Smart Libraries Newsletter

News and Analysis in Library Technology Developments

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Smarter Libraries through Technology

What to Expect in the Library Tech Industry 2022 and Beyond

By Marshall Breeding

Smart Libraries Newsletter has chronicled incredible changes in the library technology industry. The recent rounds of mergers and acquisitions have shifted the balance of power, with more technology products concentrated into a smaller number of organizations, some of which are massive. The drivers for business consolidation have been relentless and are ongoing. Given current trajectories, what changes can we expect to play out in the next five years or so?

This new consolidated reality raises concerns regarding the options available to libraries, but it also brings some potential benefits in the form of new technologies that would be less likely to emerge from smaller companies with limited development capacity.

The acquisitions of Ex Libris and Innovative by ProQuest were bold moves, catapulting the company into a role as the largest provider of technology to academic libraries. These acquisitions disrupted the relative power among the top competitors, especially relative to EBSCO Information Services and OCLC. Mid-level players like SirsiDynix, The Library Corporation, and Auto-Graphics walk in looming shadows of the industry giants.

The proposed acquisition of ProQuest by Clarivate, if completed, will be the boldest move yet in the library sector, with a stated valuation of $5.4 billion. The finalization of this acquisition has been delayed by a few months to clear regulatory hurdles through the Federal Trade Commission. ProQuest's acquisition of Innovative was also complicated by FTC review but was approved without conditions. If this acquisition is completed, it will establish a key precedent for the next phase of the industry.

We can be sure that additional moves lay ahead that will further deepen industry consolidation. Bold moves that realign the positions of the companies in the industry rarely go unanswered. The timing and the form of those next moves may take aren't easily predicted. The pattern currently underway involves larger companies adjacent to the community of those directly oriented to libraries. There are many possibilities of adjacent businesses that may see library technology and services as an opportunity that would complement their business strategies. Changes in ownership of multiple smaller or mid-sized library technology companies would be expected in the next few years. Possibilities include lateral ownership moves as well as those that assemble multiple companies together, including acquisition into larger strategic organizations.

Even within the context of a deeply consolidated industry, we can also expect some smaller companies to thrive. Many companies are not interested in joining the fray of mergers and acquisitions and will continue to offer their more specialized products and services, representing essential layers of competition to the field.

The business environment will have great impact on the next phase of library technologies. The characteristics of public, academic, and school libraries increasingly diverge, leading to even less overlap in the technology products and services. Technology products have become ever more specialized by library type, and this trend will likely continue and accelerate. The supersized vendors have the potential to accelerate the development of new technologies for any library sector that they opt to address.

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Technologies in support of public libraries have considerable room for expansion and modernization. The integrated library system (ILS) remains at the core of public library automation and most of the products currently used have evolved over multiple decades to adapt to current needs. The current area of technical development is concentrated on patron interfaces and digital services. Public libraries will increasingly prioritize patron-facing interfaces and services. These libraries have high expectations for catalog interfaces and website management tools consistent with the current flavors of the web, including easy use through mobile devices. Building interest in tools in support of marketing strategies and outreach initiatives will drive adoption of the current line of specialized products and will spark the creation and integration of these capabilities as part of the business infrastructure for public libraries. Looking further into the future, the core ILSs used by public libraries are overdue for modernization. If the incumbent vendors fail to fully modernize or rebuild their core products, they will be vulnerable to new challengers.

Among academic libraries, the library services platform continues to be well established as the preferred model for resource management. The number of academic libraries using legacy integrated systems remain substantial but going forward will fall rapidly. Those legacy systems will be increasingly outdated and ill-suited to manage the electronic and print collections of academic libraries. Drivers for libraries to defer moving away from legacy systems have eroded since migration options are as diverse now as can be expected, with open source and proprietary alternatives available. Beyond the core resource management systems, academic libraries will accelerate their use of supplemental products for reading list management. Some will acquire tools to help manage institutional research processes, though the role of the library in this area of the university remains less well defined. The need for cutting-edge interfaces for library patrons and technologies to build patron engagement will continue to build, though in somewhat different directions than those for public libraries.

The accelerated movement away from legacy systems in use by academic libraries will eventually spell the demise of some long-standing products, though any such extinction lays at least five years from now and would apply only to those mostly used by academic libraries. One of the important, and fortunate, trends in the library technology sector is that vendors do not sunset products as long as libraries continue using them. The low cost of ongoing support for mature and stable products means that it makes good business sense to avoid premature product withdrawal that would incur wrath from customer libraries.

