

THE INFORMATION SERVICES AND USE IN THE LIBRARY INFORMATION LANDSCAPE AS WE APPROACH THE YEAR 2050: AN OVERVIEW

Mohamed Riyaz
Librarian

A.R. M. First Grade College, S. Nijalingappa Layout, Davangere, Karnataka State, India.

E- mail ID: riyaz29.md@gmail.com

Abstract: The library technology industry has undergone significant transformations due to the events of the past year. The acquisition of ProQuest by Clarivate, in particular, has had a profound impact, surpassing previous rounds of acquisitions. This strategic move has propelled the leading library technology provider into the wider commercial sector of scholarly communications. The paper provides information on What impact will IT trends have on our global society? Changes of Technology Changes in the higher education system and transformations in the library and information technology landscape.

Keywords: information services, Technology landscape, information landscape, year 2050, library technology, scholarly communication

1.0 Introduction

I consider myself fortunate to have had the opportunity to establish my career as a technology professional within the library community. Throughout my journey, I have witnessed and adapted to significant advancements in computing. Initially, I gained experience with mainframe-based systems, which was followed by my involvement with microcomputers. Subsequently, I transitioned to client/server systems, where I witnessed the integration of powerful desktop computers with cost-effective servers. In recent times, cloud computing has emerged as a dominant force, and I am currently observing the inception of a new era in Web-based library platforms that are deployed through software-as-a-service. I am grateful for the generous opportunities I have received to share my expertise and perspectives with the wider profession. These opportunities have come in the form of professional and academic publications, conference presentations, as well as through various online platforms and social media channels.

I gained entry into the profession through an unconventional path, gradually progressing in the technology field within an academic library without pursuing a formal education in library and information science through a graduate program. My proficiency in technology, ability to acquire knowledge through hands-on experience, and awareness of the broader aspects of libraries and information technology helped bridge that gap. My postgraduate degrees in the humanities broadened my perspective, enhanced my communication skills, and refined my analytical capabilities. Throughout the years, I have had the opportunity to work with a wide range of hardware, from mainframes to desktop computers, various network equipment, and to comprehend the intricacies of computing from firmware and operating systems to applications, while also gaining considerable experience in software development. All of this was accomplished within a library environment, where my primary focus was always on how it would contribute to meeting the specific needs of the organization. Through my consulting and public speaking engagements, I have expanded my expertise and been fortunate enough to collaborate with libraries of various sizes and types in numerous regions across the globe.

The opportunities that have come my way can be attributed, at least partially, to the traditional nature of the professional educational programs during that time. In the 1980s, there was a disconnect between the curriculum of LIS programs and the technology being used in libraries. This resulted in a scarcity of systems librarians who possessed up-to-date technology skills, creating a gap that allowed self-taught professionals like myself or librarians from other specialties, particularly technical services, to step up as technology leaders. In today's world, where technology is deeply intertwined with all areas of librarianship, it is crucial for these programs to equip new information professionals with the ability to master current technologies and, more importantly, adapt to the ever-changing landscape throughout their careers.

In this position paper, I will analyze the prevailing trends in library technology and their implications for the future. While it is impossible to accurately predict what will happen by 2050, it is important to consider the potential disruptions that may reshape the landscape. By extending current trends beyond their predictable trajectories, we can

explore a range of possibilities that the next generation of information professionals should be ready for. Considering the ongoing trends and their potential outcomes, the perspectives, knowledge, and skills required for success in the field of information professionals may undergo significant changes compared to the present.

2.0 What impact will IT trends have on our Global Society?

I am optimistic that the current disparities in technology access will diminish in the future. Although individuals with greater financial means will likely always have earlier and more abundant access to new technologies, there will come a point when communication and computational devices will be affordable and accessible to the majority of people worldwide. How long will it take for smartphones and their corresponding data plans to be as widely available as landline telephones or cell phones? It may be overly hopeful to envision a future where a rapidly growing population can provide sustenance, shelter, and basic technology for all, but there is hope that the existing digital divides will gradually diminish over the next few decades. A globally connected society will create more opportunities for educational institutions to extend their reach beyond traditional residential and distance programs.

Prominent technology companies play a crucial role in shaping the future of information professionals. Currently, corporate giants like Google, Apple, and Facebook dominate the industry. However, it is likely that some of these tech companies will lose their prominence in the coming decades, while new ones will rise to exploit the evolving societal and technological trends that follow the era of web search, social networking, and consumer-oriented technology. I envision a future where connectivity is even more pervasive than it is today. The widespread use of mobile devices and seamless connectivity may serve as catalysts for mass adoption of this new media for commerce. Perhaps, social networks will not only thrive based on their entertainment value but also become integral to facilitating official civil discourse and daily commerce.

