tools*

A2.4.3 Market offering

The main components/modules in the offering to the HE library market:

(Adapted from various sources including the company website)

LMS

Symphony

LMS development is converging on SirsiDynix Symphony, a development based in Unicorn. The Horizon 8.0 (inc. Corinthian) development has stopped in favour of SirsiDynix Symphony. Horizon 7.4 is still in development mode and progresses for the foreseeable future. *Symphony* includes *core* capabilities for Circulation, Cataloguing, Serials, Acquisitions, Materials Booking, and Course Reserves. It has optional consortia capabilities for multi library operation. The OPAC can be enhanced with a range of content such as book summaries, reviews, book jacket images, tables of content, author notes, first chapters and book lists.

OPAC/Portal

EPS/Rooms

SirsiDynix Enterprise Portal SolutionTM is a single and unified interface to the varied information, resources, and services offered by an institution, including books, databases, digital archive, RSS feeds, virtual reference, and federated search capabilities.

Using EPS/Rooms, libraries can 'build' subject-based environments within which information seekers content – everything from eBooks, videos, and photos to virtual reference tools, Web sites, and local information – all focused, connected, and presented in the context of particular subjects.

In November 2007 Sirsi announced a (OEM) partnership with Brainware Inc., (a company also owned by SD Private Equity owners) whose context-based enterprise search technology will be incorporated into SirsiDynix's next-generation search solutions. According to the press release Brainware technology 'will provide innovative fuzzy search, fuzzy logic, dynamic categorization and other capabilities to enable information seekers to discover more content from more sources — including libraries' own catalogues, Z39.50 sources, subscription resources, digital collections, crawled Web content, subscription content and social networking data'

Federated Search

360 Search

'Prior to March 2006, SirsiDynix based its Single Search product on technology from Muse. While continuing to sell and support Single Search, SirsiDynix formed a partnership with Serials Solutions in April 2006 to offer that company's Central Search (recently renamed 360), as its primary federated search offering' (Breeding 2007).

Resolver

Article Linker

Sirsi Dynix partners with Serial Solution to deliver the Article Linker resolver product

Resource Sharing

URSA

URSA (Universal Resource Sharing Application) enables Web-based requesting of interlibrary loan (ILL) resources. Staff and users can place requests for a variety of local and remote materials, in a single, unified display. URSA also supports walk-in loan requests by enabling staff to authenticate visiting users and automatically create new records for them. URSA can be used by all types and sizes of libraries as a single, full-featured ILL solution or in combination with other interlibrary loan products, depending on the needs of the library.

Managing digital content

Digital Library

SirsiDynix Digital Library is a digital archiving system, a digital document repository, and a cadre of applications for building, managing, and integrating digital archives. Digital Library combines a suite of high-volume digital capture and production tools with a sophisticated Web-based retrieval engine. This digital collection can include images of anything – rare handwritten letters, fragile newspaper clippings, genuine artefacts, historical pictures and documents, and other non-copyrighted materials.

Service offerings

Consulting, data services, implementation, network services, training, system/data security, software as a service (SaaS).

How do SirsiDynix products interoperate with those from other LMS/ERM vendors?

Z39.50 and other, APIs (SD has been doing this API stuff for over 15 years). We work with other vendors through our certification programme – in particular for SIP2 and NCIP. All other ILS vendors are supported through Z39.50 as well as federated search programs.

Partnerships with other LMS/ERM vendors?

No genuine partnerships with LMS competitors (e.g. to cross sell products).

Deeper integration is available for resource sharing and ILL.

A2.4.4 Engagement with Customers

We have a range of channels -strategic, user groups, focus groups, forums 'institutes', Advisory boards, surveys, etc. Note especially the SirsiDynix Institute, which has started some international events.