These are only some of the possibilities that may play out in the next few years. The pace of change seems to be accelerating, which brings potential for positive developments as well as concerns for a more adverse environment. These changes may drive the relative balance of power between vendors and libraries as customers of their products. Libraries will need to collectively find ways to amplify their influence in the directions of product development and to moderate pricing. The next phase of the industry will involve higher stakes than any previous era.

Looking Back at the Main Events of the Library Technology Industry

The library technology industry has seen profound change during the time that I have been contributing to *Smart Libraries Newsletter*. This newsletter, like its predecessor Library Systems Newsletter, has chronicled the major and minor events that impact the technology products and services used by libraries. The many news stories published in the newsletter give readers important, current information, but they also help us understand the broad trends transpired over the decades. They give insight on future possibilities, as we project existing trends into the next phases of the industry.

Patterns of Consolidation

The organizations developing technologies for libraries has followed a steady pattern of consolidation, though some new companies have emerged. Not only have products evolved, but there have been interesting trends in the types of products developed and deployed.

The landscape of companies active in 2003 when I began covering ILS technologies for *Smart Libraries Newsletter* including many that have since been absorbed into other organizations and a few that have faded away. The ILS industry at

that time was much more fragmented than what we see today, comprised mostly of smaller or mid-sized companies.

Polaris was quite successful as an independent company offering an ILS for public libraries with strong sales, especially among municipal libraries and consortia. The company had emerged from the sale of its parent company, Gaylord Bros. to its archrival Demco. The Polaris ILS has continued its path of success, though the company has since been absorbed within Innovative Interfaces, and now its parent company ProQuest, which, in turn, seems destined to be acquired by Clarivate.

The acquisition of Dynix by Sirsi Corporation brought a steep step of consolidation to the industry (see *Smart Libraries Newsletter* [SLN] August 2005). Both companies had previously made multiple acquisitions (Sirsi: DRA, Docutek, Inlex, MultiLIS; and Dynix: NOTIS Systems, URSA, and the Local Systems division of OCLC). Although Sirsi Corporation was the acquiring entity, many aspects of Dynix prevailed, including some executives and the company headquarters. Shortly after the merger, SirsiDynix was acquired by Vista Equity Partners (see SLN February 2007), which followed its aggressive playbook to the company. This new strategy included the cancellation of new Corinthian product, phasing out the Horizon ILS, to focus on Unicorn, rebranded as Symphony as the company's single flagship product (see SLN April 2007). This strategy sent shockwaves through the industry and fueled the then-nascent open source ILS movement. By about 2011, SirsiDynix had reinstated its commitment to Horizon (see SLN June 2012). Beginning in 2013, SirsiDynix began to concentrate its development efforts on its BLUEcloud suite of web-based applications designed to work equilaterally with Symphony and Horizon (see SLN May 2013). The flagship products of both companies, Symphony and Horizon, continue through today, though the installed base of Horizon has diminished. The product strategies following the formation of SirsiDynix have been a lesson to the industry of the requirement to preserve products, despite the temptation to drive library customers to a single product. While many companies may have their sights set on eventually concentrating on a single product, such a strategy must be gradually played over the course of a decade or more and not abruptly enforced in the short term.

Serials Solutions was a rising star in the electronic resource management arena, having created a knowledge base and linking tools that revolutionized the management of electronic resources in academic libraries. ProQuest acquired Serials Solutions in July 2004, accelerating the development of its products. The 360 Suite of electronic resource management components were major competitors to parallel offerings from Ex Libris, such as its SFX link resolver and knowledgebase. In 2004, ProQuest fully integrated Serials Solutions into its business and retired its brand (see SLN March 2014).

The steady rise of Ex Libris has been well chronicled, beginning with its attempt to become a public company through an IPO (SLN November 2005) and its subsequent business events, including its acquisition by Francisco Partners (SLN September 2006) and its follow-up purchase of Endeavor from Elsevier (SLN Jan 2007), the sale of the company to Leeds Equity Partners (September 2008), and then to Golden Gate Capital (January 2013). Following these rounds of private equity ownership, Ex Libris was purchased by ProQuest marking one of the most aggressive moves in industry consolidate up to that time (see SLN November 2015). In an even bolder move, Clarivate, a global player in scholarly communications and intellectual property technologies is on track to add ProQuest to its arsenal of businesses (see SLN July 2021). The completion of this acquisition has been delayed pending FTC review (SLN September 2021).

Some New Players Emerge

The library technology industry is populated mostly by companies that have endured for multiple decades. *Smart Libraries Newsletter* has tracked the progress of the new businesses that have launched. These companies include Biblionix, Equinox, and ByWater Solutions.