If society manages to avoid a digital dark age, where a catastrophic event reverses or temporarily halts technological progress, it is highly likely that electronic information will permeate nearly every aspect of human life. The question then arises: will commercial interests seek to restrict and monetize this information, or will the current ideals of open access prevail? The manner in which the freedom or restriction of information unfolds in our future society will have significant implications for educational institutions. Whether the trend leans towards open access to information or towards reinforcing proprietary commercial models for accessing scholarly research will greatly impact the role of libraries during that era. Personally, I remain optimistic that the current momentum towards open access publishing will continue to grow, enabling libraries to focus more on developing services based on widely available scholarly content rather than expending their resources on acquiring it.

3.0 Changes of Technology

If current trends continue, cloud computing will be fully implemented, enabling libraries and their parent institutions to reallocate resources from managing basic infrastructure to focusing on higher value-added activities closer to their users: students, faculty, and staff. Outsourcing IT infrastructure to third parties will come with a cost, potentially less than current expenditures, but allowing organizations to focus on their areas of core expertise and strategic interest. It is anticipated that many of the obstacles impeding the adoption of cloud computing, such as privacy regulations like HIPPA and FERPA, as well as general concerns about protecting the privacy of library patrons, will be resolved in the coming years. Currently, cloud computing in libraries has been more talk than substance. Much of what is labeled as cloud computing can be considered legacy applications residing in the vendor's data center rather than the customer's, offering marginal improvement in efficiency but not radically transforming the way technology supports the organization. True multi-tenant software as a service is necessary to realize the potential of cloud computing. This model not only enables a more scalable and efficient use of computing resources but also opens up opportunities for communities to share information assets, reducing the burden of information management.

4.0 Changes in higher education system

It's difficult to envision higher education maintaining its current form in the future. Universities are currently under economic pressure, which will likely lead to significant structural changes. The rising cost of tuition and other factors will threaten the sustainability of the traditional residential undergraduate program.

If universities are to survive in their current form, they will need to find new efficiencies, with technology and information management playing a crucial role. Recent events are poised to reshape the future of education, research, and scholarly publishing. Several institutions, including Harvard University and MIT, have taken bold steps to make their intellectual outputs accessible to a wider audience, potentially challenging the dominance of commercial publishers. It's possible that the standard level of access to research and teaching may become more akin to the Creative

5.0 Commons 0 public domain license

The dissemination of teaching materials and primary research data may also follow a similar pattern. The release of 12 million MARC records by the Harvard University Library under CC0 had an immediate impact, being incorporated into various services within days. This move addressed a pent-up demand for public domain bibliographic data within the library community.

The future will require information professionals to advocate for more open access to information and be well-versed in the legal, organizational, and commercial aspects of the information landscape. Merely holding philosophical views on open information will not be sufficient; participation in business ecologies to design solutions that maximize content openness while maintaining sustainable business models will be essential. The ability to establish sustainable processes to support the information environment will be crucial, even in scenarios where open access takes precedence over proprietary restrictions.

6.0 Transformations in the Library and Information Technology Landscape

Libraries are at the start of a decade-long cycle that will witness the development and implementation of a new breed of library services platforms. These platforms, such as Ex Libris Alma, Serials Solutions Intota, OCLC's WorldShare Platform, Innovative Interfaces Sierra, and the community source Quali OLE project, are well positioned to supplant the current outdated systems that automate most higher education-serving libraries. These modern library services platforms, each in their own way, assist libraries in moving away from print-centric management, discovery, and access to library collections, towards a more unified approach that acknowledges the predominance of electronic resources, digital collections, and decreasing reliance on print materials. While they are relatively new, they are entering the scene many years behind, considering the critical tipping points reached by library collections in the transition from print to electronic. Given the progress made thus far and the typical pace of change in libraries, it appears that these new systems will experience a rapid increase in adoption in the next two to three years, followed by a more gradual transition phase over the subsequent four to five years. These new systems offer capabilities crucial to academic and research libraries, including the ability to utilize cloud computing infrastructure, leverage highly shared metadata and content stores among extensive educational institution communities, manage complex collections of print, digital, and electronic materials, handle both owned and licensed content, integrate more effectively with the broader institutions' enterprise infrastructure through Web services and APIs, and provide modern user interfaces.

