

Libraries

at Webscale





Libraries at Webscale

A discussion document

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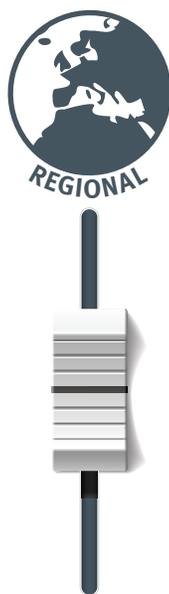
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Introduction

our world now

scales



A decade ago, when business, academic or social leaders consulted experts on how best to manage their organizations in the increasingly global, interconnected world, the advice was often, “Think global and act local.” It was sound advice at the time because many organizations and most individuals did not have the ability to *act* global.

Leaders may have wanted to expand their reach, broaden their connections or tap into resources outside their communities, but they were faced with significant limitations. They were limited by geography and time zones; by infrastructure, resources and systems. Many were limited by their own thinking about the needs of their communities, users and customers, or by the local focus of their strategies, policies or missions.

The Web and the ever-expanding set of services that has been created and delivered in the last decade changed everything. They have changed world economics, world politics and personal communications. And they have changed the expectations of our users and customers.

The new, scalable infrastructure of the Web allows us to reimagine how we deliver services.

The Web changed our ability to scope both our thinking and our actions. We are no longer limited to simply thinking globally and acting locally. We now have the capacity to think and act both globally and locally, and to do so simultaneously. Barriers have been lifted on how we can communicate, conduct commerce, conduct research, share data, create communities and deliver products.

Leaders can now apply the dimensions of geography and scope to almost every decision they make. Their organizations can tap into tools and resources, and serve communities and markets that are global, national, regional, local—and even personal.

Operating at Webscale allows us to reach everyone and every one.

In short, the Web scales. And it allows our organizations to dynamically increase or focus capacity. Organizations now have access to infrastructure and platforms that enable them to reach a broad, geographically diverse community and at the same time scope their services to focus on meeting the specific needs of a single person.

Organizations can increase the visibility and accessibility of their services, inventories or collections by making them available via a Web marketplace or a shared community exchange. Organizations can expand their infrastructures and their resources beyond the limits of their institutions. They are no longer bound by what their organizations can afford, build or maintain. They can leverage the power of the Web.

This is operating at Webscale.

Operating at Webscale makes it possible for leaders to reimagine how they manage their organizations. They can focus less on managing internal infrastructure and more on managing relationships, building partnerships and creating value for the people they serve.

What new opportunities can operating at Webscale provide to educators, researchers and librarians? What will it mean for consortia and for cooperatives like OCLC? How can we collectively use these new capabilities to increase the reach, impact and sustainability of libraries? What can we do to deliver the greatest benefits for the users of libraries?

This report is a discussion document—a work-in-progress that explores three areas:

First, we present **the environmental forces that are reshaping the information landscape** through the latest thinking of experts in technology, education, social trends and libraries. They help us review the themes and issues that are quickly reshaping the fields of information, research and education. We also asked OCLC Global Council delegates to share with us the top factors influencing the future of their organizations and libraries, and conducted dozens of discussions with library leaders across the globe. The trends these experts identified point to new opportunities for reshaping and reimagining how information will be delivered and how libraries can increase their reach, impact and visibility. A high-level summary of these views appears in the next section, “Our Web wide world.” For a more detailed look at their insights and advice, please review the full essays included in “Appendix A: World views.”

The next section of the report, “The case for Webscale,” further defines Webscale and moves on to explore the attributes and characteristics of Webscale that are important to providing new value to users and communities that use the Web.

In **“Libraries operating at Webscale”** we examine more specifically how the challenges and opportunities of operating in a worldwide, connected information environment impact libraries. While serving local communities often requires an “institution-scale” focus, we will explore how operating at Webscale can increase efficiencies and impact for both local and global communities.

Finally, we address the increased importance of collaboration in the new information ecosystem. Success at Webscale calls for bold initiatives and “big collaboration.”

Acknowledgments

Among the most rewarding aspects of working for the OCLC cooperative is the opportunity it affords OCLC staff to engage on a daily basis with members, library leaders, industry specialists and library organizations of all types. We extend a special “thank you” to the dozens of colleagues and experts (see “Appendix B: People consulted”) who took the time to share their thoughts with us and respond to our surveys. Their insights and advice are highlighted throughout this document and, as always, shape and guide the direction and work of the cooperative.

W W e b our wide world

The Web may well be history's greatest change agent. In less than two decades, it has connected billions of people across the globe and reshaped the practices of commerce, communications, politics and even friendships.

We sought out some of the world's top thinkers and writers in the fields of information, education, marketing and technology to share their ideas on what comes next. What will shape the world that libraries will both advance and serve? How will our world—now 7 billion people, more than half of whom will soon be connected and interconnected via a mobile device, PC, tablet or gaming console—look different? What advice would these thinkers have for libraries as we consider what new or different sets of library services will be required in this new environment? How should libraries consider the role of cooperation and collaboration in a Web-connected world?

These expert views, expressed through a series of brief essays, are presented in Appendix A. Thought leaders like Thomas Friedman, Kevin Kelly, James G. Neal and Ellen Hazelkorn describe major restructuring that will occur. Over the next few years, the Web will continue to serve as a global change agent, fundamentally reshaping how the world operates, and how we will approach education, learning, research and work. When you finish reading “The future is personalized,” “In a flat world, there is one road to success,” “Big innovation requires big collaboration” and the other essays and overviews, you will be struck by consistency of the message—the Web is now *the* environment we must consider when planning the future of information, communication, media and social services.

Present voices, future thoughts

The essays in **Appendix A** provide a backdrop and roadmap to the important ideas in this document.

Seth Godin believes that the Web requires us to stop focusing on mass communication and instead support individual and community-specific conversations so that we can focus on their goals.

Kevin Kelly describes the “universal library,” where we move beyond being “people of the book” to become “people of the screen.”

Thomas Friedman explains how the only path to success in our newly flattened world is innovation... powered by education.

Ellen Hazelkorn reflects on the challenges of sustaining education at a time when utility and efficiency are driving funding and rating issues.

Chris Anderson, Tim O’Reilly, danah boyd and **Doug Henschen** comment on the promise of **Big Data**.

James G. Neal points at the forces of innovation, collaboration and deconstruction of library collections.

Steven Berlin Johnson identifies innovations that demand new models and platforms for sharing and collaboration...**BIG** collaboration.

Leslie Crutchfield and her colleagues at FSG outline how social organizations can become real agents of change and social advancement by working together to enact sustained, collective impact.

The **European Commission on Information Society and Media** (ERCIM) provides some broad, technical context for cloud computing.

OCLC Global Council Delegates share their views on the challenges and opportunities facing libraries.

It’s all about “me”

The Web lets us express our individuality (and demand services) in ways that are more powerful, connected and visible than ever before. As Seth Godin lays out in his essay, “The future is personalized,” “...for fifty years, the attainment of mass communication and the efficiencies of mass has been the goal of business.” The Web, he says, empowers individuality like nothing before: approaches that rely on mass markets no longer work.

“The revolution that we’re living through,” Godin says, “has many facets, and a profound and overlooked one is that mass is not the center any longer... We must consider a lens that sees individuals—Lisa, Ishita, Rafit—rather than seeking groups of ‘students’ or ‘customers.’ There is no us. No mass. No center. Our culture is now a collection of individuals and tribes, and each tribe is a community of interests.”

Unlike traditional business, education and even political models, **the Web doesn’t require clean-cut layers and standard definitions**. The Web scales from one person to a billion as easily as a funny YouTube video goes from 1 to 100 million hits in a matter of days, then back down to a few views when trumped by the popularity of another choice.

Part of what provides the fuel to create and connect in so many new ways is the amount and variety of information available to every person with a Web connection. Kevin Kelly points out in the essay, “Creating and consuming a universe of content,” that the Web’s ability to

make perfect copies of any digital item—at almost no cost—means that the value of having or owning a copy is falling away to nothing. And when the value of a copy approaches zero, people will flock to services and organizations that provide value above and beyond simply making copies available.

“We have been people of the book,” Kelly says, “but we are now becoming people of the screen. We are surrounded by screens as we travel, work and live... they are ubiquitous. That is the context in which we’ll publish books and all other content.” Screens—increasingly portable and wirelessly connected—are the context in which users will consume information.

Context and detail—layered on top of content—creates value in the Web world, particularly if the value provided is created for specific use—for the one—as opposed to the many.

Learning to innovate, innovating to learn

Kevin Kelly’s universal library, combined with the tools of personal empowerment that Seth Godin emphasizes, and cloud technologies that make computing power accessible to millions more, produce a world that according to Thomas Friedman can be referred to simply as “flat.” As Friedman notes in our essay, “In a flat world, there is one road to success,” we have a level playing field, where nearly everyone, everywhere has the tools, resources and connectivity to compete and create. Libraries have been a part of this transformation, too, providing access to new technologies and new forms of content as they’ve become available.

When everyone can compete on a Web that is quickly becoming ubiquitous, individual success, Friedman says, will depend on innovation. **And innovation, he continues, requires one thing above all others: education.**

“ The reality of digital community is that individual people are now available for close inspection, and the Web allows us to keep all of them in focus at once.”

SETH GODIN

“ Once all the technology is a given, all the old-fashioned stuff [the quality of school systems, training, rule of law, national governance and regulatory policies, combined with individual creativity, inspiration and imagination] will start to matter even more.”

**JOEL CAWLEY, VICE PRESIDENT,
STRATEGY & ENTERPRISE INITIATIVES, IBM**

“ The rising prominence and obsession with global rankings have highlighted the investment attractiveness of nations based upon the capacity of their universities to produce new knowledge and lead innovation.”

ELLEN HAZELKORN

In her essay, “Three key challenges facing higher education,” Ellen Hazelkorn explains that similar models hold true for educational institutions: that innovation is necessary in order to improve the quality of students’ experience. She points out that more and more organizations, funding bodies—even entire nations—see a robust, productive educational system as the engine for economic growth.

This is all occurring, of course, within a worldwide economic downturn. As outlined in the OCLC Global Council essay, “A world view on the library landscape,” nearly every librarian surveyed identified issues relating to the economy as one of the largest challenges they face. As one OCLC Global Council delegate from Europe expressed, “[Our top challenge is the] drive to be able to measure ‘impact’ and link performance to improvements in society and the economy.”

For individuals, organizations, nations—and for libraries—innovation will be the differentiator. As Friedman points out, the technology of the Web is becoming a commodity, a utility. Inspiration and imagination will drive success.

How we learn to analyze the growing universe of data must also radically change. In our “Big Data” essay, Chris Anderson points out that there is untapped potential within huge, new data sets to change how we do research, serve customers and understand the world. “Big Data” may be the key that unlocks the masses of information that billions of users are generating every day, leveraging our personal efforts in ways that we are only now beginning to understand. Friedman agrees. **Analytics, alongside innovation, will be the drivers of success in a flat world—powered by the Web.**

A Global Council delegate stresses that the more important change needed in library management over the next five years is “more focus on the digital library and on innovation and less attention and resources [focused on] the physical library.”

Innovating together

A flat world is one that rewards innovation enabled by education, both at the individual and institutional levels. How then should libraries best pursue meaningful innovation?

The answer, per Steven Berlin Johnson’s research, is cooperation (See “Big innovation requires big collaboration”). The really big breakthroughs—the ideas that shape our collective future—almost always occur in environments that promote sharing and cooperation.

Leslie Crutchfield and her colleagues at FSG make a similar point (see “Creating collective impact—tomorrow’s strategy for successful nonprofits”) about the success of cooperatives in general: large-scale social change, they observe, comes from better cross-sector coordination rather than from the intervention of organizations within one industry or sector—an approach they call “isolated impact.” **Instead, they suggest, collective impact requires a fundamental change in how funders—and leaders—see their roles.** Participants need to see themselves more as leaders of a long-term process of social change.

Library leaders agree. The words “collaboration” and “partnerships” surfaced again and again in our interviews and surveys as top opportunities for libraries over the next five years. They see opportunities to expand collaboration beyond libraries to “cooperate with society, companies, firms and new types of partners, to make libraries visible and increase complementary funding.”

In his essay, “Parabiosis and particularism: redefining the 21st century collection,” James G. Neal stresses that collaboration is indeed needed—but not collaboration in the traditional sense. Instead, he says, “radical collaboration...an advance from ‘Kumbaya’ to more fundamental cooperation,” is needed to meet the challenges of the 21st century.

“...an essential focus for institutions with unique holdings is to emphasize the benefits of the use of originals... Modern emphases on the digital provide unparalleled opportunities to illustrate why the originals matter so much: in terms of context, detail and other aspects.”

RESEARCH LIBRARIAN

“ Library collection development is being driven by four fundamental shifts. [One of which is] radical collaboration: new, drastic, sweeping and energetic combinations across and outside libraries.”