A2.4.5 UK HE Customers

New Name accounts in UK HE since January 2005

- University College for the Creative Arts (Formed through the union of The Surrey Institute of Art & Design, (was Talis)
- University College and the Kent Institute of Art & Design (merged institutions)

SirsiDynix customers in UK HE - January 2008

Institution	LMS	OPAC
Royal College of Art	Dynix Classic	??
Birkbeck, University of London	Horizon	HIP
Birmingham College of Food, Tourism and Creative Studies	Horizon	HIP
Bradford, University of	Horizon	HIP
Huddersfield, University of	Horizon	HIP
Lincoln, University of	Horizon	HIP
Marjon, The College of St Mark & St John	Horizon	HIP
Middlesex University	Horizon	HIP
Staffordshire University	Horizon	HIP
Trinity College Carmarthen	Horizon	HIP
Bath Spa University	Unicorn	iLink
Bath, University of	Unicorn	iLink
Bristol, University of the West of England	Unicorn	iLink
Brunel University	Unicorn	iLink
Buckingham, University of	Unicorn	iLink
Buckinghamshire Chilterns University College	Unicorn	iLink
Cranfield University	Unicorn	iLink
Education, Institute of	Unicorn	iLink
Glasgow Caledonian University	Unicorn	iLink
Guildhall School of Music and Drama	Unicorn	iLink
Imperial College London	Unicorn	iLink
Leeds Metropolitan University	Unicorn	iLink
Leicester, University of	Unicorn	iLink
London Business School	Unicorn	iLink
London School of Hygiene and Tropical Medicine	Unicorn	iLink
Newport, University of Wales	Unicorn	iLink
Pharmacy, School of	Unicorn	iLink
Queen Margaret University Edinburgh	Unicorn	iLink
Queen Mary, University of London	Unicorn	iLink
RCN Institute	Unicorn	iLink
Reading, University of	Unicorn	iLink
Robert Gordon University	Unicorn	iLink
Royal Academy of Music	Unicorn	iLink
Royal College of Music	Unicorn	iLink
Royal Scottish Academy of Music and Drama	Unicorn	iLink
Royal Veterinary College	Unicorn	iLink
Southampton, University of	Unicorn	iLink
St George's, University of London	Unicorn	iLink
Trinity/Laban (Trinity College of Music site)	Unicorn	iLink
University College for the Creative Arts at Canterbury, Epsom, Farnham, Maidstone and Rochester	Unicorn	iLink
York St John University	Unicorn	iLink

A2.5 Talis

Dave Errington (CEO)

Justin Leavesley (CTO and Director)

A2.5.1 The Business

(Adapted from Breeding 07[97] with major changes and additions)

Talis

Knights Court, Solihull Parkway, Birmingham Business Park B37 7YB
Tel: 0870 400 5000
www.talis.com

Company Profile

Though the focus of its business is in the UK, Talis has been a vocal proponent of Web 2.0 technologies, with frequent appearances in the United States (Breeding 2007). Over the last 4 years Talis has been undergoing a major change programme to position itself as much more than UK & Ireland based LMS provider. It now has global ambitions and characterises itself as an 'innovative technology company expert at managing semantically rich metadata and in delivering software and services for information management'.

In February Talis was reconstructed and the owners (BLCMP Ltd and an Employee Benefit Trust) voted to transfer ownership to a new company called Talis Group. Talis Information Limited is now wholly owned by Talis Group. The shareholders of Talis Group are the company staff and the local authority and academic institutions (around 60) that had previously been members of BLCMP.
Talis now presents itself in two parts. The first is 'Applications' and comprises the LMS products and services part of the business. The second, 'Platform' business, is devoted to the promotion and development of the Talis Platform. 'Using Semantic Web

[97] 'An Industry Redefined. Private equity moves into the ILS, and open source support emerges. Automated System Marketplace 2007'. By Marshall Breeding. Library Journal 1st April 2007. http://www.libraryjournal.com/article/CA6429251.html

technologies coupled with advanced indexing and fast searching, any type of unstructured or semi-structured data can be managed by the Talis Platform and made available to share, remix and reuse. Developers have access to a wide range of open web services that use standard protocols and formats to dramatically reduce the complexity and cost of application development'

The scale of the operation (2006)

Global Revenues
£7.6m

Global: staff:

90

UK HE Annual revenues

£3.3m

Estimate: based on Talis reporting that approx half annual revenues are from academic libraries. This equates to £3.8m so UK HE represents less than this.