Biblionix was founded in 2006 to market and support the Apollo ILS, a web-based product designed for small and mid-sized public libraries. Biblionix was featured in the September 2014 issue, with later coverage for the development of support for ad hoc consortia (see SLN July 2018). Although Biblionix has built a substantial customer base, with over 850 libraries using Apollo, it remains a small company.

Equinox was founded in 2006 to provide development and support services for the open source Evergreen ILS initially developed for the PINES consortium of public libraries in Georgia. Many of the original developers of the company joined Equinox. Other public library consortia in the US later implemented Evergreen, including Indiana Evergreen (SLN October 2008), Bibliomation (SLN February 2010), and the King County Library System (SLN November 2010). Equinox reorganized as a non-profit organization in 2017 (SLN February 2017). The company currently supports about 500 libraries on Evergreen and over 30 on Koha.

ByWater Solutions was launched as a startup in 2009 to

provide commercial support services for Koha and other open source software (SLN October 2009). ByWater Solutions has not only grown organically, currently supporting Koha for over 1,000 libraries, but it has also expanded into new products including Aspen Discovery (SLN December 2019) and FOLIO (SLN March 2018).

TIND Technologies, came on the scene in 2015 as a spin-off from CERN to commercialize a suite of products based on the open source Invenio resource management system developed at CERN (SLN August 2015). TIND has refined and market the TIND ILS, attracting some US libraries including Caltech, Mills College, and the law libraries of the Berkeley School of Law. While TIND has found modest success, it also illustrates that for the last decade the library technology industry has not been fertile ground for new startups.

Resource Management

The ILS has been the longstanding model for library automation and has been extensively covered by *Smart Libraires Newsletter*. Most, but not all, of the ILS products available in 2005 remain in use today, including Sirsi Unicorn (now SirsiDynix Symphony), Horizon, Aleph, Voyager, Millennium (upgraded to Sierra), Virtua, Library.Solution, and Carl.X.

The functional model of the ILS has proven resilient for the management of print resources but was not designed to manage and provide access to electronic resources. Academic libraries have seen major shifts in their collections to higher proportions of subscription-based electronic resources. The initial approach for helping academic libraries manage electronic resources involved applications that would operate separately from the ILS.

The first wave of electronic resource management tools took the form of link resolvers, using a knowledge base to calculate links based on the library's subscriptions. The initial product in this category was the SFX context-sensitive link resolver from Ex Libris introduced in 2000; Endeavor announced LinkFinderPlus (2001); Serials Solutions followed with Article Linker, later rebranded as 360 Link (2002); and EBSCO introduced LinkSource (2003).

Link resolvers and their associated knowledge bases provided the foundation for more fully-featured electronic resource management products. Several ERM products were announced in the mid-2000s including the Innovative Interfaces ERM module in 2002; Endeavor Meridian and Ex Libris Verde (see SLN March 2005). VTLS announced its Verify ERM in 2005 (see SLN May 2005). 2005 was characterized as the "year of ERM" (see SLN March 2005). EBSCO released ERM Essentials in 2010 bringing together multiple products previously offered separately. The ERM products never gained major traction. Most libraries considered these products overly complex and found managing electronic resources with a separate application to be inefficient.

Library Services Platforms

Academic libraries felt ever more pressure to find efficient ways to manage their electronic resources and the failure of the ERM drove the development of a new slate of products following a model of comprehensive resource management. Designated as library services platforms, these new products followed a substantially different approach to resource management than longstanding model of the integrated library systems (SLN March 2013). These library services platforms were complex business applications, with at least a three year period from initial announcement to production use. Ex Libris and OCLC articulated similar visions for their respective products and followed similar development timelines. Ex Libris announced its Unified Resource Management. OCLC revealed its strategy for its new product, later branded as WorldShare Management Services in 2009 (SLN June 2009); Ex Libris began its development process for URM, later branded as Alma, with development partners joining the process in July 2009 (SLN January 2011). Alma saw its first implementation in Boston College in 2012 (SLN August 2012). OCLC made its first production implementation for a pre-release version of WorldShare Management Services in January 2011 by the Craven-Pamlico-Carteret Regional Library System. Regular implementations of WorldShare Management Services began in 2012, including Lawrence Technological University.

Serials Solutions announced it would develop a Web-scale management solution, later branded as Intota in 2011 (SLN August 2011); Although the company released some modules, including Intota Analytics (SLN Marc 2013), its development languished. When ProQuest acquired Ex Libris, development of Intota wound down, as Alma became its strategic offering.