JAMES G. NEAL

Success with this broader community collaboration is not easy. In order to succeed with cooperation, Crutchfield says that nonprofits need a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication and backbone support organizations. In fact, she says, **“The expectation that collaboration can occur without a supporting infrastructure is one of the most frequent reasons that collective efforts fail.”**

A new kind of infrastructure, as Crutchfield calls it, is necessary to promote widespread cooperation among libraries, their communities and users in our new Web world. As Neal notes, we need not only the desire to collaborate but new architectures and systems that:

- ▶ innovate at institutional levels [in order to]
- ▶ promote education that drives personal innovation [while]
- ▶ demonstrating value to funders, shareholders and users.

How to do all of this within a context of an always-on, connected world where industrial-age hierarchies are no longer as relevant to personally empowered users is the big question. **The answer, as Johnson suggests—is through big collaboration.**

“ We can’t go it alone.”

PUBLIC LIBRARIAN

the case for

Web scale

The Web scales. And it allows organizations to dynamically increase and decrease capacity. Organizations now have access to infrastructure and platforms that enable them to reach a broad, geographically diverse community and at the same time scope their services to focus on meeting the specific needs of their users.

We have seen many service providers emerge in recent years that leverage the power of the Web to “operate at Webscale”: Google, Facebook, Skype, Amazon, Salesforce, Etsy. They have all aggregated the supply of something—a search service, retailing, relationship management—on the Internet. With aggregated supply, demand collects. As demand collects, use grows...often exponentially. **Webscale providers concentrate capacity in platforms whose benefits can be broadly shared.** These platforms provide the computing infrastructure and the data that drive the value of participation at scale. Additionally, many of these services build strong communities—networks of participants who communicate, share or trade on the platforms in ways that meet their diverse and individual needs.

We are very familiar with how the Web has changed the way we research, learn and communicate. However, the Web has also reconfigured organizations and activities in important ways, and disrupted whole industries. As the network lowers interaction costs, a major effect has been to allow greater specialization and sharing of functions across organizations. Google can offer communication and productivity tools to scholars and university faculty; eBay and Etsy can provide platforms that unite many sellers and buyers; UPS and DHL can coordinate supply chain operations across multiple firms. When Facebook's new Timeline feature was released, it enabled users of the Heroku computing platform to build thousands of applications in just days.

“ The Web is all about scale, finding ways to attract the most users for centralized resources, spreading those costs over larger and larger audiences as the technology gets more and more capable.”

CHRIS ANDERSON, EDITOR, *WIRED*

In this way, the Web allows capacities to be concentrated to create scale and to deliver the benefits of scale efficiently to many users. Those users in turn do not have to focus attention and resources on nondistinctive activities: things that everybody else is also doing. A craftsperson who uses Etsy can focus on her product, not on managing a Web store and e-commerce operations. A developer who uses Heroku can focus on the app itself and not on servers and deployment issues.

We are familiar with this also from our personal lives, where many people turn every day to large network hubs: to Amazon to buy a book; to YouTube to upload or watch a video; to Pandora, Spotify or Last.fm to listen to music. **These organizations operate at Webscale.**

Several different types of Webscale providers have emerged, each category creating value through aggregation and concentration that can be broadly shared.

Examples of Webscale providers

- ▶ **On-demand capacity providers.** Organizations are externalizing infrastructure to specialist providers. Organizations like Microsoft Azure enable others to build, host and scale applications in their development environment. Application providers like Salesforce allow organizations to manage core operations like customer relationship management that were once highly organization-specific. Logistics providers like DHL offer services to manage relationships across supply chains and logistics networks. Outsourcing specific infrastructure allows organizations to benefit from reduced upfront costs, less long-term commitment, the ability to scale capacity with demand and usage-based pricing models. It also allows organizations to focus on their core value and competencies.
- ▶ **Marketplace builders.** These Webscale providers bring together different communities of users. Google brings together advertisers and consumers; eBay and Amazon bring together buyers and sellers; the iPhone App Store brings together developers and consumers. ‘Free’ services are often offered on one side of the market (e.g., Google is free to the user).
- ▶ **Long-tail facilitators.** These providers use the scale of the network to better match supply and demand. By aggregating niche materials and audiences, such services can satisfy a greater proportion of requirements. In this way specialist providers or materials have a better chance of finding interested users; and users with specialist interests have a better chance of finding relevant materials or providers. Successful long-tail facilitators build community around their products. They rely heavily on usage data (analytics) and user participation (social) to rank, relate and recommend materials, creating rich pathways through their sites.
- ▶ **Social networks.** Social networking services that connect people with similar interests are increasingly pervasive in our personal and our work lives. We use Facebook and Twitter to communicate and share. Companies use social networks to market and engage. We are now used to selectively affiliating and disclosing our interests and activities.

On-demand capacity providers

HEROKU = COMPUTING INFRASTRUCTURE

SALESFORCE = CUSTOMER RELATIONSHIP
MANAGEMENT

DHL = BUSINESS PROCESS/LOGISTICS

Marketplace builders

GOOGLE = ADVERTISERS + USERS

EXPEDIA = BUYERS + AIRLINES + HOTELS

AMAZON = BUYERS + SELLERS

Long-tail facilitators

ETSY = ONE-OF-A-KIND CRAFTS

YOUTUBE = PERSONAL VIDEOS

EBAY = UNIQUE ITEMS

Social networks

FACEBOOK, QQ = PERSONAL

LINKEDIN = PROFESSIONAL

Clouds vs. Webscale



By now, cloud computing is widely recognized shorthand for a wide variety of Web-based data and information services. A common definition of the cloud is the ability to deliver applications remotely over the Web. The attributes or characteristics of cloud computing include on-demand self-service, broad network access (both bandwidth and Web and mobile clients), resource pooling (sharing), rapid elasticity (the ability to easily scale up or scale down) and measured service. Server hardware is off-site and the only local IT infrastructure required is a Web browser with reliable Internet connectivity.

There are different types of cloud computing providers:

- ▶ **Infrastructure as a Service (IaaS):** Managed and scalable processing, storage, networks and other fundamental computing resources. Examples include Savvis, Terremark, Rackspace, Amazon S3 and EC2.
- ▶ **Platform as a Service (PaaS):** User-created or acquired applications made using programming languages and tools supported by the provider. The user does not manage or control the underlying cloud infrastructure, but has control over the deployed applications. Examples include Force.com, Google App Engine and Windows Azure.
- ▶ **Software as a Service (SaaS):** The capability to use provider applications running on a cloud infrastructure. The applications are accessible from interfaces such as a Web browser (e.g., Web-based e-mail). *Examples include Google Docs, Salesforce CRM and Microsoft Office 365.*

The key axiom of the cloud is that it frees organizations to focus on their core businesses or mission, rather than on IT infrastructure and software management.

Webscale requires more than operating in the cloud. Webscale providers leverage the cloud to provide access to platforms, services and analytics that allow organizations to collectively create new value through shared resources and broad collaboration. **Operating at Webscale creates network effects—increased visibility, efficiencies and impact that cannot be achieved by any single organization.**

Webscale attributes

Providers that deliver Webscale, such as Amazon, Google, eBay and Facebook, have some common attributes. They:

- ▶ **Create value based on massive aggregations of data.** Google has a massive aggregation of search indexing and online advertising data; eBay has a massive aggregation of sale and purchase offers; Amazon has an aggregation of online retailing information; Facebook has an aggregation of social data.
 - ▶ **Connect users to create large-scale, engaged communities.** Amazon, Google and Facebook aggregate community very well, which in turn has added value to their data and services. Google has aggregated the community of searchers and online advertisers, and that community adds value to the search process by optimizing search results according to community use.
 - ▶ **Support the community and the data through scalable, shared infrastructure.** Webscale providers have built cloud-based infrastructures that allow users and partners sharing the infrastructure to experience new upgrades and enhancements in real time.
- “ Look for more collaboration on the cost side as stuff moves into the cloud. Some people think that no longer having local control is a big problem, but the economic imperatives are overwhelming for a move to the ‘network level.’”

NONPROFIT LEADER

Webscale benefits

The benefits of operating at Webscale are about the value that can be delivered through a combination of aggregated data, large-scale communities and scalable infrastructure. This value is delivered to users through Webscale platforms.

Webscale platforms create shared capacity. Users of Webscale platforms can focus on creating additional functionality, rather than on rebuilding the services provided by the platform. The platform releases energies for innovation and focus. In different ways the Web, GPS, Windows and the mobile phone have provided platforms on which others have been able to build more quickly. Facebook or YouTube could not have been built so quickly 15 years ago. Etsy, eBay and Amazon have allowed many people to become merchants who otherwise would not have been able to do so.

Network effects are integral. The more buyers there are on eBay the more attractive it is to sellers; the more sellers there are on eBay the more attractive it is to buyers. The more people buy from Amazon the better its recommendations become and the more people want to use it. The more people use social networking sites the more connections each can make. These are the network effects Webscale platforms can enable.

“ Web services will have a profound impact on library services. They should be exploited to help library customers in information discovery and navigation. The added value that libraries can provide are the relationships between seemingly unrelated pieces of information.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

“ You have to be able to take risks with whatever the new trends are and be able to have vision and look ahead to see not just in libraries but in the larger environment.”

PUBLIC LIBRARIAN

Social interaction and analytics are cumulative. Webscale platforms promote community by facilitating interaction around shared interests (music, books, crafts, careers). They also collect data about use behaviors and leverage this to improve the service. They use shared purchasing patterns, navigation options and recommendations to develop a stronger relationship with individual customers and to refine their offerings. In this way, social and analytics have emerged as ways of managing abundance and scaling community.

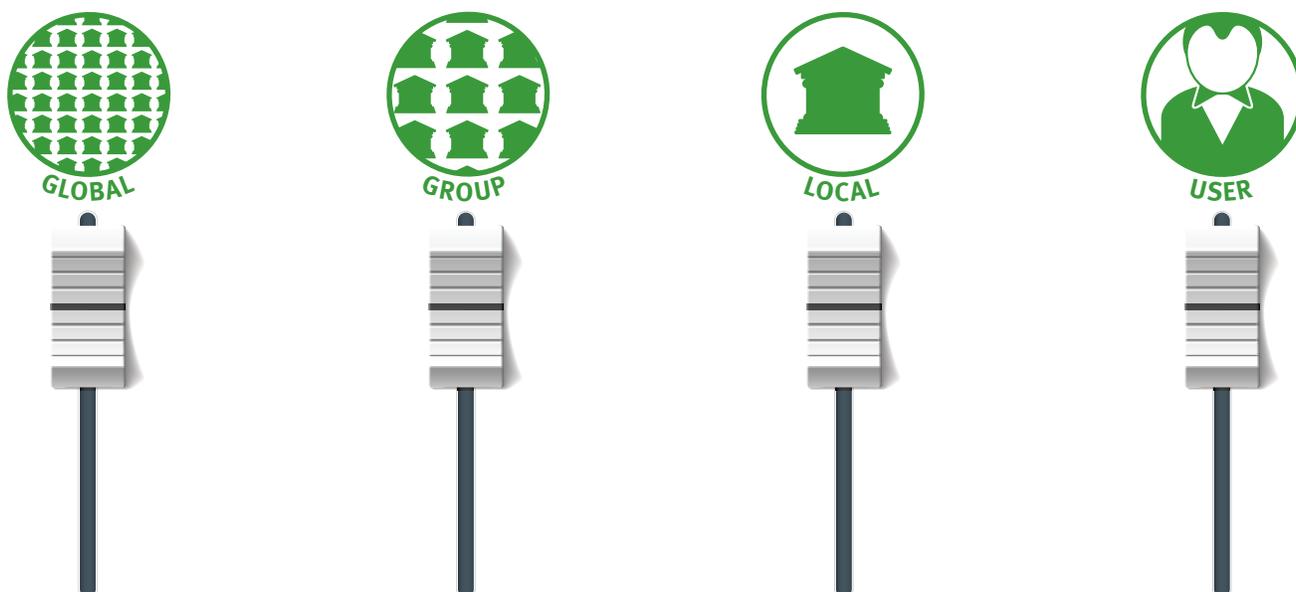
Webscale platforms enable communities to innovate collectively. Providers of smartphones and tablet devices have created platforms for developers and third-party providers to access Web services and create a wide variety of new applications. Developers can concentrate on creating unique applications for specific audiences and making them widely available. Users benefit from access to a breadth of innovative applications that could not have been created by one manufacturer alone.

In the current environment, there is a drive to focus resources where distinctive value can be created. True Webscale operators have successfully aggregated data and taken advantage of new forms of scalable, shared infrastructure to provide value to their communities. **The network effects of Webscale generate a virtuous cycle that accrues back to the shared community.**

Libraries

operating at Webscale

Libraries pioneered networking. They have developed robust frameworks for resource sharing and cooperative cataloging, leveraged publisher and aggregator platforms to deliver electronic collections, and created vibrant consortia and groups that share services across regions and countries. Significant network advantages have been achieved, but the full potential of what library networks can deliver has yet to be realized.



Institution scale and Webscale

Individual libraries are naturally “institution scale.” Libraries are optimized to provide services at the level of the institutions or the communities they serve—the university or college, the city or township, the school or the company. That focus has some important implications.