UK based staff

90

Presence in UK HE

Has a 30+ year history in UK HE being founded originally as a cooperative (BLCMP) at Birmingham University. It has 23% of the UK HE market. (See Appendix)

A2.5.2 Strategy

Trends

> *In the HE sector spending has shifted to electronic resources –so there's a need to manage that expenditure --hence ERM. Repository market is nascent so players are small. Quality of peer review is important so there are critical business issues in managing this stuff*
>
> *Looking at wider trends the real underlying factor is that everything and everyone are getting connected. The Web is a manifestation of this wider trend. The web first made content more visible to humans. The semantic web makes it visible to machines. So this ripples through everything. The web is just another step on the road. There have been other connectivity examples before e.g. phone.*
>
> *The increasing importance of search is demonstrated by Google. It's a need to search inside and outside—a web of repositories for example. Google isn't presently solving the entire problem. It doesn't yet provide enough 'context', for example to students and researchers. So what's the best stuff? What stuff should*

the institution licence? If we knew this it would result in an improved use of resources. It's about the user's context (e.g. University student). Your profile gives better results. The better the context defined the better results will be. The context problem is not solved in HE, which has an opportunity here because its users are (relatively anyway) well defined—with a particular goal anyhow. So students won't wait for JISC or its IE. They'll just get on Facebook or whatever.

Trends in how staff interact with products.

Self serve is changing roles. Changes in managing cash, e-payments. Changing roles in acquisitions and supplier selection. More finance integration. Less sitting in front of admin screens. Less data entry. Cataloguing is changing to creating metadata for electronic materials. Management information is becoming more important with more data more mining.

Where is the LMS going?

It needs to synch with external trends. Talis' job is interpreting these trends for its market. Trends such SaaS and interoperability reduce cost. The break up of monolithic systems to interoperate – loose coupling of applications, applications getting connected with each other. So requires non-domain specific standards e.g. web services. 'Processes' get connected with others, so it doesn't matter where the data is.

Standards

By definition connectivity mean global standards. Hence Talis is active on W3C to influence. Dominant standards are web (e.g. W3C) derived standards rather than NISO (e.g. z39.50)

SOA and web services

SOA and web services are a wider software industry trend that Talis is responding to in order to enable loose coupling of applications. The JISC attitude is fine but isn't a motivation. Nevertheless this could be an area where JISC could come and engage with vendors to see how this trend is being applied.

There is more to be done to increase the take up of this approach in the library domain. What could really help is, for example, a model for a borrower or a reading list schema we can all share. Maybe JISC could bring together the community and remove friction. Or how about establishing common web services schema guidelines and best practice to enable something like OCLC's World Cat local to interact deeply (e.g. reservations/holds and other user account activities/transactions). Because the JISC is a non-vendor body it could have a valuable role in this way, which would have the result opening up the market, increasing competition, and so reducing costs.

Open source (and Open Data)

Open source is about distributed innovation. It's 'free like kittens not free like beer'. Will distributed innovation increase? It will become dominant. When you distribute it enables recombination of innovation. Science is an analogy—what would happen if all universities kept research secret?

We understand the technology, the philosophy. So how does this translate—Talis is already distributing Open Source—Cenote, Keystone. The UI for Prism will be Open source. The templates that libraries produce must be Open Source so the community will get all these.

There is also as big an issue about Open data as there is with Open source. Look at the power of Google maps and Google earth. Libraries are not opening up their data.

Overall product strategy

This is about improving service, reducing cost and duplication. We are also thinking a lot about the end user. Why Facebook? Why Youtube? What are the key elements that make them successful? Students want their library account in Facebook (or similar). With fees etc HEIs are operating in a commercial market. Students are consumers. So Keystone is there because students want services in their portal or wherever they happen to be. There are things the institution wants too—better registry connectivity for example to get efficiencies.
New technologies enable global integration and this is also a global HE need. Talis will grow by profitably solving people's needs. This means looking wider than just the LMS. Keystone is an obvious example and it puts library services into other places—institutional portal for example—i.e. where the student wants them. Other examples are universal search, managing digital resources and integrated resource management.

Differentiators in, and approach to, the UK HE market

It's a smaller market [than US] and public not private—means different adoption curves—we don't have rich institutions that can risk spending on innovation. Fewer bloggers

We differentiate our approach to the UK market. It's about small things like focus and closeness (not just geography) to our market. We have kids at university-our customers. We have large a UK market share. Our company culture is much hungrier.

A2.5.3 Market offering

The main components/modules in the offering to the HE library market:

(adapted from various sources including the company website)

LMS

Talis Alto

The LMS is at the heart of the suite. Includes modules for Circulation, Cataloguing, Acquisitions, Serials and ILL

OPAC/Metasearch
Talis Prism

Payment Handing
Income Manager

All of payment handling facilities of a till, combined with l banking, auditing, and income generation tools

Messaging
Talis Message

Extends the postal and email notification options within Talis Alto with the latest telephony and SMS technologies.