Innovative Interfaces announced Sierra in 2001, positioning it to follow a similar automation model as Ex Libris and OCLC, but instead it was delivered more as a major upgrade to Millennium. Sierra has been a successful product for Innovative as an upgrade path for libraries using Millennium, though it has not attracted a large number of new academic libraries.

The Open Library Environment aimed to create a comprehensive resource management system as open source software beginning in 2008 but was not able to realize that

vision. FOLIO, as an open source library services platform, has completed development of its initial version with libraries implementing it, including some libraries beginning with its ERM functions and other completing full migrations from their incumbent ILS.

Evolution and Revolution in Discovery

In 2003, the library catalog reigned supreme as the interface for patron search and access to library collections. These catalogs increasingly suffered from a poor reputation as library users were acclimated to search tools on the web that not only were simple to use, but also delivered amazingly relevant results.

A new set of discovery interfaces emerged to replace or supplement native ILS catalogs. Ex Libris launched Primo as a catalog replacement for its own Aleph and Voyager ILS products, as well as those of its competitors (SLN March 2006). Innovative announced Encore to provide a more modern search interface for libraries using its Millennium or Sierra ILS products. OCLC launched WorldCat Local as a library catalog interface to work with any ILS, through a web interface and including search result from WorldCat (SLN June 2007). Sirsi developed Rooms, a new web interface for its Unicorn ILS; this became SirsiDynix Enterprise, which is able to work with Symphony and Horizon. There have also been open source discovery interfaces. VuFind emerged as a project from Villanova University, which has been very widely implemented, and continues to be developed (SLN September 2007). This code has been the basis of other products including Pika and Aspen Discovery. The eXtensible Catalog project had important contributions in interoperability components but did not result in a full discovery interface (SLN December 2007); AquaBrowser was a discovery interface with an interesting visual component originally developed in the Netherlands and eventually acquired by ProQuest (SLN May 2008). It has largely fallen out of use. BiblioCommons developed a discovery interface for public that has become widely implemented (SLN August 2009, September 2011, May 2012, and April 2015) and was recently acquired by Volaris Group (SLN September 2021).

Smart Libraries Newsletter has chronicled the rise and fall of metasearch products for libraries. As collections of electronic resources proliferated, libraries wanted to provide an easier way to simultaneously search multiple resources. These products, based on federated search technologies, were only somewhat effective, and were notorious for their slow response, shallow results, and difficult usability. But even these limited tools seemed better than to put the burden on library patrons to figure out the relevant resources and to separately search each one. Multiple products were introduced, including MetaLib from Ex libris (2000), Central Search from Serials Solutions (2005), and Webfeat Prism (2000). MuseGlobal provided its own Muse Search interface and licensed connectors and other technologies for use in other products. Webfeat caused a stir in the industry when it was granted a patent in October 2004 for some of the methods inherent to federated search (SLN February 2005). ProQuest acquired Webfeat and merged it into Serials Solutions in February 2008 (SLN April 2008). All the major library-oriented federated search products fell away once index-based discovery solutions became established.

As part of ProQuest, Serials Solutions initiated a new category of index-based discovery services with the launch of Summon in 2009. Ex Libris and EBSCO shortly joined this competition. Primo, originally developed as a modern discovery interface was enhanced with a central index, to provide comprehensive search results. EBSCO Discovery Service leveraged the EBSCOhost platform created for access to EBSCO databases, with a broader index of scholarly content to address the full universe of electronic resources and local library materials (SLN September 2009). OCLC introduced WorldCat Local in 2007, which integrated with a library's ILS to blend local results with those available in libraries worldwide. WorldCat Local later was enhanced to include article-level scholarly content. OCLC launched WorldCat Discovery Service as its successor in 2014. These products rely on massive central indexes of citation metadata and full text to deliver rapid, relevancy-based search results through simplified interfaces.

All four index-based discovery services for libraries continue to be developed and supported. Even with the acquisition of Ex Libris into ProQuest, both Summon and Primo continue as separate products, though a Central Discovery Index now powers both.

The Open Source Movement

Another interesting industry thread involves the development and implementation of open source products. Today, products based on open source software have become a routine part of the industry. In the early to mid-2000s the concept was more revolutionary. Yet many libraries and developers were committed to open source as a strategy to decrease dependence on vendors and to create alternatives to the prevailing proprietary products.