“ The Web is all about scale, finding ways to attract the most users for centralized resources, spreading those costs over larger and larger audiences as the technology gets more and more capable.”

CHRIS ANDERSON, EDITOR, *WIRED*

- ▶ **Libraries face the growing challenge of making sure library resources are represented in the places where library users are doing their work.** For many library users, information discovery has partially moved from an institutional level to the large providers of Webscale platforms like Google Scholar, PubMed and Amazon, or to specialist disciplinary resources. These platforms offer immediacy, findability and accessibility to a wider and wider range of data and an increasing number of communities.
- ▶ **Tailoring services to the needs of institutions and communities has historically meant that libraries have had to manage a significant amount of local infrastructure.** This includes local hardware and multiple systems and repositories for collection management, patron management, workflow management, etc., among which integration is difficult. As library users increasingly build their expectations around network-level tools, new systems will be required. Systems will need to deliver local services as well as integrate with the expanding amount of digital content, connect to the growing number of Web-based services, and provide access through a wide variety of mobile devices. Libraries also need to integrate their systems with university and community systems (e.g., PeopleSoft, Blackboard, enrollment management and budget systems, etc.).
- ▶ **Libraries are making decisions about collections and services based primarily on data from their local institutions.** Even with increasing investment in systems and infrastructure, most libraries do not have access to the analytics required to inform decisions across services, collection types and institutions.

Operating at institution scale allows libraries to focus on serving specific, local communities. As the information environment changes, however, the opportunities to best serve local constituents will increasingly require regional and global scale.

Collaboration in a changing environment

Increasing competition for resources and attention across institutions and communities is driving changes in the ways libraries work and collaborate. Many libraries are investing in programs and technologies that can raise the visibility of and access to their resources. Libraries are coming together in new ways to:

- ▶ Build capacity and impact through cooperation
- ▶ Forge broader and more diverse partnerships
- ▶ Leverage their higher-value services
- ▶ Share innovative and efficient solutions to keep up with the rapid pace of change
- ▶ Amplify the value they bring to the communities they serve
- ▶ Analyze data in new ways that link library value to student learning, educational value and community impact.

Limiting operational focus to the institution level is no longer sufficient, and as recent successes with new collaborative efforts have shown, it is no longer required. Libraries now have the opportunity to meet their challenges through a combination of institution scale and Webscale efforts.

Challenges shaping library services

OCLC members, along with other technology and information experts, identified the forces shaping the future of libraries across the globe:

- “Demands to deliver resources electronically, ubiquitously, seamlessly”
- “The need for broader, diverse partnerships”
- “Challenges of proving relevance”
- “Dynamics of serving an education system under reconstruction”
- “Rethinking the library’s role in terms of greater collaboration and cooperation with other institutions”
- “Redeveloping the library’s online presence to better address user needs”
- “Managing the transition from print to electronic media”
- “Keeping pace with the rate of technological change”
- “The need for new types of analytics and metrics more closely tied to performance measures”
- “Finding new efficiencies as budget pressures intensify.”

Libraries at Webscale: building network effects

The more the world's libraries work together to aggregate and share data, utilize shared infrastructure and collaborate as a global community, the more value can be delivered to the users of libraries. The more value delivered, the more libraries will be used; the more libraries are used, the more value will be delivered. With aggregated supply, demand collects.

By working together to operate at Webscale, libraries can collectively experience the benefits exhibited by other successful Webscale providers. Webscale creates concentrated capacity of library resources whose benefits can be broadly shared. Libraries can better deliver and demonstrate their combined relevance in an increasingly complex information environment, both globally at the scale of the Web, and locally in serving the specific needs of their campuses and/or communities.

As the diagram "Libraries at Webscale" illustrates (page 23), working together at Webscale offers substantial new advantages for both the discovery and delivery of library resources and the management of library operations. Shared data and shared infrastructures provide the system-wide intelligence and platforms needed to collectively innovate and drive new operational efficiencies.

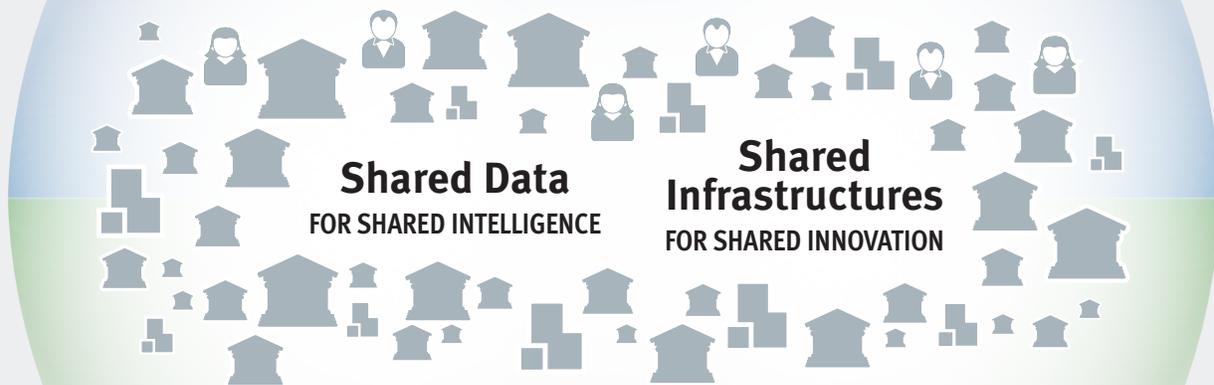
Libraries at Webscale

Discovery & Delivery

INCREASED
VISIBILITY

COLLECTIVE
COLLECTIONS

COMBINED
INFLUENCE



Library Management

When libraries work together to operate at Webscale, they leverage the cloud to share data and infrastructure to reduce the burden of locally managing IT infrastructure and software. But more importantly, operating at Webscale provides access to platforms, services and analytics that allow libraries to collectively create new value through shared resources and broad collaboration.

Operating at Webscale creates network effects—increased visibility, efficiencies and impact that cannot be achieved by any single organization.



Discovery and delivery

Discovery and delivery at Webscale creates network effects. By aggregating data, libraries expand their impact and relevance both locally and globally. The full range of library services and collections will be better represented on the Web in ways that library users can find them at the point of need, increasing relevance and creating gravity on the Web.

“ Web services will have a profound impact on library services. They should be exploited to help library customers in information discovery and navigation. The added value that libraries can provide are the relationships between seemingly unrelated pieces of information.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

► **Increased visibility:** Massively aggregated library data, presented in workstreams of users, in the library and on the Web, provides increased visibility of the full range of global library resources. Aggregation of library materials of diverse library collections gives the scholar, student and information seeker better access to the most relevant materials.

► **Collective collections:** Through the aggregation of data, libraries can more effectively work together regionally or globally to advance shared collection management. Cooperative management of shared print/digital archives increases space, reduces inventory and decreases associated management costs.

► **Combined influence:** As libraries and library users operate and share at Webscale, creating more and more aggregated data and using more services and resources, the greater the demand for library services grows. Greater demand also delivers increased value to publishers, authors, educators, Web service providers and others information community participants. Greater value drives greater influence, allowing libraries to forge new partnerships and to improve the economics of existing relationships.

We can already see many examples of libraries working together to envision new services and new approaches to service that leverage the power of the Web. Nonprofit organizations and cross-organizational initiatives such as HathiTrust, DuraSpace, JSTOR, Europeana and the emerging efforts of the Digital Public Library of America, to name just a few, have been created by librarians, museums, universities, consortia and policy and civic groups to pioneer new approaches to service and education.

These initiatives are starting to deliver the Webscale impacts of discoverability and visibility. For example, **HathiTrust**—a partnership of major research institutions and libraries—is working to contribute to the common good by collecting, organizing, preserving, communicating and sharing the record of human knowledge. **Europeana** has the goal of making Europe’s cultural and scientific heritage accessible to the public. It promotes discovery and networking opportunities in a multilingual space where users can engage, share in and be inspired by the rich diversity of Europe’s cultural and scientific heritage. And **JSTOR** uses information technology and tools to increase productivity and facilitate new forms of scholarship. These initiatives also deliver some important library management advantages.

Library management

Library management at Webscale creates system-wide capacity. As libraries focus increased resources on delivering greater value to users through distinctive, local resources, they can drive efficiencies by moving routine operations to a shared, cloud-based infrastructure to manage their collections, coordinate their workflows and track transactions. This will reduce the burden of local IT hardware and software.

- ▶ **Shared cost:** Shared infrastructure cost can be spread, and scaled, across multiple users. Capital expenditures on local hardware, software and other peripheral services can be reduced or eliminated. Implementation of applications and upgrades and the integration across services is significantly simplified. Services can be brought to libraries and geographies that could not otherwise afford them.
- ▶ **Streamlined workflows:** Operating together at Webscale creates new opportunities to evolve and simplify library workflows. For example, automated resource sharing practices based on global knowledge of shelf status and electronic rights will lower costs and improve response times. Libraries will also benefit from the flexibility of staffing across workflows and between institutions.
- ▶ **New efficiencies:** At Webscale, hardware and software can be managed collectively for all participating libraries. System-wide infrastructure requirements, such as performance reliability, security, privacy and redundancy can be more efficiently managed in one shared system than in hundreds or thousands of local systems.



Shared intelligence. Shared innovation.

The information environment is evolving so rapidly that it is almost impossible for any single organization to keep up with the changing needs of users, the advances in technology and the expanding array of topics and formats that library collections are expected to provide.

“ In order to better collaborate on the infrastructure there needs to be a structure, and then people have to say what they’re willing to do on behalf of others, and then build the trust to make that happen. The time is good for that sort of thing.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

Libraries are a source of significant creativity, resourcefulness and innovation. However, many are expending duplicate effort to solve the same problems or to take advantage of similar opportunities. As libraries share more and different types of data and build critical mass, new technologies make it possible to mine that data quickly and efficiently to provide instant and flexible access to the kind of shared intelligence and analytics that has traditionally has been too costly or too difficult to obtain.

Shared platforms that leverage the same technologies and tools pioneered by other Webscale providers will enable library staff to combine data across platforms and to build apps that deliver new services to users. Webscale platforms will also allow libraries to share innovations, taking advantage of the specific applications that best meet the needs of their institutions.

Libraries will benefit from access to a breadth of innovative applications and services that could not have been created by one library alone. The network effects of operating at Webscale will create a virtuous circle that will accrue back to the library community.

OCLC is committed to helping libraries leverage the full potential to operate and innovate at Webscale. OCLC’s strategic initiatives to support and connect libraries at Webscale are outlined in the following section.

OCLC'S STRATEGIC DIRECTION

The world's libraries. Connected.

OCLC members are committed to connecting people to knowledge through library cooperation. The Web offers unprecedented opportunities to advance that mission. OCLC is committed to helping libraries leverage the full potential to operate and innovate at Webscale. Core elements of this strategic direction are to **deliver value through shared library data** and to **support library cooperation through shared, scalable infrastructure**.

As illustrated below, OCLC has partnered with members over the last decade to deliver Web-based services and infrastructure as the Internet has evolved. From the syndication of data that delivers collections on the Web, to the launch of WorldCat.org and WorldCat Local, these efforts have empowered people to use the Web to search local, group and global library resources. And now, OCLC WorldShare Management Services and the OCLC WorldShare Platform deliver system-wide efficiencies and provide new ways to share resources and innovation.



Library services and the Web—a timeline

2000	2005	2006	2007	2009	2010	2011
OCLC publishes “Weaving libraries into the Web, weaving the Web into libraries”	Open WorldCat connects information seekers to libraries via partnerships with Google, Yahoo! and others	WorldCat.org launches	WorldCat Local provides a view of local collections and access to the global collection	Work with members begins on Webscale Management Services (WMS)	Early adopters begin using WMS	OCLC introduces OCLC WorldShare

Creating value through shared library data

Webscale discovery **increases visibility** of libraries by connecting information seekers to more library services in more ways.

WorldCat data and services connect and provide access to more than 875 million articles, videos, books, photographs, maps and other library materials. On behalf of libraries, OCLC works to share, connect and enhance library data so that the full range of library resources can be more easily discovered and delivered at the point of need, through dedicated library portals such as WorldCat.org and WorldCat Local, and by sharing aggregated data with partners such as Google Books, Google Scholar and HathiTrust.

OCLC will continue to work with libraries, regional and national library groups and content aggregators to represent the **collective collection** and services offered by libraries, with data about growing digital and electronic collections (licensed materials, special collections, open access materials), institutional data (vendor records and library information) and workflow data (acquisitions and circulation data, and resolver, knowledge base, search and interlibrary loan transactions).



OCLC continues to explore new technologies, new partnerships and new approaches to data quality management, enhancing libraries' ability to dynamically scale up to provide access to a full range of global library resources, or scale down to focus on the unique resources needed by an individual scholar or student.

Aggregation and sharing of more data, about more types of library assets and activities, enable library staff to benefit from new forms of **shared intelligence**. OCLC will develop analytics to better inform decisions that individual institutions and groups make about collection management, resource sharing and service development. OCLC will seek new and expanded partnerships with a broad range of organizations that make library collections more accessible on the Web, increasing the **combined impact and influence** of libraries worldwide.