Reporting
Talis Reports

A quick and convenient desktop reporting solution for everyday management information needs.

Management Information
Talis Decisions

A performance management tool allowing decision makers to analyse the library's performance and trends.

Complementary Products

(Solutions that integrate with diverse library management systems)

> ***Bibliographic data***
> Talis Base
>
> The largest UK bibliographic data source delivering quality records into the LMS, which includes the ability to search across a very large database of records with a UK library orientation.
>
> ***Integration***
> Talis Keystone
>
> Enables integration of library-centric functions with other institutional applications, making library data visible and accessible in a range of channels.
>
> ***EDI***
> Talis Gateway
>
> A procurement service for EDI (electronic data interchange) transmissions between libraries and suppliers that reduces complexity surrounding EDI and networking standards.

Reading Lists/Resource Lists
Talis List

Resource list management system, providing creation and presentation of learning resources.

Catalogue aggregation/ILL
Talis Source

The largest single free union catalogue of bibliographic and holdings in the UK, with 26 million catalogue items and 55 million holdings records from over 200 academic and public libraries.

How do Talis products interoperate with those from other LMS/ERM vendors?

Talis List integrates with all LMSs and Talis Base does too (via Ztarget). Gateway (EDI) will interoperate but it not quite there yet. We work with other link resolvers, self-serve, and SRU/SRW services etc

Keystone is focussed on our own LMS for now but is designed to enable interoperability with other LMSs. Anything new we develop is standards based to work with other LMS and as appropriate with other external system

Partnerships with other LMS/ERM vendors

The only formal relationship is with ExLibris. Our Connexions programme includes working with ExLibris with Verde but there were some problems because Verde didn't support 1Cate (now OCLC resolver), which the customer wanted to continue to use.

A2.5.4 Engagement with Customers

We have a strong belief in community-so will use whatever tools we come by. We use (open) forums to enable peer-to-peer support. All the usual stuff –User Groups, Focus Groups Advisory Boards etc. it's about harnessing collective intelligence—for example using podcasts to share

The dialogue goes wider than just 'customers' in the narrowest sense. Talis is open. Blogging etc is done to reach out to other players. Talis organises events to stimulate the conversation. We believe that the 'market is a conversation'. In our experience other LMS vendors are inward looking and defensive and can't see it as a two way process. Customers have much more info—the market hasn't responded to this fact.

A2.5.5 UK HE customers

New name accounts in UK HE since January 2005

- University of Cumbria

Talis UK HE Customers - January 2008

Institution	LMS	OPAC
Birmingham, University of	Alto	Prism
Bournemouth University	Alto	Prism
Brighton, University of	Alto	Prism
Cardiff, University of Wales Institute	Alto	Prism
Central England in Birmingham, University of	Alto	Prism
Central Lancashire University of	Alto	Prism
Chichester, University of	Alto	Prism
Cumbria, University of	Alto	Prism
De Montfort University	Alto	Prism
Derby, University of	Alto	Prism
East London, University of	Alto	Prism
Glamorgan, University of	Alto	Prism
Glasgow School of Art	Alto	Prism
Greenwich, University of	Alto	Prism
Harper Adams University College	Alto	Prism
Kingston University	Alto	Prism
Liverpool Hope University	Alto	Prism
Manchester Business School	Alto	Prism
Manchester Metropolitan University	Alto	Prism
Manchester, University of	Alto	Prism
Newman College of Higher Education	Alto	Prism
Northampton, University of	Alto	Prism
Northumbria University	Alto	Prism
Oxford Brookes University	Alto	Prism
Paisley, University of	Alto	Prism
Portsmouth, University of	Alto	Prism
Queen's University Belfast	Alto	Prism
Roehampton University	Alto	Prism
Salford, University of	Alto	Prism
Scottish Agricultural College	Alto	Prism
Sheffield, University of	Alto	Prism
Stranmillis University College	Alto	Prism
Sunderland, University of	Alto	Prism
Surrey, University of	Alto	Prism
Sussex, University of	Alto	Prism
Swansea Institute of Higher Education	Alto	Prism
Teesside, University of	Alto	Prism
Thames Valley University	Alto	Prism
Ulster, University of	Alto	Prism
Winchester, University of	Alto	Prism
Wolverhampton, University of	Alto	Prism
Worcester, University of	Alto	Prism