The first open source ILS to gain traction was Koha, originally developed in New Zealand in 1999. Koha was implemented by a few public libraries in the United States,

including the Nelsonville Public Library in Ohio. LibLime was launched in about 2005 to further develop Koha and offer support services. It purchased assets related to Koha, including the division of Kapito Communications in New Zealand that originally developed the software (SLN April 2007). LibLime took an aggressive position in its Koha development, including forking the code base to create a version it exclusively supported. This move was not well received by the broader community of Koha developers and implementors (SLN November 2009). LibLime was acquired by PTFS, a vendor specializing in technology systems and services in the US federal government sector in 2010 (SLN May 2010 and February 2013). Under PTFS, LibLime continued its separate and independent development rather than collaborate with the global Koha development community.

ByWater Solutions entered the Koha support services arena in 2009 (SLN May 2010) and has since eclipsed LibLime and others to become the dominant provider in the United States.

Evergreen, an open source ILS designed for consortia of public libraries, was developed by the Georgia Public Library Service to replace a SirsiDynix ILS then in place for the PINES consortium. This development was closely watched by the library community since it would demonstrate whether an open source product could handle a very large scale implementation. PINES placed Evergreen in production in 2006 (SLN October 2006) and has gone on to support several other public library consortia in the US and Canada. Evergreen has not been implemented widely outside North America.

Another open source project, the Open Library Environment, was launched for academic libraries. This initiative began in August 2008 with funding from the Andrew W. Mellon Foundation. The project advanced through multiple rounds of grant funding and eventually partnered with the Kuali Foundation for governance and technical infrastructure (SLN Janurary 2010 and September 2013). Changes in the business model of the Kuali Foundation made a major impact on the Kuali OLE project (SLN October 2014). By 2016 the Kuali OLE software was only partially complete, though three institutions had placed parts of it into production use.

As it became clear that the Kuali OLE software could not be completed, a new initiative was launched, with major support from EBSCO Information Services, to begin anew in the creation of an open source library services platform called FOLIO, with the involvement of many of the libraries involved in the Open Library Environment (SLN May 2016). This project has seen steady progress, with completion of early versions of the software (SLN January 2018) and implementations in many libraries (SLN November 2019 and August 2020). Multiple vendors provide hosting and support services for FOLIO, including EBSCO Information Services, Index Data, and ByWater Solutions.

Lessons from the Past

Reviewing the major events in the library technology industry reveals some observations that can help inform our expectations for the future.

There has been a good record for the long-term endurance of integrated library systems. Most ILS products outlive their original makers, often surviving multiple rounds of mergers or acquisitions. Libraries rightly change products on their own timeframes and do not respond well to vendor-enforced migrations. These factors mean that successful business strategies mean the preservation of legacy products. The fear that a business transition may translate into the sudden withdrawal of a products will usually be unfounded. While libraries should have some degree of confidence that their ILS will very likely continue to see very long term support, they should also be sure to consider more modern alternatives when they are available, especially if newer products are better able to meet their operational needs.

The pressure for consolidation continually increases.

The pressure for consolidation continually increases. Mergers and acquisitions have been a constant for the last three decades. Over time the velocity of the mergers and ownership changes has accelerated. More importantly, the scale of some of the business transitions has become increasingly aggressive. Further, the pattern of standalone technology companies seems to be giving way to library technology products becoming part of the portfolio of large-scale businesses within the higher education or scholarly publishing sector with diversified offerings spanning content, workflow applications, or other related business activities. Another trend is for independent companies to be acquired by larger organizations.

The lifecycle of a product follows quite long cycles: development, implementation, sales and implementation, and eventual decline. Many of the ILS products currently in use have been in play for over thirty years and have seen considerable technical and functional evolution over that period. It will be interesting to see if these trends differ in the more recently developed category of library services platform. These products were built around an ambitious scope of functionality and therefore had a long development phase. Both OCLC's WorldShare Management Services and Ex Libris Alma have

been in the implementation phase for over a decade with good ongoing forward momentum. While ILS products based on older architecture and technical components have a finite lifespan, those based on modern web and cloud technologies may have the potential for even longer endurance. These platforms accommodate the replacement of internal components should any become obsolete with minimal end-user disruption and are designed for continual deployment of new features or modules.

The library technology industry has been a challenging setting for new startups. It seems much more likely that new product innovations will arise out of the existing players rather than from a new company or project. Smaller and newer companies have had more of an impact on discovery, mobile, and other add-in technologies than for enterprise applications like integrated library systems or library services platforms.

Decisions regarding complex technology systems should be informed by many perspectives. This newsletter has aimed to provide information on the major changes in technology and business events. These news stories have been framed with a historical and competitive context. It's useful to know how any give development builds upon or departs from its antecedents and how it fits in among competing alternatives. I have found it interesting to explore these angles as I develop content for this newsletter and hope that it has been helpful to its readers.

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