Supporting the library cooperative through shared, scalable infrastructure

Library management at Webscale allows libraries to **share infrastructure costs and resources**, as well as collaborate in ways that remove the restrictions of local hardware and software.

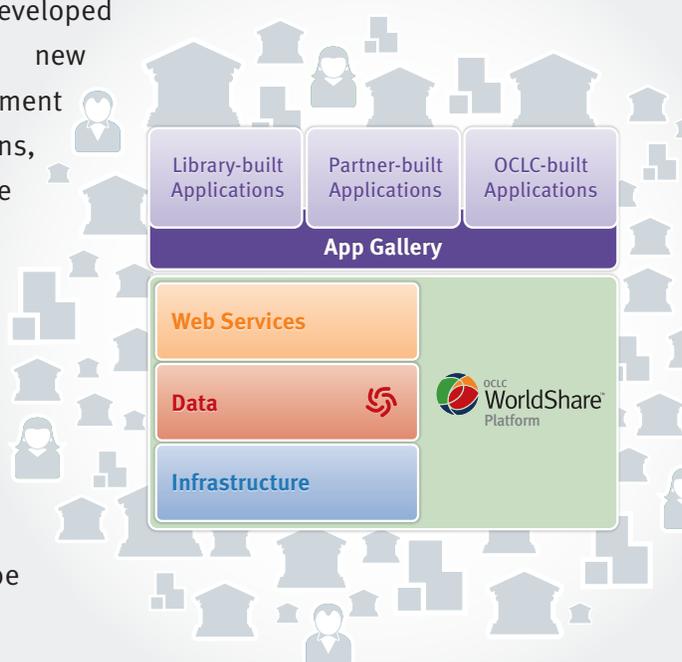
OCLC WorldShare represents the cloud-based infrastructure OCLC provides libraries to share, collect and manage their resources more effectively. The WorldShare Platform supports OCLC-developed and community-built applications and Web services, leveraging the aggregated data in WorldCat alongside valuable repositories managed by the library and information community. Data, tools and services to create and share apps will leverage the **collective innovation** of the community to create new services and value around the assets of libraries.

OCLC WorldShare Management Services, developed using this shared infrastructure, offer new approaches to cooperative library management across a range of tasks, including acquisitions, circulation, patron administration and license management. Combining information from many libraries and **streamlining workflows** across functions, formats and locations eliminates traditional operational silos and **delivers new efficiencies**.

Over time, new and existing OCLC services—including resource sharing, consortial borrowing and metadata management—will be delivered through the WorldShare Platform.

OCLC will establish data centers around the world to support performance, reliability and scalability. Data centers are now available in the United States and the United Kingdom. Additional data centers are scheduled for continental Europe, Australia and Canada.

Together, cooperative data and shared infrastructures will connect the world's libraries and help them operate, innovate and collaborate at Webscale.



big Collaboration

Everything that happens on the Web that’s more than “just you” and less than “everybody else” occurs because we can now scale our efforts up and down almost effortlessly. While we have explored the potential and promise that the Web and operating at Webscale can provide—success is not guaranteed. A clear, shared vision of the role that libraries will have in connecting people to knowledge in a webbed world is essential. The fervor with which we collaborate to achieve that vision may be the single most important contributor to success in a digital age.

“**Radical collaboration:** new, drastic, sweeping and energetic combinations across and outside libraries.”

JAMES G. NEAL

Any thriving ecosystem contains an abundance of interdependencies among diverse participants. These connections help it adapt and evolve to continuously support the growth and needs of the community. If the Web will be the dominant catalyst that drives adaptation in today’s information ecosystem, it will also most certainly bring new form and shape to libraries. The really big breakthroughs that will shape new futures occur when people, organizations and ideas come together and work in new ways that encourage risks, challenge assumptions and invite critique. As Steven Berlin Johnson reminds us, big innovation is driven by big collaboration.

Big collaboration in the information ecosystem will come not only from broader collaboration across libraries, library groups, consortia and cooperatives, but increasingly through new, innovative alliances and partnerships across the broader knowledge community—across researchers, publishers, commercial vendors and Webscale providers such as Google, Amazon and Facebook.

“ The trick to having good ideas is not to sit around in glorious isolation, trying to think big thoughts. The trick is to get more parts on the table.”

STEVEN BERLIN JOHNSON

At the very moment when libraries need to find ways to cooperate creatively, when the economic and technological pressures make collaboration more important than ever, political pressure intervenes. Local politicians and appointed officials—in political subdivisions, school districts, and colleges and universities—become ever more protective of “local” resources when times get tough.

Big collaboration facilitates the creation of partnerships without sacrificing the ability to meet local needs and find local benefits. Library managers and decision-makers can make changes for the benefit of their institution and the broader community. And as they do, share the benefits with other institutions, and other communities.

We must push the boundaries of what we have traditionally meant by collaboration and commit ourselves to new ways of operating and new forms of partnerships.

What might this look like?

An ecosystem is a system whose members derive benefit from each other’s participation via symbiotic or positive sum relationships. Applying the dynamics of an ecosystem—interactive relationships, cooperation and competition—offers one approach to thinking about the new possibilities that collaboration can deliver.

Relationships and interactions

An ecosystem thrives through complex relationships and interactions among its members. Several possibilities emerge for building library relationships and interactions within a Webscale information ecosystem:

- ▶ **Connect users with content** regardless of format or where it is stored by creating new models of partnership with all types of content providers
- ▶ **Develop new forms of knowledge** through dialogue and discourse that are easily distributed, reviewed and added to the collective collection

- ▶ **Build creative ‘spaces’** that encourage collaborations of pure exploration and invention among any ecosystem members, organizations or groups
- ▶ **Build bridges, links and tunnels to wells of information** that make it easy to find, connect, compare, contrast, mix or mash up all content into any format.

Cooperative and competitive

The network of organisms within the ecosystem contributes to its growth and expansion by facilitating adaptation, change and contribution. This critical balance between cooperation and competition generates energy and motivates the evolution of the ecosystem toward higher function, nourishing the entire community. How can we develop forms of collaboration that promote sharing, and still drive innovation?

- ▶ **Nurture partnerships to co-create a vision of the future** with publishers, library service providers, library consortia, national and global library initiatives, and consumer sites
- ▶ **Establish shared values and principles** that can support cooperation, commerce and the role of the library
- ▶ **Lead and expand dialogue with vendors and suppliers** to find new ways to better serve the library community and their users
- ▶ **Look outside of our own ecosystem** for multidisciplinary expertise, and examples and practices that we can draw on
- ▶ **Commit to research and advocacy** by building new collaborative partnerships with both for-profit and not-for-profit organizations with shared values and interests.

These are just a few examples of the shapes that new forms of collaboration might take. Where to begin, of course, is with a decision to come together. Libraries and their partners must define the best opportunities and make them a reality. A Webscale world makes this conversation urgent—and exciting.

Our path forward

We're no strangers to collective innovations. Ranganathan's five laws of library science called for greater access to collections and indicated the need for open shelves. Cutter's objectives for a cataloging record are still recognized in modern cataloging definitions and standards. Carnegie built U.S. libraries filled with open stacks, inviting reference interaction with library staff, a feature now persistent in libraries across the globe.

Already, libraries collaborate at national, regional and local levels, on everything from catalogs and reference to website development and digitization. Still, many of our operations and functions remain stand-alone, manager-owned processes. We must now apply systematized thinking and big collaboration to all features of library service and management. We must do so with urgency and speed if we are to adapt in our new environment.

It's not hard to envision an information ecosystem that can deliver on the promise of "connecting people to knowledge through library cooperation." We have a solid foundation of library collaboration from which to advance this work.

Based on this foundation, our next crucial step is to further develop a virtual and global network of libraries and others in our ecosystem to build, steward and share the collective collections of the world's knowledge. As we rise to this occasion, we will strengthen collections, expedite workflows, enhance services and increase the value returned to all. Local patrons will have, at their fingertips and on their screens, the information they desire, whether it's stored in the building or on another continent. And we will collectively serve, collectively share, collectively build and collectively support a shared vision of improved information access for everyone and every one.

Appendices

Appendix A: World views

Ten brief essays and some sage advice from dozens of librarians and technical leaders can help us envision the landscape and chart the roadmap for libraries. This is what they have to say.

- **Seth Godin**, entrepreneur, author and speaker, sees the end of mass media. He believes that the Web requires us to stop thinking about mass communication and instead support individual and community-specific conversations so that we can focus on their goals.
- Noted thinker and futurist **Kevin Kelly** describes the “universal library,” where we move beyond being “people of the book” to becoming “people of the screen.”
- Author and economist **Thomas Friedman** explains how the only path to success in our newly flattened world is innovation, and that the only reliable driver of innovation is education.
- Professor **Ellen Hazelkorn**, Vice President of Research and Enterprise, and Dean of the Graduate Research School, Dublin Institute of Technology (DIT), reflects on the challenges of sustaining education at a time when utility and efficiency are driving funding and rating issues.
- The promise—and perils—that **Big Data** bring to science, education and business are addressed by Chris Anderson, Tim O’Reilly, danah boyd and Doug Henschen.
- **James G. Neal**, Vice President for Information Services and University Librarian at Columbia University, points at the forces of innovation, collaboration and the deconstruction of library collections.
- Writer **Steven Berlin Johnson** identifies innovations that demand new models for sharing and collaboration... BIG collaboration.
- **Leslie Crutchfield**, author of *Forces for Good*, and her colleagues outline how social organizations can become real agents of change and social advancement by working together to enact sustained, collective impact.
- To understand the broad, technical environment currently shaping the Web, we turn to findings on cloud computing from the **European Commission on Information Society and Media** (ERCIM).
- **OCLC Global Council delegates** share their views on the challenges and opportunities facing libraries of all types.

The future is personalized

In his 2011 book, *We Are All Weird*, Seth Godin examines the decline of mass media, mass marketing and mass culture, and the “rise of the weird.” The Web, he says, lets us see people as individuals, create community around specific interests, and empower “tribes” to act on the goals that they think are important.

The following essay is based on the work of **Seth Godin** as an entrepreneur, author and speaker. He is the author of 14 best-selling books and has challenged the way people think about marketing, change and work.

“Mass” is what allowed us to become efficient

Mass marketing and mass production have defined us. Mass is what we call the undifferentiated, the easily reached majority that seeks to conform and survive. The mass market is efficient and profitable. It determines not just what we buy, but what we want, how we measure others, how we vote, how we have kids and how we go to war.

“Weird” is what we call people who aren’t normal, who aren’t defined by the mass.

For 50 years, the attainment of mass has been the goal of business: if you can get the masses to yearn for what you offer, and you can satisfy their needs in bulk, you win.

Weird (not normal) means that you’ve made a choice, you’ve done what you want, not what the market wants. More and more, that’s precisely what’s happening.

“ We expect customization—we expect Amazon to recommend and suggest books based on our purchasing behavior; when we log in, we expect the site to “know us.” Everything today in libraries is based on opinion—we don’t collect that data. How can we move forward on personalization if we don’t collect data on people? How can we demonstrate value if we don’t track usage?”

DIRECTOR, LIBRARY ASSOCIATION

The weird aren’t loners. They’re not alone, either. The weird are weird because they’ve forgone the comfort and efficiency of mass and instead they’re forming smaller groups, groups where their weirdness is actually expected. And when you don’t feel alone, it’s easier to be weird. Social acceptance of weird behavior makes being weird more popular...but not big enough to be attractive to the mass marketer. As a result, mass marketers keep missing the point, looking for giant clumps instead of organizing to service and work with smaller tribes and individuals.

Mass and the reign of a normal education

We organize our teachers and classes around normal. The normal education system takes a precise number of years to graduate a normal student from a normal school. Normal education is built around a standard curriculum—one size must fit all. Get too far ahead and you stress us out. Get too far behind and we fail you, reprocess you and give you another chance to get with the program. Education reform, then, tends to focus on raising the standards for the middle.

What great educators have discovered, though, is that there is no blob of normal. There is no center of the curve, no pack of students who have no problems, no talents, no issues. Instead, there are millions of silos, millions of individuals and small groups that learn differently, think differently and dream differently. Why are we puzzled that in a world filled with change, a static, history-based approach to education is not working out so well?

When we consider whom we pay the most, whom we seek to hire, whom we applaud, follow and emulate, these grown-ups are the outliers, the weird ones. Did they get there by being normal students in school and then magically transform themselves into Yo-Yo Ma or Richard Branson? Hardly. The stories of so many outliers are remarkably familiar. They didn't like the conformity forced on them by school. Struggled. Suffered. Survived. And now they're revered.

What happens if our schools (and the people who run them and fund them) stop seeing the mass and start looking for the weird? What if they acknowledge that more compliance doesn't make a better school, but merely makes one that's easier to run? The solution is simple: don't waste a lot of time and money pushing students in standard, normal directions. Instead, find out what weirdness they excel at and encourage them to do that. Then get out of the way.