The transition from traditional integrated library systems to the new generation of library services platforms is a crucial step in helping academic libraries meet their immediate needs. However, it is only a small step towards supporting the role of libraries in the future. These platforms consolidate how libraries manage and provide access to their collections, but in a library-centric way that must evolve into an approach focused on the broader information management needs of the institution. I anticipate increased consolidation of the business and information management infrastructure of educational institutions. Large organizations need enterprise resource planning (ERP) systems that comprehensively manage their resources to support strategic and operational decisions. Examples of these systems include PeopleSoft, SAP, and the Quali Financial System. The automation infrastructure for a library can be considered, at least to some extent, as an ERP system driving the library's operation. A significant challenge today is improving interoperability between the business and accounting components of the library management system and the institutional ERP. Current integrated library systems typically interact with institutional ERP systems through inefficient batch processes.

The new generation of systems aims for more dynamic interoperability through APIs, leading to significant efficiency improvements. However, this approach still fails to unify the library with the strategic infrastructure of its parent institution. I anticipate further consolidation, with the library operating more as a node of the institutional ERP. The Quali OLE project follows this approach, using the Quali Financial System as its foundation for acquisitions and other business functions. Similar opportunities for deeper integration exist between the institutions' learning management systems and the library's services platforms. The delivery of library content to students and instructors through learning management systems such as Blackboard or Sakai will become strategically important, requiring more efficient interoperability.

I foresee additional examples of alignment or consolidation between the institution's information technology infrastructure and that of the library. Information technology infrastructure specifically for libraries may eventually be displaced by institutional infrastructure that includes information assets and business processes previously considered within a separate library domain. In the future, the consolidation of information technology systems will take place at the institutional level, where systems deployed for specific operational units will be subsumed into a cohesive and comprehensive institutional environment. This may be achieved through domain-specific components using service-oriented architecture to achieve strategic interoperability.

Efficient information technology management is crucial for the survival of higher educational institutions. This includes integrating the library into the overall enterprise rather than keeping it in technical isolation. The traditional idea of the library managing its resources separately will give way to a more comprehensive and unified information architecture.

The evolution of library information systems towards a more enterprise-oriented approach will have far-reaching implications. Distinctions between open source and proprietary software will blur, and systems will be developed using low-level services and APIs for local customizations and interoperability. As a result, the role of library technical personnel will shift towards creating higher-level customer-facing services, rather than managing hardware and software development. Future information professionals in libraries will need a broader understanding of information architecture to ensure that the library does not become a silo within the institution.

I remember how we used to receive the Wilson databases on magnetic tape and load them into our mainframe-based NOTIS system using the MDAS (Multiple Database Access System). We also used CD-ROM discs that we mounted on multi-drive network towers and jukeboxes before electronic resources were available through the Web. Since my early days in library computing, I have been involved in consolidating various types of library content into a single interface. This work continues today through my participation in index-based discovery systems, including studies of products and technologies, and through the Open Discovery Initiative.

In the future, a key challenge will be to fill the gaps in library resources not covered in these discovery environments, expand the depth of indexing from mostly metadata to mostly full-text, and improve the state of the art of relevance and other search and retrieval technologies used in these products to more effectively provide access to library-managed materials. While library discovery services will likely become comprehensive in relation to the content of interest to academic institutions, it is uncertain whether they will ever become the central tool relied upon by students or faculty for their academic research. Will they become powerful enough and be positioned in ways that make them the starting point for research? That is not the case today. Alternatively, will the power of these tools be realized as their capabilities are embedded in other tools closer to the daily lives of students, faculty, and staff? Information professionals of the future will face challenges in finding new ways to bring traditional library services into the appropriate information infrastructures and architectures.

7.0 Conclusion

Across all the different aspects that I have explored, the essential qualities that future information professionals should possess are adaptability and a continuous sense of curiosity and exploration. The specific knowledge acquired at the beginning of one's career will have limited relevance as time progresses. Each technology has a limited lifespan, and with each new cycle, its expiration date becomes even shorter. It is the general abilities, attitudes, and learning methods that are more likely to endure in the long run. Sometimes, changes in technology or the organizational context call for gradual adjustments, while other times, a complete overhaul of one's career path is necessary. Any program designed to train information professionals should not only provide them with the specific knowledge and practical skills that are currently relevant, but also instill in them the foresight to anticipate the implications of future technology cycles and societal changes that will unfold over several decades.

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