Digital is not a shadow: it's the engine of weird

The interconnected nature of the Internet has gone beyond the sideshow of the dot-com boom and ended up influencing everything that's made and sold and distributed and discussed. It used to be possible (even advantageous) to ignore the digital hoopla. Now, though, it's basically impossible to interact with the future (or the present) without determining how digital interactions are going to change the game.

The Internet encourages weirdness because it's generally a private connection between one person and another, rather than a public media that's occasionally private. On the 'Net, you can be weird on your own long before the "culture" (what's left or right of it) tells you to stop.

The reality of digital community is that individual people are now available for close inspection, and the Web allows us to keep all of them in focus at once.

Don't seek mass: see individuals

The revolution that we're living through has many facets, and a profound and overlooked one is that mass is not the center any longer. Us and not-us is a dead end.

Dishwashing soap is general. Family sedans are general. Coca Cola is general. Your policies are general. Please don't dress them up and pretend they're particular. They're not. When you do that, you're not catering to the weird, you're defending mass in any way you can. Our knee-jerk reaction, inculcated by generations of mass, is to worry about the big hump in the middle of the curve, not to obsess about the weird outliers.

The relentless search to recreate the mass of the past is at the heart of the stress we feel at work. It's pushing governments, NGOs, entrepreneurs and most of all, big marketers, to go to extravagant lengths to push us to conform. A few outliers have seen a different path. They're catering to the weird.

Consider a lens that sees individuals—Lisa, Ishita, Rafit—rather than seeking the mass. There is no us. No mass. No center. Our culture is now a collection of tribes, and each tribe is a community of interests.

The challenge of your future is to do productive and useful work for and by and with the tribes that care about you. To find and assemble those tribes, earn their trust and take them where they want and need to go. ●

“ Understanding and engaging customers is necessary for libraries to stay relevant. The use of business intelligence, analytics and even data mining will be more common. It is all about customer engagement and intimacy.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

“ Patrons want personal and personalized service, they want that personal touch that comes with human interaction.”

ACADEMIC LIBRARIAN

Seth Godin writes www.sethsblog.com, one of the most popular marketing blogs in the world. In addition to writing, he speaks to large groups on marketing, new media and what's next, and is the founder of Squidoo.com, a fast-growing recommendation website.

Creating and consuming a universe of content

Is the mythical dream of having all knowledge—past and present—available in one place within our grasp? Kevin Kelly thinks so, saying that **today is the best time in history to be a reader**. He also identifies trends that are shaping the technological and social context of content consumption for both creators and users. To what end? To bring us **the universal library of everything**. Accessible by ubiquitous screens, it is the portal into all content: TV, film, phone, podcasts, newspapers, books, music, e-mail, blogs, websites, magazines, radio. The long-heralded, great library of all knowledge will transform the nature of what we now call books and the libraries that hold them.

The following essay is based on the work of **Kevin Kelly**, author of the article, “Scan This Book,” which appeared in the *New York Times Magazine* in May 2006. He also gave a presentation at the O’Reilly TOC (Tools of Change for Publishing) 2011 conference in New York City titled, “Better than Free: How Value is Generated in a Free Copy World.”

A renaissance for readers...but what of producers?

There has never been, Kelly explains, a better time to be a reader. We have more selection, more quality, more access to great books and other content than anybody anywhere in the world has ever had. The problem is that everyone is benefiting except producers. Kelly suggests that downward pricing pressure will continue to where someone will always offer competitive content at or near a zero price point. How, then, do we motivate creators to continue to add to the universal library?

“The added value that libraries can provide is the relationships between seemingly unrelated pieces of information.”
LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

Beyond making copies, producers must generate value

Since the Internet works like a giant copy machine, Kelly believes that creators need to focus on generating value in new ways, rather than relying on simply selling copies. He identifies eight categories of value that can bring in revenue, even when books, music, games, software—anything digital—is available freely or nearly so:

- ◉ **Immediacy.** You can eventually get anything you want for free if you wait long enough. But if you want it as soon as the creator or the artist has created it, you may be willing to pay for the immediacy of it.
- ◉ **Personalization.** If raw music is free, you might pay to personalize it to the acoustics of your living room.
- ◉ **Authentication.** People will pay for the “official” version of software to make sure they have the most complete, robust copy with guarantees, updates, etc.
- ◉ **Findability.** A particular piece of content may be free or nearly so. But in a nearly infinite library, you may pay for a good way to locate just what you’re looking for.
- ◉ **Embodiment.** The recording is free, but you’ll pay to see the performer, the author, the artist.
- ◉ **Interpretation.** The old joke in the software industry is that the software is free...but the manual is \$1,000. Training, education and understanding will cost money.
- ◉ **Accessibility.** Paying for the ability to get something immediately, in your preferred format.
- ◉ **Attention.** That is, patronage. People will pay if the creator is giving them some attention.

These eight concepts are **the generatives**: they have to be generated in context; they cannot be copied. They are what's valuable, even if the content in the universal library is free.

Six new verbs for patrons of the universal library

Beyond changing the rules for content providers, the universal library has also turned the world upside down for consumers of all digital media. Kelly points out six new “verbs” that we need to be comfortable with in order to thrive as users of the universal library:

- **Screening.** We have been *people of the book*, but we are now becoming *people of the screen*. We are surrounded by screens as we travel, work and live. Even at the gas station movies are being shown on the pump. They've permeated, and they are ubiquitous. That is the context in which we'll publish books and all other content.
- **Interacting.** We now expect to interact with content, intellectually and, increasingly, physically. We'll interact with gestures, voices and hands, and in nonlinear modes.
- **Sharing.** All of our media activity is becoming social. Reading will become an increasingly social activity, and books will be woven together into shared libraries.
- **Accessing.** That is “not owning.” The future of media is in access rather than ownership. Why own your own copies if you can have instant access to everyone's?
- **Flowing.** Streaming data everywhere, always on, never done. The paradigm of the page is coming to an end; instead, narratives and information exist in constantly reconfigured streams. We're moving away from static, fixed pages to streams and flows, as in Twitter, RSS feeds, Facebook walls, lifeblogs.
- **Generating.** Users need to be cognizant of the eight “generatives” noted above and how they'll support content creation in new ways, and insert themselves into those streams.

Not just inevitable: immediate

The final, absolute universal library may still be a ways off, but we can see and feel aspects of it in our lives today. Kelly asks: “What is the technology telling us?” Answer: “Copies don't count any more.”

What counts are the ways in which these common copies of a creative work can be linked, manipulated, annotated, tagged, highlighted, bookmarked, translated, enlivened by other media and sewn together into the universal library. The only way for books to retain their waning authority in our culture is to wire their texts into the universal library.

The reign of the copy is no match for the bias of technology. All new works will be born digital, and they will flow into the universal library as you might add more words to a long story. In the clash between the conventions of the book and the protocols of the screen, the screen will prevail. On these screens, now visible to billions of people on earth, technology will transform what are now isolated pieces of content into the universal library of all human knowledge. ●

Kevin Kelly is Senior Maverick at *Wired* magazine. He cofounded *Wired* in 1993, and served as its executive editor from its inception until 1999. He published *What Technology Wants* for Viking/Penguin in October 2010. He is also editor and publisher of the *Cool Tools* website, and was publisher and editor of the *Whole Earth Review*, a journal of unorthodox technical news. He cofounded the ongoing Hackers' Conference, and was involved with the launch of the WELL, a pioneering online service started in 1985. He authored the best-selling *New Rules for the New Economy* and the classic book on decentralized emergent systems, *Out of Control*. You can read more from Kelly at his website, www.kk.org.

“Technology has made it possible for an incredible number of individuals to capture and create sound, images, text and compilations, and disseminate them very widely. This is referred to as the ‘generative nature’ of the Internet, and it is producing a vast enlargement of this cultural record.”
TECHNOLOGIST

“Rebranding libraries around readers and reading rather than around books is imperative. We need to redefine libraries around the people they serve, rather than the content they store and concentrate on transformation over information.”
CONSULTANT

“Librarians should be more involved with customized content providers, improving how they get themselves inserted into these for-profit settings. Library advisory panels from multiple disciplines with true clout need to help drive change for libraries.”
PRINCIPAL

In a flat world, there is one road to success

In his 2011 follow-up book, *That Used To Be Us*, Thomas Friedman brings us up-to-date on what the changes he observed five years earlier have brought us, and where they may lead. He predicts that within a few years, virtually everyone on the planet will have the tools and network connections to participate in a hyperconnected, flat world.

The flat world of 2005

We are, today, more connected than ever before. Networks of trade, commerce, investment, innovation and collaboration exist that were unthinkable just 20 years ago. In his 2005 book, *The World Is Flat*, Thomas Friedman explored three powerful forces that came together between the 1980s and the new millennium to create those connections:

- **The personal computer** enabled hundreds of millions of people to create their own digital content in a variety of formats.
- **The World Wide Web** gave people the ability to send that digital content to more places, share it and collaborate with many more people for the relatively low costs associated with PC access and an Internet connection.
- **A revolution in programming languages** and transmission protocols (an alphabet soup of HTML, HTTP, XML, SOAP, AJAX, EDI, FTP, SSH, SFTP, VAN, SMTP, AS2 and so on) has made everyone's desktop, laptop and cell phone interoperable with everyone else's. This feels natural today, but it was truly revolutionary at a time when many people ran different machines using different operating systems and different software.

Put these three innovations together and the result was that in the span of a decade, people in Boston, Bangkok, Bangalore, Mumbai, Manhattan and Moscow all became virtual next-door neighbors. Two billion people suddenly found themselves with newly acquired powers to communicate, compete and collaborate globally—as *individuals*. Previously, only countries and companies could act in this way. When the world got flat, people themselves could create and connect globally—as *individuals*. And more of us do so every day.

“ The customer expects the experience to be easy. They expect it to be like the iPhone, and they expect it to be intuitive. They don't want any training and they also do not want somebody finding it for them.”

PUBLIC LIBRARIAN

Today, technology platforms provide a level playing field

The Web instruments of innovation will become what electricity is for most of the world today: a utility. When that happens, according to Joel Cawley, Vice President for Corporate Strategy at IBM, who Friedman quotes, two things will differentiate successful organizations and countries. The first is analytics—the ability to analyze and apply all the data pouring through our networks in order to optimize efficiency, service and innovation. Second, once all the technology is a given, Cawley predicts that “all the old-fashioned stuff will start to matter even more.” The quality of school systems, training, rule of law, national governance and regulatory policies, combined with individual creativity, inspiration and imagination, will drive success. The technology? Everyone will have that.

A level playing field does not lift all boats

Mixed metaphor notwithstanding, the dramatic changes that came with a flat world have not proved beneficial to all players. A lot of people feel up-in-the-air and are asking, “Where do I fit in? How do I stay relevant in my job? And what kind of skills do I need to learn?” The short answer is that the workplace is undergoing a fundamental restructuring that every educator, parent and worker needs to understand.

Over the past decade, workers let go due to the global recession have not been hired back as quickly as after previous economic downturns. This isn't because employers have gotten meaner, but because the hyperconnecting of the world has enabled them to become more efficient, and this process has eliminated a lot of jobs. For a decade or so, the housing bubble in the U.S. masked the ongoing decline of blue-collar opportunities. When the bubble burst, and home building/renovation took a sharp decline, many good paying jobs went with it...and haven't, yet, come back.

The four new faces of employment

Friedman argues that in this newly flattened, globally connected world, workers will fall into four broad categories:

- **Creative creators** who do nonroutine work in distinctively nonroutine ways—the very best lawyers, accountants, doctors, entertainers, writers, professors and scientists
- **Routine creators** who do nonroutine work in a routine way—average lawyers, accountants, etc.
- **Creative servers** who do low-skilled, service work in inspired ways, whether that be a baker who comes up with special recipes and designs, or a nurse with extraordinary interpersonal skills
- **Routine servers** who do routine serving work in ordinary ways—nothing extra provided.

No one's job, he argues, is safe. Routine creators and servers, both who do average work and add no personal value, will be the first to go during any economic squeeze. And in a flattened world, we compete with people geographically and topically removed from us. New workers and new ideas from sectors and places that have no traditional connection to what we do are now positioned to seriously impact our lives.

The only answer: education

There is only one way, Friedman says, for any country, industry or individual to “square the circle” and benefit from the efficiencies of our new, flat world, yet still connect to decent-paying jobs: more innovation powered by better education. A healthy economy is one driven not just by greater efficiency, but also by people inventing more goods and services. Success will come from making others more comfortable, more productive, better educated, more entertained, healthier and more secure. To do that, we all need to be creative creators and creative servers. We need education and information that empowers us to invent new solutions and deliver service with extra passion, a personal touch and new insights.

In today's hyperconnected world, the rewards for those who can raise their educational achievement levels will be bigger than ever, while the penalty for those who don't will be harsher. We need tools and teachers that inspire us to start something new, add something extra or adapt something old, no matter where we are or what we do. Without them, Friedman argues, there can be no security—for individual workers, or entire nations. ●

“ The role of the reference librarian is now changing into the role of account manager. It's all about relationships, being a liaison, and making the connections with faculty and with students and with alumni.”

ACADEMIC LIBRARIAN

“ It's easy to look at technology and how quickly you could change it and forget how long it might take to change teaching methods—that range of created materials and expertise and dealing with a particular subject area and search methods over a number of years.”

ACADEMIC LIBRARIAN

Thomas L. Friedman is an internationally renowned author, reporter and columnist—the recipient of three Pulitzer Prizes and the author of five best-selling books, among them *From Beirut to Jerusalem* and *The World Is Flat*. Friedman is a member of the Brandeis University Board of Trustees and, since 2004, of the Pulitzer Prize Board. This essay was written by OCLC to introduce some of Thomas L. Friedman's ideas, and it reflects our interpretation of those ideas.

Three key challenges facing higher education and policymakers

BY ELLEN HAZELKORN

Our preoccupation with the relative standing of universities and national education systems—illustrated by the growing popularity and obsession with university rankings—reflects the consensus that **higher education is essential for economic growth, global competitiveness and a civil society**. Universities and nations are being measured according to indicators of global capacity and potential in which comparative and competitive advantages come into play. The more globalisation drives a single market in education, as it does in most goods and services, the more higher education is a beacon for investment and talent—the more this kind of barometer is inevitable.

Common factors influencing higher education

While each country and university faces particular and often unique challenges, there are common factors that affect most countries around the world today—issues that have become more acute since the global financial crisis in 2008. Let me focus on the three big challenges of the moment:

1. **Ensuring sustainable higher education systems** at the same time that public funding is decreasing and competitiveness is increasing
2. **Improving the quality of the total student experience** even as the demand for participation is growing
3. **Strengthening knowledge and innovation** as drivers of growth while ensuring that multi- and cross-disciplinary critical inquiry is maintained.

Ensuring sustainable education systems

The application of knowledge is now widely acknowledged as being the source of social, economic and political power. Studies repeatedly show the **strong correlation between educational attainment and social and economic advantages** for individuals and society. Over the last decades, access to higher education has expanded from being a privilege of birth or talent or both (elite phase), to a right for those with certain qualifications (mass phase), to being an obligation for the vast majority of society and occupations (universal). However, the financial crisis has exposed **fundamental weaknesses in the funding model** that underpins higher education.

“Formal education may be more expensive and less accessible to many people, and so we’ll see a move towards more adaptable forms of education—including online options—and libraries can play a role in that change.”

PUBLIC LIBRARIAN

The impact of the financial troubles in California on its public university system is symptomatic of problems around the world. Whether funded from public or private sources, escalating costs and tuition fees have prompted *The Economist* to suggest that higher education could be the next bubble (Schumpeter, 13 April 2011). At the same time, **higher education faces increasing competition** from China and India. What is the best way to sustain mass higher

education at a time of decreasing public funding and escalating global competitiveness? Can tuition fees continue to rise—and what are the implications for widening access to a more diverse student cohort? Are there **new business models or financial instruments** more appropriate to the new environment? What regulatory and governance frameworks would work best?

Improving the quality of student experience

The quality of higher education is coming under increasing scrutiny. If higher education is the engine of the economy, **governments are looking for verifiable and measurable evidence of benefit and impact.** Students, as consumers, are questioning the value-for-money of their study programme relative to the tuition fee that they pay, or to the institution's status and reputation. Evidence of quality and the pursuit of excellence have become the key mantra dominating higher education, inside and outside the academy. Rankings have emerged as a simple shorthand for students and the public to gauge quality—but **do rankings really measure what's meaningful?** What level of accountability is required? As participation widens beyond the traditional student cohort, how should pedagogical methods and modes of learning adapt? To enhance the quality of the total student experience, what barriers should be eliminated?

Elevating innovation

The rising prominence and obsession with global rankings have highlighted the investment attractiveness of nations based upon the capacity of their universities to produce new knowledge and lead innovation. In response, many countries have spearheaded a **review of their higher education systems.** The world-class research university has become the panacea for ensuring success in the global economy and world science. Kansas and Texas want to improve the performance of their universities because they are a magnet for investment; Sri Lanka has announced a strategy to upgrade six universities. Malaysia has a similar aim, and so do Nigeria, Denmark, France and Germany, to name just a few. However, many of these developments are leading to the **prioritisation of scientific and technological research over investment in the arts, humanities and social sciences.** Our societies face serious problems; unemployment is a major issue. But, at the time when scientific and social challenges require collaborative interventions from a multidisciplinary perspective, there is growing evidence that **simplistic economic indicators are being used to measure research quality.** These changes are impacting on and changing universities, often in perverse ways. As the emphasis shifts to translating knowledge more quickly into new products and services, how can we ensure that the breadth of intellectual inquiry required to underpin civil society is preserved?

Local change reflects global shifts

We often look upon changes within our universities as peculiar to them, a phantom of the management or the culture. But the changes being experienced are worldwide. It is no cliché to say that higher education and policymakers are facing major challenges. ●

“ There has been a profound change in terms of the kind of push for value and push for change in the way that the education sector does things, in a way that has more visible and tangible kinds of outcomes.”

ACADEMIC LIBRARIAN

“ The definition of what constitutes an academic research library is going to be harder and harder to quantify. Each one will need to look more closely at institutional needs and then respond by creating the library service, environment and collections that our university needs.”

ACADEMIC LIBRARIAN

“ I think how humanities fit in as a way of understanding globalization will influence libraries in the next few years. ‘STEM culture’ and heavy reliance on science and technology in the academy is now opening itself to a humanistic approach to understanding that culture.”

PROGRAM DIRECTOR

Professor Ellen Hazelkorn is Vice President of Research and Enterprise, and Dean of the Graduate Research School, Dublin Institute of Technology (DIT), Ireland; she also leads the Higher Education Policy Research Unit at DIT. She is a consultant to the OECD Programme on Institutional Management of Higher Education (IMHE), and is also associated with the International Association of Universities (IAU) and UNESCO. She is a member of the Higher Education Authority (Ireland). Professor Hazelkorn has been/is a member various governmental and international review teams, including the Committee on the Future Sustainability of the Dutch Higher Education System (2010); OECD review for the state of Victoria, Australia (2009), Catalonia, Spain (2010) and Wroclaw, Poland (2012), and the Finnish Higher Education system (2012–2015); and the German Excellence Initiative (2012). *Rankings and the Reshaping of Higher Education: The Battle for World-Class Excellence* was published by Palgrave Macmillan, 2011.

Big Data

Technically speaking, Big Data refers to data sets so large as to be unworkable using standardized, local database tools and software. The challenges of dealing with these incredibly large pools of data make them technologically awkward for many organizations. But for those able to leverage large information assets, the opportunities of Big Data—enabling new types of research, spotting and predicting social and natural trends, analyzing consumer behavior, providing customized service—may well prove worth the effort.

In the *Wired* magazine article, “The End of Theory: The Data Deluge Makes the Scientific Method Obsolete,” editor Chris Anderson argues that the “Petabyte Age,” as he calls it, “is different because more is different.” He makes the point that, with enough data, mathematics can do things like evaluate the relative value of a hyperlink, translate languages, win lawsuits, predict the spread of epidemics and perform other tasks that used to be relegated to the domains of theory and modeling.

For example, Sharmila Majumdar, a radiologist at University of California, San Francisco, is using Big Data techniques to analyze millions of x-rays of bones in order to better understand how they wear out from the inside. A 3-D scan of a single segment of bone can generate 30 gigabytes of data, and Majumdar’s lab often generates nearly a terabyte of data in an average day. The lab is able to combine information from many different bones in order to learn why some patients suffer severe bone loss but others don’t.

“We need to be data scientists. That’s different than either of the two cultures we currently come from, science and the humanities. Big data is different than either of these. It involves pattern seeking and the epistemology of data; creating models that are good enough to predict patterns without needing to understand all the underpinnings.”

PROGRAM DIRECTOR

Tim O’Reilly, the CEO of O’Reilly Media, agrees that Big Data is an important phenomenon. At the Strata “Making Data Work” conference in 2011, O’Reilly said that in the future, “...data is going to be the focus of competitive advantage.” O’Reilly points to the smartphone as an example in consumers’ lives: “When you pick [it] up and ask for directions, the information is not on the phone, it’s reaching out to a big database on the Internet... It’s based on where I am, in real time.”

This kind of value, he says, is more and more expected by users. Privacy of data, however, may be a concern. O’Reilly admits

that, “The utility of [these services] depend on you giving up privacy.” He says that “[companies will] want to build a platform on which people can build innovative interfaces and innovative tools so they can build more useful stuff with their data...then the market will address issues [like privacy].”

danah boyd, Senior Researcher at Microsoft Research, puts the privacy concerns of Big Data within a larger context of education, research and access. In her paper, “Six Provocations for Big Data,” she says, “How we handle the emergence of an era of Big Data is critical...current decisions will have considerable impact in the future.”

boyd presents some cautions about the use of Big Data, among which are privacy and access. She argues that just because data is available, using it isn’t necessarily ethical. She also points out that access to both large data sets and the skills necessary to parse them sets up a situation of “haves” vs. “have-nots,” where some organizations are better situated to take advantage of Big Data. As boyd says, “An anthropologist working for Facebook or a sociologist working for Google will have access to data that the rest of the scholarly community will not.”

An October 2011 *InformationWeek* article, though, suggests that pioneers at companies of many sizes are proving resourceful in terms of data mining. Writer/Editor Doug Henschen says that while “big data used to be the exclusive domain of corporate giants...now the challenge of quickly analyzing massive amounts of information is going mainstream, and many of the technologies used by early adopters remain relevant.” He predicts that while the technology for big data will get better, practitioners need to “exploit the tools you know...[since] big data isn’t getting any smaller.”

Whatever the concerns, the potentials of Big Data may simply be too promising to ignore. As Anderson states, “The new availability of huge amounts of data, along with the statistical tools to crunch these numbers, offers a whole new way of understanding the world.” ●

Companies, organizations and even countries around the world are recognizing the importance of collecting and analyzing massive amounts of data and the promises and potential breakthroughs the effort could provide.

The **National Institute of Informatics (NII) in Japan**, established in 2000, is building the Cyber Science Infrastructure (CSI) to connect a wide range of networks in order to collect and share the massive amounts of data being generated by society. Dr. Masao Sakauchi, Director General, says that the circulation and archiving of scholarly and research information will be a critical element in determining the international competitiveness of educational and industrial activities—and the single most urgent challenge for Japan.

NII is coordinating activities among universities, research institutes, industrial circles, government agencies and citizens throughout the country to advance integrated research and development of data-centric science. Among the projects that CSI is currently working on: the Science Information Network (SINET), the country’s largest and most advanced research and education network; the National Research Grid Initiative (NAREGI), an effort to develop grid infrastructure software used in large-scale, wide-area, dispersed computing environments; SSS-PC, a next-generation operating system designed to serve as the base software of dependable computing systems; and The Digital Silk Roads Project, which entails digitizing and preserving physical cultural resources and compiling digital archives.

For more information, visit www.nii.ac.jp/en.

Parabiosis and particularism: redefining the 21st century collection

BY JAMES G. NEAL

What is the 21st century library collection? Libraries of all types—national, public, academic, special, school, government—remain focused on their distinctive missions and the information needs of their diverse communities. But some powerful shared collection strategies are emerging. And content is evolving with some obvious and some speculative characteristics.

The concept of the “collective collection”—our current euphemism for the long sought but never realized coordinated collection development—is becoming real. Libraries are selecting, acquiring, synthesizing, servicing, archiving and owning publications together. “Open access” as a political objective is rapidly exploding into a vast array of widely discoverable and accessible public domain volumes, websites, orphan works and current scholarship.

“ The business models for data, content and software need to be changed, and libraries should take part in the negotiation of these models.”

ACADEMIC LIBRARIAN

We are realizing the advantages of digital information in library collections: it is more accessible and available, it is more current and searchable, it is more multimedia and linked, and it is more dynamic, interactive and collaborative. Digital content is also intimately conjoined with applications—the tools and functionality demanded by users—that let us more effectively mine, use, integrate and apply information. Semantically aware applications apply meaning. Geolocation and geotagging applications place information in space and time. Personal Web tools enable customized authorship

and management of content. Smart objects link the physical world with information. Games—as tools for learning and entertainment, with remarkable visualization and simulation capabilities—are ubiquitous. All enrich and challenge library collection development.

Our efforts are confronted by new formats like data, blogs, websites, learning objects and news feeds. Demand-driven rather than anticipatory acquisition is expanding. As collective, open and vendor-aggregated resources become prevalent, our focus is moving to the unique, the special and the local content. Given the remarkable array of available electronic resources, discovery—the ability to locate and use content regardless of format or source—is evolving as the dominant collection challenge. We also continue to face issues of affordability, as publishers seek new models to reflect use, value and the market.

The 21st century library collection:

Enables fresh approaches to library collaboration; an advance from “Kumbaya” to more fundamental cooperation. We need to unbundle redundant and inefficient library operations and service paradigms, and recognize the importance of scale and network effects through aggregation and advanced open architectures and systems.

Refocuses attention on institutional and collective responsibility for preservation and archiving of content. This includes the conservation of our traditional rare and special materials, and the long-term preservation of both materials digitized and born-digital information. The repository function is critical, guaranteeing persistence and integrity through policy-based curation and stewardship. We have shared solutions like Portico for electronic journals, HathiTrust for electronic books and the Library of Congress program for films and sound recordings. But new leadership is demanded as Web and social networking content calls out for continuing access and care.

Expands the focus on national and global information policies and laws that were formulated for an analog and stationary condition, and not for the electronic and dynamic and mobile modes of the post-digital library. This means expanded advocacy, agitation and political action around such policy areas as privacy, telecommunications, government information, intellectual freedom and copyright.

Provokes fresh thinking about library space. The focus is shifting from collection to user, from staff to technology. Learning space, social space, collaborative space and community space characterized by flexibility and adaptability are the priorities. An agile balance among function, usability and aesthetics is key.

Demands new approaches to the recruitment and development of staff. Individuals with diverse professional, technological, subject, service and interpersonal credentials and skills are needed. Qualities like communication and marketing, research and development, political engagement and influence, partnership and collaboration are more relevant, as library workers are present less in the physical library, and more out in the communities they serve.

Spawns new requirements for accountability and assessment. This aligns with enriched tools for collection and use analysis. Is our investment in content meeting user expectations and institutional mandates? Can we successfully employ new measures of satisfaction, market penetration, cost-effectiveness, usability and impact?

Library collection development is entering a period of parabiosis, of deep integration and interdependence; of polygamy, of multiple and intersecting relationships; and of particularism, of deep specialization and niche responsibility in the face of rampant shared and open resources. As a result, libraries are redefining the physical, expertise, organizational and intellectual infrastructure, and developing new approaches to the geography, the psychology and economics of originality.

Library collection development is being driven by four fundamental shifts. **Primal innovation:** creativity as an essential component of organizational and individual DNA. **Radical collaboration:** new, drastic, sweeping and energetic combinations across and outside libraries. **Deconstruction:** taking apart traditional axioms and norms, removing the incoherence of current models and concepts, and evolving new approaches and styles. **Survival:** persistence and adaption that focuses more on the “human” objectives of users—success, productivity, progress, relationships, experiences and impact.

Will 21st century library collections deliver on these expectations? ●

“ If you come to our library you see that most of the space is occupied by people behind workstations or laptops and there are almost no books left.”

ACADEMIC LIBRARIAN

“ Content management and distribution has traditionally been driven by shelving; magazines don’t fit on bookshelves, CDs and DVDs don’t work on magazine racks, and—oh my god—the maps! With content hybridization on the Web, the format no longer matters.”

INDUSTRY PUNDIT

“ Selectors or bibliographers are finding that when 70 percent of your collections budget goes to electronic journals, there is really not much selection left to do. But now they’re finding out that the Ph.D. they have in chemistry is actually coming in really handy because they have to sit down at a table with a faculty chemist and talk to her about her data needs.”

ACADEMIC LIBRARIAN

James G. Neal is Vice President for Information Services and University Librarian at Columbia University, providing leadership for university academic computing and a system of 22 libraries. His responsibilities include the Columbia Center for New Media Teaching and Learning, the Center for Digital Research and Scholarship, the Copyright Advisory Office and the Center for Human Rights Documentation and Research. Previously, he served as the Dean of University Libraries at Indiana University and Johns Hopkins University, and held administrative positions in the libraries at Penn State, Notre Dame and the City University of New York.

Big innovation requires big collaboration

Historical evidence suggests that really big breakthroughs—the ideas that shape our collective future—almost always occur in environments that promote sharing and cooperation. From laboratories to coffee shops, places where challenges, assumptions, criticism and hunches bump up against each other tend to be the spots where really new, exciting ideas are born. Whether a new idea comes out of a planned conference for experts in a particular field or the chance meeting of two eager, curious students, the benefits of sharing to the creative process are becoming better understood all the time.

Are we investing in places and systems where ideas can connect, multiply and flourish? Or are we—inadvertently or not—stifling the creativity of our scholars, students and citizens—and ourselves?

Ground zero for innovation: the conference table

What kind of environment creates good ideas? Ones that help their inhabitants explore the “adjacent possible”—a map of all the ways in which the present can reinvent itself. Not an infinite space or a totally open playing field. **But a place that grows as you explore its boundaries.** Environments that block or limit new combinations—by punishing experimentation, obscuring certain branches, or by making the current state so satisfying that no one bothers to explore the edges—will generate fewer innovations than environments that encourage exploration. Challenging problems, though, don’t define their adjacent possible in a clear, tangible way. **The trick to having good ideas is not to sit around in glorious isolation, trying to think big thoughts. The trick is to get more parts on the table.**

“ We can show the worth of libraries as a community space. Develop partnerships with local businesses, hire out space to start-ups, and stimulate local networking opportunities and links between businesses.

INDUSTRY PUNDIT

Looking at innovation on the scale of individuals and organizations distorts our view and creates a picture that overstates the role of proprietary research and “survival of the fittest” competition. **In the long term, openness and connectivity may be more valuable to innovation than competitive mechanisms.** When we embrace those patterns, we can build environments that do a better job of nurturing good ideas. We can think more creatively if we open our minds to

the many connected environments that make creativity possible. We are better served by connecting ideas than by protecting them.

For example, in the early 1990s, McGill University psychologist Kevin Dunbar studied innovation and invention among scientists by actually watching how they worked in their daily activities. He found that the most important breakthroughs didn’t take place in the heads of scientists alone in their labs, hunched over microscopes. Those eureka moments were rare. Instead, the most important ideas emerged during regular lab meetings, where a dozen or more researchers would meet to informally present and discuss work. **The ground zero of innovation wasn’t the microscope, but the conference table.**

The coffeehouse model

Shared environments like that provide a “third place” for ideas to bump up against similar but possibly unrelated information. The “coffeehouse model” of innovation has historical precedents as varied as the Enlightenment-era inventions related to electricity, insurance and democracy. Freud maintained a celebrated salon. The legendary “Homebrew Computer Club” of the 1970s sparked the personal computer revolution. In all of these cases, it wasn’t encouragement that led to creativity, but collisions—the kind that occur when different fields of expertise converge in some shared physical or intellectual space.

Research has shown that entrepreneurs with diverse, horizontal social networks are three times more innovative than those with uniform, vertical networks. Platform building is, by definition, a kind of exercise in emergent behavior whereby we try to encourage those kinds of collisions and connections. Platform builders don't just open a door in the adjacent possible. They build an entire new floor. **And, in a funny way, the real benefit of platforms lies in the knowledge you no longer need to have.** You don't need to know how to send signals to satellites or parse geo-data to send a tweet that circulates throughout the Web's ecosystem.

Like any complex social reality, creating innovation environments is a matter of trade-offs. Financial incentives will spur innovation, but also create barricades and secrecy, making it harder for open patterns of innovation to work their magic. The real test is how open markets, driven by finance, fare against nonmarketed networks. Most academic research today is of this nature; **new ideas are published with the goal of allowing other participants to refine and build upon them.** Most of the paradigmatic ideas in science and technology that arose in the past century have roots in academic research; open innovation creates a platform that commercial entities can then build upon.

Open platforms encourage innovation

The more that we can encourage open platforms over centralized bureaucracy, the better it will be for all of us, citizens, activists and entrepreneurs alike. The historic (and somewhat ironic) opportunity presented by the Internet is probably the clearest example of the way that public- and private-sector innovation can complement each other. The platform of the Web, created by a loose affiliation of information scientists and funded, in large part, by the U.S. government, created a space where countless fortunes have been made.

The patterns are simple, but followed together, they make for a whole that is wiser than the sum of its parts. Go for a walk; cultivate hunches; write everything down, but keep your folders messy; embrace serendipity; make generative mistakes; take on multiple hobbies; frequent coffeehouses and other liquid networks; follow the links; let others build on your ideas; borrow, recycle, reinvent. ●

“ We have the opportunity to use cloud computing to improve operations, save or redirect money and greatly facilitate collaboration among libraries.”
ACADEMIC LIBRARIAN

“ Our top opportunities come from the possibility of radical cooperation within our academic library consortium.”
COMMUNITY COLLEGE LIBRARIAN

“ Libraries can no longer embark on useful and impactful services alone. Without collaborative programs, useful and impactful programs are difficult and expensive to develop.”
LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

Steven Berlin Johnson has written books on subjects as varied as popular culture (*Everything Bad is Good for You*), the evolution of intelligent systems (*Emergence*), the role of Web browser design in our culture (*Interface Culture*), the London cholera epidemic of 1854 (*The Ghost Map*), and the history of early American science (*The Invention of Air*). The text above is based on his most recent book, *Where Good Ideas Come From: the Natural History of Innovation*. In it he explores the roots of creativity and what is required for an innovative environment. This essay was written by OCLC to introduce some of Steven Berlin Johnson's ideas, and it reflects our interpretation of those ideas.

Creating collective impact—tomorrow's strategy for successful nonprofits

In Leslie Crutchfield's book *Forces for Good*, and in a 2011 article for the *Stanford Social Innovation Review*, Leslie, Mark Kramer and John Kania outline how social organizations can work together to become what Leslie calls **catalytic agents of change**. It is no longer enough, they argue, for nonprofits to focus on either advocacy or service. Nor is it efficient for them to work separate from—and often in competition with—other nonprofit groups. To enact sustained, **collective impact**, mission-based organizations need to create effective interorganizational efforts that intertwine a variety of activities, stakeholders and goals.

The following essay is based on the work of **Mark Kramer, Leslie Crutchfield** and **John Kania** (Founder and Managing Director, Senior Advisor and Managing Director, respectively) of the Foundation Strategy Group (FSG), a nonprofit consulting firm specializing in strategy, evaluation and research.

The six practices of great social sector organizations

In *Forces for Good*, Leslie identifies six practices that high-impact nonprofits use to achieve extraordinary results:

1. **Advocate and serve:** provide great programs, but also advocate for resources, access, funding or legislation
2. **Make markets work:** build partnerships and leverage market forces to achieve social change on a grander scale
3. **Inspire evangelists:** treat volunteers as more than a source of free labor or dues; emotional experiences inspire loyalty and growth
4. **Nurture nonprofit networks:** devote time and energy to advancing a larger field and share wealth, expertise and power with peers
5. **Master the art of adaptation:** modify tactics as needed, respond to changing circumstances quickly, innovate constantly
6. **Share leadership:** distribute control throughout organizations and networks, empowering others to lead.

Wildly successful nonprofit organizations employ all, or a majority, of these practices. **Doing so creates momentum that fuels further success.** It is a relentless pursuit of results in the face of almost insurmountable odds that characterizes **social entrepreneurship** as opposed to nonprofit management.

Service meets advocacy

“Intrapersonal skills, entrepreneurial skills and consulting skills are just as important as skills with resource management, stewardship and traditional librarianship, and the combination of them is phenomenal and powerful.”

ACADEMIC LIBRARIAN

Most organizations in the social sector can be divided into two camps: direct service organizations that run programs in local communities, and advocacy organizations that raise public awareness and push for policy reform. Leslie's research shows, though, that **high-impact nonprofits engage in both direct service and advocacy.** They provide services that meet immediate needs, and help to reform larger systems—simultaneously doing both creates a virtuous cycle. Rather than causing the organization to lose focus or decrease its effectiveness, the two together can create impact that is greater than the sum of its parts—**the more they do of both, the more they achieve.**

Broad, cross-sector coordination creates collective impact

Two of Leslie's colleagues at the Foundation Strategy Group, John Kania and Mark Kramer, also stress that groups must work together, extending their reach across industries and sectors, building on the six practices above to create **collective impact that fosters real change**.

The social sector, they admit, is filled with examples of partnerships, networks and other kinds of joint efforts. But large-scale social change, they observe, comes from better **cross-sector coordination** rather than from the intervention of organizations within one industry or sector—an approach they call *isolated impact*. Most nonprofits try to find and fund solutions that are embodied within their own organizations, hoping that effective programs will grow or replicate to extend their impact more widely. As a result, nearly 1.4 million nonprofits try to invent independent solutions to major social problems, often working at odds with each other and increasing the perceived resources required to make meaningful progress.

John and Mark argue that five conditions are necessary to produce true alignment and lead to powerful results for groups looking to achieve collective impact:

- **A common agenda:** agreement on the primary goals for the initiative as a whole
- **Share measurement systems:** an agreement on solutions is illusory without consensus on how success will be measured
- **Mutually reinforcing activities:** not a uniformity of efforts, but coordinated, mutually reinforcing plans of action
- **Continuous communication:** years of regular meetings build experience and appreciation among participants, enabling them to see that their own interests will be treated fairly
- **Backbone support organizations:** the expectation that collaboration can occur without a supporting infrastructure is one of the most frequent reasons that collective efforts fail.

“ Leaders need the ability to build real, ‘hard’ partnerships.”
LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

“ The most important leadership skill for librarians is vision. Be someone who is prepared to take risks, who is a cultural entrepreneur.”
CONSULTANT

Sharing these basic ideals, diverse groups can come together and create widespread, meaningful change.

New perspectives on leadership

Collective impact requires a fundamental change in how funders—and leaders—see their roles. Those who truly support the agreed-upon goals of the participants need to see themselves more as **leaders of a long-term process of social change and less as sustainers of specific organizations**. Funders and leaders can no longer rely on solutions, no matter how innovative, that focus on narrow goals. If we are ever to address many of the large, important problems that face us today, we need to create and sustain cooperative processes. No single entity is responsible for any major social issue. It's time to realize that no single organization can provide a cure. ●

Leslie Crutchfield is an author, speaker and leading authority on scaling social innovation and high-impact philanthropy. She coauthored *Forces for Good: The Six Practices of High-Impact Nonprofits* (Wiley 2008). Her new book, *Do More Than Give: The Six Practices of Donors Who Change the World*, provides a blueprint for individuals, philanthropists and foundation leaders to increase their impact. **Mark Kramer** is co-founder and Managing Director of FSG and the author of influential publications on CSR, catalytic philanthropy, strategic evaluation, impact investing and adaptive leadership. **John Kania** is a board member and Managing Director at FSG with over 25 years of experience advising senior management on issues of strategy, leadership, assessment and organizational development. Mark and John co-authored the article, “Collective Impact” for the Winter 2011 issue of the *Stanford Social Innovation Review*. This essay was written by OCLC to introduce some of Leslie Crutchfield's ideas, and it reflects our interpretation of those ideas.

The shape of clouds: definitions and distinctions

In 2010, the European Commission on Information Society and Media (ERCIM) produced the white paper, “The Future of Cloud Computing: Opportunities for European Cloud Computing Beyond 2010.” In it, the editors, Keith Jeffery (ERCIM) and Burkhard Neidecker-Lutz (SAP Research) both describe the aspects of cloud computing that have garnered the topic so much interest, and examine the ways in which cloud computing might impact Europe—and the world at large.

Though the concept of “clouds” is not new, it is undisputable that clouds have proven a major commercial success over recent years and will play a large part in the Information and Communications Technology (ICT) domain over the next 10 years or more. Clouds are of particular interest not only with the growing tendency to outsource IT so as to reduce management overhead and to extend existing, limited IT infrastructures, but even more importantly, they reduce the entrance barrier for new service providers to

offer their respective capabilities to a wide market with a minimum of entry costs and infrastructure requirements. In fact, the special capabilities of cloud infrastructures allow providers to experiment with novel service types whilst reducing the risk of wasting resources.

“ In the near future, technical people won’t be monkeying around with hardware...they will be crafting services and shaping interfaces. This is a good thing; library technical talent can focus on a higher level of work.”

INDUSTRY PUNDIT

The characteristics of clouds

Cloud systems are not to be misunderstood as just another form of resource provisioning services and infrastructure. Multiple opportunities arise from the principles of cloud services and

infrastructures that will enable further types of applications and reduced development and provisioning time. Cloud computing has particular characteristics that distinguish it from more classical models.

Types of clouds

Cloud providers typically centre on one type of cloud functionality provisioning: infrastructure, platform or software/application, though there is potentially no restriction to offer multiple types at the same time. The following list identifies the main types of clouds:

- **(Cloud) Infrastructure as a Service (IaaS)** also referred to as Resource Clouds, provides managed and scalable resources, such as servers, storage and network, as services to the user. Examples include Amazon S3 and EC2, Savvis and Terremark.
- **(Cloud) Platform as a Service (PaaS)** provides computational resources via a platform upon which applications and services can be developed and hosted. PaaS typically makes use of dedicated APIs to control the behaviour of a server hosting engine that executes and replicates the execution according to user requests. Examples include: Force.com, Google App Engine and Windows Azure.
- **(Cloud) Software as a Service (SaaS) – Service and Application Clouds** offer implementations of specific business functions and business processes; i.e., they provide applications/services consumable by an end-user through the Internet without the need for additional software development or infrastructure deployment. Often, standard application software functionality is offered within a cloud. Examples include: Google Docs, Salesforce CRM and Microsoft Office 365.

Why choose to live in the clouds?

Since “clouds” do not refer to a specific technology, but to a general provisioning paradigm with enhanced capabilities, it is mandatory to elaborate on their **specific capabilities**. There is currently a strong tendency to regard clouds as “just a new name for an old idea,” but **there are concrete benefits associated with clouds** that are considered essential:

- **Elasticity is a core feature of cloud systems.** The capability of the underlying infrastructure to adapt to changing requirements (for example, amount and size of data supported by an application, number of concurrent users, etc.).
- **Agility and adaptability (on-demand) strongly relate to elastic capabilities,** including on-time reaction to changes in the amount of requests and size of resources, but also adaptation to changes in environmental conditions.
- **Cost reduction and pay-per-use.** The capability to distribute costs according to the actual consumption of resources moves computing from the usual capital, upfront investment model to an operational expense.
- **Improved time to market** is essential for enterprises that want to provide services quickly and easily with little delays caused by acquiring and setting up infrastructure.
- **“Going Green”** is relevant not only to reduce additional costs of energy consumption, but also to reduce the carbon footprint; clouds principally allow reducing the consumption of unused resources.
- **APIs and/or programming enhancements** are essential to exploit cloud features; past programming models require that developers take care of scalability and autonomic capabilities, while a cloud environment provides the features in a fashion that allows the user to leave such management to the system.

“ Technology must be the enabler, not the end product. If suitable uses can be found, then new technologies should be exploited. The cloud can assist libraries with collaboration and storage needs. It should also reduce the total cost of ownership for our software and hardware.”

ACADEMIC LIBRARIAN

“ There are obvious benefits of cloud computing. Timeliness and instant gratification are the norms of information services. Collections sources are huge and distributed all over. Gone are the days when you can store your collection within your libraries. Processing of the information to meet the needs of the customers is complex and hence systems and applications required are complex, sophisticated and expensive to develop. Applications services will be shared services. Shared services are the way to go for packaging information that will be useful and relevant to customers. Cloud services are the natural way to go for libraries.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

Moving skyward

Clouds offer the opportunity to build systems where data, software and expertise work together to help solve a broad array of problems in the government, social and business sectors. Clouds could assist greatly in the e-government agenda by providing information in one place to citizens, together with software to manipulate the data. Cloud models can be employed to provide an environment for new business models and expertise to ensure economic value creation. And new systems that automate cloud configurations even more efficiently will implicitly relate to aspects of Green IT.

Overall, there is a growing interest in cloud technologies, which provides a specific opportunity for Europe to participate in this global movement. It is clear that cloud computing in the widest sense presents opportunities for industry and academia to work together to develop appropriate technologies, economic models and legal structures. ●

The full report from the ERCIM is available at <http://cordis.europa.eu/fp7/ict/ssai/docs/cloud-report-final.pdf>.

OCLC Global Council: a world view on the library landscape

OCLC is owned, governed and guided by its members. Three Regional Councils (assemblies of OCLC members) work together to provide input and direction to OCLC and represent the needs and perspectives of their respective regions. The Regional Councils elect representatives to the OCLC Global Council. The Global Council is made up of 70 delegates and alternates from 19 countries. Comprised of leaders from academic, public, community college, national, research and special libraries, as well as library cooperatives, museums and archives, it is among the most diverse library governance bodies in the world.

A recent survey among Global Council delegates identified the challenges and opportunities they expect to face over the next 3–5 years and the initiatives they are currently pursuing as they seek to better serve the needs of their communities in a rapidly changing information landscape.

Assessing opportunities

The opportunities identified by delegates showed more similarities than differences, despite the diversity of representation across geography, institution types and sizes. The need for increased collaboration was a common theme. Delegates highlighted a number of opportunities for members of the library community to form **strategic partnerships** within their institutions, with other libraries and with other types of organizations, both public and private. Examples include statewide and national cooperative collection management efforts, partnerships with local businesses and joint initiatives with public service providers and government agencies.

“ Opportunity: Demand for resources delivered electronically, ubiquitously, seamlessly, obviously.”

PUBLIC LIBRARIAN

“ Opportunity: Cooperation with society, companies, firms, etc., will make the university visible and increase complementary funding.”

ACADEMIC LIBRARIAN

“ Opportunity: Focus on research investments driven by research-quality measurement programs.”

ACADEMIC LIBRARIAN

Changes in education and advances in technology are also creating opportunities for collaboration and new service development. The growth of e-learning, the use of social media in education, the emphasis on personalized educational experiences and the increasing importance of measuring program success and outcomes all create openings for the library to be more actively engaged in day-to-day research and teaching, delivering new value both to the institution and to the individual.

The **increasingly digital nature of collections and how they are delivered** is another important driver of change. Libraries of all types and in all geographies are focusing increasingly on **licensed materials, e-books and the digitization** of their unique items.

Delegates also recognized that the shift to providing **better and broader online access** to collections—both locally and globally—will accelerate the restructuring of physical collections and the redesign of physical spaces to better serve patrons, scholars and communities.

Responding to challenges

Delegates were clear that many of the opportunities before them are the result of a rapidly changing, and therefore challenging environment. Not surprisingly, the **tough economy and increasing budget pressures** were almost unanimously cited as the biggest challenge facing libraries. Budget cuts and restrictions as well as competition for funding were common across geography, library type and size. All of this brings with it increased **pressure for the library to prove its relevance and promote its value** to those who make and influence resourcing and funding decisions.

Other challenges that the delegates identified reflect the many ways that libraries are responding to the economy and the need to deliver new value. Delegates identified a number of **staffing challenges**—the need to reduce staffing levels, retrain staff for new programs, and hire for new skill sets.

Academic libraries will need to expand services to meet the **educational needs of an increasingly diverse population. Competing with other institutions** to attract top scholars while vying with other departments for space and funding will pose new demands on library directors and deans. Libraries of all types are **competing for attention with other providers of information services**.

As libraries adapt to the changing needs of their users and provide better and broader access to their collections, they are working to **keep pace with technological advancements** and **explore new strategic partnerships**.

“ Challenge: Higher education is being questioned as too expensive and not giving a good enough ROI for students.”

COMMUNITY COLLEGE LIBRARIAN

“ Challenge: Funding seems to be always inadequate. We’ll have to be innovative to do more with less.”

LIBRARIAN – NATIONAL, GOVERNMENT LIBRARY

“ Challenge: Proving relevance of a liberal arts education in a society that values quick solutions and rapid change.”

ACADEMIC LIBRARIAN

Building the future...together

The educational requirements of students and lifelong learners in an always-on, Web-connected world are very different than in decades past. The transition from print to electronic resources is happening rapidly and accelerating, while advances in technology such as cloud computing, mobile devices and social media have removed many of the barriers that previously limited access to information. Yet the Global Council delegates recognize that technology is only a means to an end—the ability to deliver on their collective mission to provide access to information, to preserve the record of human history, and to support the pursuit of lifelong education and scholarly excellence.

As the information landscape continues to evolve, libraries play a unique role in that landscape, driven by their shared purpose and values, not economic reward.

It is not yet clear what the true impact will be of the current economic reality. What are the long-term ramifications? And what will the library of the future look like? What is clear is that libraries around the globe are operating in an environment where change is now the norm, the need for funding and library advocacy go hand-in-hand, and libraries believe that they must build that future together. ●

“ Equity of access is critically important... We sometimes take for granted the things that are really important and our values are part of that.”

ACADEMIC LIBRARIAN

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Appendix C: Readings and sources

Crutchfield, Leslie. *Forces for Good: The Six Practices of High-Impact Nonprofits*. San Francisco: Jossey-Bass, 2008.

Friedman, Thomas L. *The World is Flat*. New York: Farrar, Straus and Giroux, 2005.

Friedman, Thomas L. and Michael Mandelbaum. *That Used to Be Us: How America Fell Behind in the World It Invented and How We Can Come Back*. New York: Farrar, Straus and Giroux, 2011.

Godin, Seth. *We Are All Weird: The Myth of Mass and End of Compliance*. Amazonencore 2011.

Hazelkorn, Ellen. *Rankings and the Reshaping of Higher Education: The Battle for World-Class Excellence*. New York: Palgrave Macmillan, 2011.

Jeffery, Keith and Burkhard Neidecker-Lutz [eds.]. "The Future of Cloud Computing: Opportunities for European Cloud Computing Beyond 2010." European Commission on Information Society and Media, 2010. <http://cordis.europa.eu/fp7/ict/ssai/docs/cloud-report-final.pdf>.

Johnson, Steven Berlin. *Where Good Ideas Come From: the Natural History of Innovation*. New York: Riverhead Books, 2010.

Kelly, Kevin. "Better Than Free: How Value is Generated in a Free Copy World." O'Reilly Tools of Change for Publishing conference. February 16, 2011, <http://www.toccon.com/toc2011/public/schedule/detail/17570>.

Kelly, Kevin. "Scan This Book." *New York Times Magazine*, May 2006. <http://www.nytimes.com/2006/05/14/magazine/14publishing.html?pagewanted=all>.

Kramer, Mark and John Kania. "Collective Impact." *Stanford Social Innovation Review*, Winter 2011. http://www.ssireview.org/articles/entry/collective_impact/.

Neal, James. "Parabiosis and particularism: redefining the 21st century collection," 2011.

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For updates and more information about
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